Professional Master’s Programs at Notre Dame
A report of the *ad hoc* committee established by Dean Gregory Sterling

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Executive Summary

An ad hoc committee was formed in early 2012 by Greg Sterling, former Dean of the Graduate School, to examine a broad range of issues related to professional master’s programs at Notre Dame. The committee had representatives from each of the four divisions of the Graduate School. The committee held a series of meetings with the Academic Affairs committee of the Faculty Senate, Deans Kilpatrick (Engineering) and McGreevey (Arts and Letters), Associate Dean Taylor (Science), the Directors of the four existing professional master’s programs, and the Graduate School Professional Development staff. An open forum was also held at a Directors of Graduate Studies meeting in November 2012. The committee investigated a series of questions in the following five broad areas: 1) the need for professional master’s programs; 2) the size of these programs; 3) quality; 4) operation and governance; and 5) finance. The report is structured around these categories and the questions that emerged in relation to these broad topical areas. The recommendations of the committee are as follows:

Recommendations: General need for professional master’s programs

1. Notre Dame should continue to entertain the establishment of professional master’s programs, but should ensure that the program helps advance strategic needs of the university as a whole.

2. Notre Dame should consider professional master’s programs in any field of study, not just science and engineering.

3. Programs need to develop specific metrics related to career placement and success, and program effectiveness needs to be judged on how well graduates of the programs meet these objectives. Programs should be regularly assessed as to their effectiveness.

4. Professional master’s programs need to be clear as to how they are helping advance the overall aspirations of Notre Dame.

Recommendations: Program size

5. Governing bodies of the university should monitor the number of professional master’s programs carefully to ensure that the university has the capacity to handle the new programs. The total number of professional master’s programs on campus must be a factor when considering new programs.

6. The target number of students in a program and its operating budget must be clearly defined and monitored.

7. While the total number of professional master’s students should have little impact on the student body dynamics, these students do require resources from support services on campus and provisions need to be in place to ensure that these resources are sufficient.
Recommendations: Program quality
8. Admission into professional master's programs should be handled just like admission into other graduate programs. The program should have broad latitude to determine which students to admit, with formal admissions handled through the Graduate School. Programs that require students to take Notre Dame graduate courses should require incoming students to take an appropriate graduate examination such as the GRE exam. Alternatives such as the MCAT or LSAT may be appropriate for some programs.

9. Programs need to rigorously track initial job placement and 5-year placement as well as other measures of program effectiveness. This information should be used to assess each professional master's program.

10. The Graduate School / Provost’s Office needs to set up a system to carry out regular and frequent assessments of the professional master’s programs. Mechanisms need to be put in place to terminate programs that are not meeting their stated objectives.

Recommendations: Operation and governance
11. Future professional master's programs should adopt the governance structure model found in Appendix II. The ESTEEM program should come under the administrative structure of the Graduate School, similar to the three other professional master’s programs.

12. Programs should establish a strong external advisory board of people in the fields their students are being trained for.

13. Instructors teaching in professional master’s programs must have relevant experience in the fields served by the programs. This can be achieved through use of professors of the practice or by ensuring that tenure track faculty have the appropriate background. Programs need to ensure that teaching in professional master’s programs does not result in an undue time burden on tenure track faculty.

14. Curricula for professional master's programs need to be defined and approved up front and degree audits need to be done to ensure compliance.

15. Students in traditional and professional programs will be mixed in classes, but admissions standards and prerequisites need to be clearly stated and administered such that the professional students will be successful in these classes. Student performance in these classes should be part of the program assessment to ensure that admissions policies are working.

16. From a student organization standpoint, professional master’s students should be treated the same as academic graduate students.
17. A working group should be created to establish a mechanism for the creation of dual degree programs that allow students to gain admittance to a PhD program and be assured that after completion of the PhD they will be admitted to the professional master’s program. The group should examine whether to allow concurrent enrollment in PhD and professional master’s programs.

**Recommendations: Finance**
18. Colleges that sponsor these programs should have complete financial control over revenue and costs. Each program should prepare a yearly financial report and share this with their advisory board and oversight committee. Transparency in finances will help allay fears that these programs are only being operated to generate revenue.

19. A cost accounting study should be undertaken to see what the incremental cost to the university is for professional master’s students, and if the 15% tuition recovery is appropriate. As part of this study, the service and infrastructure resources of the university most used by professional master’s students should be identified. This information should be included in proposals for any future programs.
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Recommendations: Finance

Appendix I – Charge to Committee

Appendix II – Governance Structure
1. Motivation

Greg Sterling, former Dean of the Graduate School, formed an ad hoc committee in early 2012 to examine a broad range of issues related to professional master’s programs at Notre Dame. The committee had representatives from each of the four divisions of the Graduate School. A copy of the charge to the committee is provided in Appendix I. A major motivation for establishing the committee was that Notre Dame had just approved a fourth professional master’s program, the Master of Science in Patent Law, or MSPL. The other programs are the Engineering, Science and Technology Entrepreneurship Excellence Master’s Program (ESTEEM), Global Health, and Applied Computational Mathematics and Statistics (ACMS). During discussions of the MSPL program proposal, several faculty asked whether Notre Dame had a long term strategic plan in place for the creation of these programs or whether instead each new program was being considered by itself. Other questions were raised, such as whether these programs would apply for affiliation with the Professional Science Master’s (PSM) organization, or whether Notre Dame intended to expand the scope of professional master’s programs outside science and engineering. Motivated by these and other questions, the committee was charged with exploring a wide range of topics pertaining to professional master’s programs. Five specific issues were raised in the charge, which are summarized below:

1) Is the degree adequate to do what it is intended to do, which is to provide additional technical training to enable graduates to obtain jobs they would otherwise not be qualified for with a bachelor’s degree?

2) How important, both from a local and global perspective, is it for Notre Dame to be offering this type of training?

3) What are the most important motivations for the creation of these programs?

4) What should the relationship be between these programs and Notre Dame’s research enterprise?

5) What mechanisms should be in place to safeguard quality and to ensure that the programs are successfully reaching their goals?

The committee had access to a wide range of materials, including the four proposals used to establish the existing professional master’s programs, a book published by the Council of Graduate Schools entitled “Professional Science Master’s: A Council of Graduate Schools Guide to Establishing Programs,” and extensive data from the PSM organization. After reviewing these materials, the committee met on February 22, 2012 and developed a list of specific questions to explore. These questions, which form the sub-headings of the sections below, fall within six broad topical areas and encompass all of the issues raised by Dean Sterling in his charge to the committee. These topical areas form the basis for the next six sections of this report.
Starting in March 2012, the committee held a series of meetings with the Academic Affairs committee of the Faculty Senate, Deans Kilpatrick (Engineering) and McGreevey (Arts and Letters), Associate Dean Taylor (Science), the Directors of the four existing professional master’s programs, and the Graduate School Professional Development staff. An open forum was also held at a Directors of Graduate Studies meeting in November 2012.

Based on these conversations, the committee drafted brief statements in response to each of the questions generated in the February 2012 meeting. These responses attempt to frame the various issues and give a sense as to what the prevailing views are of the different groups the committee met with. Often there was broad consensus on a question, while for some issues there was sharp disagreement between parties. At the end of each section, the committee makes a series of recommendations for how to proceed on each major topic.

### 2. Broad questions related to the need for these programs

#### 2.1 Should Notre Dame even offer professional master’s programs?

There was general consensus that these programs should be offered by Notre Dame. They were viewed as beneficial to Notre Dame in a number of areas, with the caveat that the programs must be properly designed and executed. While some concerns were raised that the more “practical” nature of these programs could be perceived as being in conflict with the more “academic” orientation of Notre Dame’s graduate programs, most people acknowledged that these programs can be helpful to our students and faculty, can be supportive of the mission of Notre Dame, and can help boost research programs and the economic climate of the community. The evidence suggests that academic quality and professional master’s programs can coexist, given the fact that many of the top research universities in the nation have professional master’s programs, including the University of Chicago, Columbia University, Stanford University and Cornell University (among many others).

In addition to the question of whether Notre Dame should offer such programs, a larger question was raised as to the motivation for creating these programs. Again, there was broad consensus that proposers of new professional master’s programs need to state clearly why they want to create a particular program and that this should in some tangible way be connected to the advancement of the university. It is not enough to simply create a program because it can be made financially viable. There must be some compelling reason for starting a new program. For example, the program could be a good fit for the mission of the university, it might help expand and improve research and graduate education in related programs, or it might help improve the economic and business climate of the local area.
2.2 Should these programs be focused mainly in science and engineering or should they be open to all disciplines?

Much of the emphasis on professional master’s programs over the past decade has been on professional science master’s (PSM) programs. Certified PSM programs are designed to have a core of advanced disciplinary courses, much like a traditional master’s program. In addition, they have learning activities designed to develop professional knowledge and skills, an external advisory board, team-oriented projects and an internship. They typically take two years to complete. None of the professional master’s programs at Notre Dame are designed around this model. There was a good deal of enthusiasm among the people the committee spoke to for creating professional master’s programs outside traditional science or technical areas. Examples include programs aimed at museum administration or perhaps patterned after the University of Chicago’s master’s programs on national security and liberal studies.

2.3 Since these are professional programs, they should meet certain career needs. How important is it that students from the program are prepared for careers and how should success in meeting this be measured?

The distinction between a professional master’s degree and an academic master’s degree was addressed many times in the discussions the committee had with various groups on campus. For the purposes of this report, a professional master’s degree is a tuition-bearing terminal degree program designed to give students specific skills and training that will enable them to enter the workforce in a particular area right after graduation. By definition, then, it must prepare students for the workforce. Therefore, one of the measures of success must be how well a program places its graduates in positions appropriate for their training. Do graduates get jobs? More importantly, do they get better jobs than they would otherwise get with their bachelor’s degree, and in the particular area emphasized by the program? One of the measures of success used in evaluating the MSPL program is the pass rate on the patent examiner exam. For ESTEEM, it might be the percentage of students who end up starting new companies. These measures are extremely important and need to be used in assessing program effectiveness. Success also needs to be measured in relation to the effectiveness of the programs in meeting the rationales that were used for establishing the program in the first place.

It was pointed out that “education is not placement, and faculty know education”. Therefore, professionals familiar with the target industry or field need to be available to help with placement, and programs need to plan for this. This could be a role fulfilled by an advisory council.
2.4 Do these programs need to contribute to Notre Dame’s prestige, reputation and academic aspirations? If so, how can they? If not, why not?

Some of the people the committee talked with had a sense that the whole notion of a professional master’s programs was in conflict with the aspirations of a world-class research university. Many of the PSM programs tend to be at schools that are not highly thought of as research institutions. Some of the programs are very applied and focused on job training, which can be at odds with the broader educational focus found in the best PhD programs. On the other hand, many highly ranked research universities have large offerings of professional master’s programs. For example, Duke, George Mason, George Washington, Dartmouth, Stanford, Berkeley, Northwestern, Cornell, MIT, Columbia, Johns Hopkins, and USC all have professional master’s of engineering management programs. As mentioned above, Columbia and Chicago have professional master’s programs in the humanities and social science areas, and of course, Notre Dame has had professional master’s programs in the Mendoza College of Business for a long time. Therefore it is empirically false that a great research university cannot have professional master’s programs. Rather, what the committee heard from many different groups was that the quality of the program has to be consistent with the aspirations of the university as a whole. The issue of program quality is addressed in Section 3. Here it is simply pointed out that, if done rightly, professional master’s programs do not necessarily detract from the academic reputation of the university.

In terms of contributing to Notre Dame's prestige, reputation and academic aspirations, it remains unclear whether professional master’s programs will do this in a direct way. It was noted, however, that there are many indirect benefits that existing graduate programs can derive from professional master’s programs, which would help advance Notre Dame. One obvious way is financially. Revenue from professional programs can be used to help support other activities in Colleges that have a more direct impact on academic reputation. As noted above, however, finances cannot be the raison d’être of a program. Other ways in which it was noted that professional master’s programs can help existing graduate programs is through helping fill graduate classes in small programs. For example, it was noted that if enrollments increased in some Arts and Letters graduate programs, it could help some programs by leading to a more predictable PhD curriculum and enabling them to offer more graduate classes. Others noted that technology commercialization support provided by ESTEEM and MSPL helps advance the research efforts of Science and Engineering, though it was also argued that this should be the job of the Technology Transfer Office and should not be the domain of master’s students.

**Recommendations: General need for professional master’s programs**

1. Notre Dame should continue to entertain the establishment of professional master’s programs, but should ensure that the program helps advance strategic needs of the university as a whole.
2. Notre Dame should consider professional master’s programs in any field of study, not just science and engineering.

3. Programs need to develop specific metrics related to career placement and success, and program effectiveness needs to be judged on how well graduates of the programs meet these objectives. Programs should be regularly assessed as to their effectiveness.

4. Professional master’s programs need to be clear as to how they are helping advance the overall aspirations of Notre Dame.

3. Questions Related to Program Size

3.1 How many of these programs should Notre Dame create? Is there a limit?

Each professional master’s program requires staff, faculty, and infrastructure resources. There was broad consensus that, given the overall size of Notre Dame and the small number of academic graduate programs on campus relative to our peers, there should not be a large number of professional master’s programs. Most universities that have formally recognized PSM programs have one or two such programs. Also, given that the existing programs aspire to have anywhere from 10-50 students, having a large number of such programs would fundamentally reshape the makeup of the graduate student body and require an increase in support services. The committee is not able to state exactly how many programs should exist, but this issue should be examined when new programs are proposed.

3.2 Who should decide how big these programs are? What measures should be used to make this decision?

The financial viability of professional master’s programs is intimately tied to its size. All operational expenses must be covered by tuition paying students. Based on the existing Notre Dame programs, it appears that programs like ACMS that are highly integrated within a departmental infrastructure have the lowest overhead and can be viable with as few as 10 students each year. Other programs that are designed to be more independent of departments need 30 or more students to cover costs. The MSPL program has a goal of 50 students per class, but the financial “break even” point is less than this number of students. The directors of the four existing Notre Dame professional master’s programs all commented on the importance of recruiting and publicity, and that this was one of the most challenging aspects of starting the program. It can take three or more years for a program to fully “ramp

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1 As of November 2012 there were 293 recognized PSM programs at 127 different institutions.
up.” When a program is being designed, the budget and target number of students should be spelled out very clearly. It must be demonstrated that there are faculty resources to teach the students as well as adequate space. Once a program is up and running, the size of the program needs to be monitored and adjustments made to ensure that it maintains viability without compromising quality. The committee heard from several different constituencies that there is a danger of these programs becoming “cash cows” such that the temptation will be to allow the programs to grow at the expense of student quality and to the detriment of other programs. Safeguards need to be in place to guard against this.

3.3 How many professional students should Notre Dame have relative to more traditional doctoral students? Relative to undergraduates? Is there a limit?

When the current professional master’s programs are at full strength, there will be on the order of 100-150 students in these programs. By way of comparison, there are about 8,500 undergraduate students, 560 Law students, 340 MBA students and 2,000 “academic” graduate students. Thus there does not appear to be any danger of these students fundamentally changing the balance of the student population. It was noted by staff in various support units, however, that since these students are here for only one year, they tend to take up a disproportionate share of resources for things like career and professional development services. For example, last year there were 45 separate visits by ESTEEM students to the Career Center. Oversight is needed to ensure that as these programs grow, the support structures of the university are able to accommodate the increased demand. More on this subject is given in Section 6.

Recommendations: Program size
5. Governing bodies of the university should monitor the number of professional master’s programs carefully to ensure that the university has the capacity to handle the new programs. The total number of professional master’s programs on campus must be a factor when considering new programs.

6. The target number of students in a program and its operating budget must be clearly defined and monitored.

7. While the total number of professional master’s students should have little impact on the student body dynamics, these students do require resources from support services on campus and provisions need to be in place to ensure that these resources are sufficient.
4. Program Quality

4.1 Who should have oversight on admissions and what standards should be applied?

The consensus was that individual programs should have the ultimate responsibility for assessing the quality of the students they admit. Thus the professional master’s programs should operate much like other graduate programs whereby they review applicants and make admissions decisions. Like other graduate programs, the Graduate School would make the official admission offer and would coordinate the student application process, but would generally defer to the judgment of the programs regarding who to admit. With the exception of ESTEEM (which is technically outside the Graduate School), all of the existing professional master’s programs currently operate in this manner and utilize the Graduate School’s online application and admissions system.

In terms of admissions requirements, there were differences of opinion. Some called for greater flexibility, stating that the nature of professional programs is fundamentally different from academic programs, and so traditional academic standards such as grades and GRE scores are not always the best indicators of student quality. Others expressed concerns that without rigorous requirements, standards would be compromised. For example, many faculty the committee spoke to stated that GRE exams should be required, especially if students would be taking classes alongside other graduate students. The committee agrees that admissions into these programs should be left to the discretion of the programs and that it is important to have flexibility. For those programs that will have their students taking graduate courses alongside other Notre Dame graduate students, however, it is not unreasonable to require entering students to take the GRE or equivalent exam such as the LSAT or GMAT and to factor the scores on this exam into the admission decision. Under unusual circumstances, the exam requirement could be waived upon consultation with the Graduate School. Examples of when this might be appropriate are when an applicant has an undergraduate degree from Notre Dame and the admitting program is very familiar with the academic abilities of the student or if the student already has an advanced graduate degree.

4.2 How should program effectiveness be measured?

As mentioned in Section 2.3, a key measure of the effectiveness of a professional training program is whether or not graduates of the program obtain good jobs in their field of study. Therefore systems should be in place to track initial and 5-year placement of all students in the program, just as is done with academic graduate
programs. Programs may have other metrics that they wish to consider, such as pass rates on professional exams or entrepreneurial activity; these should also be tracked and used in determining the effectiveness of a program. This is all part of program assessment, addressed in Section 4.3.

4.3 How should program assessment be handled?

Nearly everyone the committee spoke with mentioned the importance of having regular assessments of these programs by an entity outside the program and sponsoring College(s). Moreover, because of the short cycle time of the students in these programs, the assessment should be done more frequently than the typical ten-year cycle that the university uses for academic programs. For some programs, this could be the role of an external advisory board. The assessment plans of the existing programs vary greatly, as might be expected given their different objectives.

The assessment strategy adopted by ESTEEM is as follows:

(15) Program review

All new programs will be subject to a regular schedule of reviews. Provide a statement of assessment strategy.

Our assessment strategy consists of the following components: (1) number of students enrolled; (2) selectivity, yield, quality of students (GRE, GPA); (3) assessment of curriculum and courses (CIF); (4) outcome: start-ups and placement of students; (5) number of inventions/ products launched; (6) external review once every five years.

For Global Health, a very similar assessment strategy was approved:

(14) Program Review

All new programs will be subject to a regular schedule of reviews. Provide a statement of assessment strategy.

Our assessment strategy consists of the following components. (1) number of students enrolled; (2) selectivity, yield quality of students (GRE, GPA); (3) assessment of curriculum and courses; (4) outcome: placement of students; and (5) external review every five years. A client advisory board will be engaged to provide advice on the relevancy of the program to the global health endeavor and potential employers of graduates.

For ACMS, the assessment plan follows that of a more traditional department and is as follows:
Finally, the assessment strategy of MSPL is much more extensive than the other programs. It is reproduced below.

We have crafted the program based on conversations with many practicing patent professionals. We have talked to patent attorneys, patent agent, and senior administrators at the US Patent Office. In that sense, the program has been created under a process of “outside review” from experts in the field. (See attached letters of support from practicing patent professionals NB The program was originally entitled “Legal STEPS”. After conversations with John Cavagnini, and in deference to the existing “STEP” theological program, we have changed the name to Master’s in Patent Law. All of the letters of support however, still reference the “Legal STEPS” designation.)

Because this program will be among, if not the first, of its type, we are not aware of an appropriate outside reviewing body to address legal curricular content on an ongoing basis. As discussed below, we will pursue Professional Science Master’s (PSM) status from the Council of Graduate School. This designation, however, is more geared toward assessing overall curricular organization than to assessing the quality of specific curricular content. We will, therefore, also conduct yearly internal reviews with the program’s Council of Deans and a small group of outside advisors. Every third year a more comprehensive review will be undertaken. The program will convene a group consisting of a representative from the program (the Director, Assistant Director, or an affiliated Dean), an outside academician who teaches patent law; at least two outside patent attorney or patent agent, representing both law firms and R&D companies; and a leadership member from the US Patent Office. This committee will evaluate the curricular offerings and various program metrics. Metrics can include but are not limited to: number and quality of applicants, number and quality of enrolled students, placement of graduates, Patent Bar pass rate, the program’s effect on Notre Dame (percentage of applications drafted by program students which are filed with the Patent Office, any effect on the Office of Technology Transfer’s workflow), and the program’s effect on the South Bend community (startup companies based on Technologies handled by program students, including number of jobs created).

We will additionally apply for certification as a PSM within the first three years of the program’s existence. The program already has many of the components required for certification as a PSM built into its content. In particular, supervision of the capstone project by a program faculty member and an outside employer in the field is a required, and sometimes difficult to meet, component of our curriculum already. Because this is one of, if not the, first program of its kind, we are also willing to disseminate a manual of best practices and participate in crafting a governing body, should similar programs be created that follow our model.
Each of these assessment strategies was approved by the governing entities of the university, though it is not entirely clear who is charged with making sure the assessments are actually carried out and what to do with the information. The committee thinks this would be a good role for the Graduate School. Having a common assessment protocol for all professional master's programs is one reason why we recommend that ESTEEM adopt a similar administrative governance structure as the other professional master’s programs (see Section 5.1). Programs that are meeting or exceeding their objectives should continue, but mechanisms need to be put in place to close programs that are ineffective.

**Recommendations: Program quality**

8. Admission into professional master's programs should be handled just like admission into other graduate programs. The program should have broad latitude to determine which students to admit, with formal admissions handled through the Graduate School. Programs that require students to take Notre Dame graduate courses should require incoming students to take an appropriate graduate examination such as the GRE exam. Alternatives such as the MCAT or LSAT may be appropriate for some programs.

9. Programs need to rigorously track initial job placement and 5-year placement as well as other measures of program effectiveness. This information should be used to assess each professional master's program.

10. The Graduate School / Provost’s Office needs to set up a system to carry out regular and frequent assessments of the professional master’s programs. Mechanisms need to be put in place to terminate programs that are not meeting their stated objectives.

**5. Operations and Governance**

**5.1 Should there be a university oversight structure?**

In 2010, Dean Sterling worked with the Deans Crawford and Kilpatrick on a draft governance structure document for professional master's programs. This document is included as Appendix II to this report. It is unclear to the committee whether this document was ever officially approved by the university, but reference was made to this document in program proposals for Global Health, MSPL and ACMS. ESTEEM’s governance structure was set up differently, and consists of an executive committee of the sponsoring Collegiate Deans and the Dean of the Graduate School. Moving forward, it would be desirable to have a uniform governance structure for all programs. The governance structure in Appendix II (or a similar structure) should be formally approved for all professional master's programs.
5.2. Should there be an external advisory board?

The Global Health program proposed to establish a client advisory board to provide advice on the relevance of the program. ACMS proposed to establish an external advisory group of people in industry. The MSPL program proposed to do yearly reviews with the Deans and a small group of outside advisors, while every three years a more extensive group of people outside the program would conduct a review. Currently, ESTEEM does not have any outside advisory structure, though they do work with Innovation Park at Notre Dame. Given that these are professional programs, it is important for programs to seek advice from among professionals in the fields their students are being trained for. Based on the feedback given to the committee and the practices of other successful programs around the country, a strong external advisory board is an important element for a successful program.

5.3 Should the programs be staffed by professors of the practice, tenure track faculty, or some combination?

Each of the existing programs utilizes a mix of staff, special professional faculty / professors of the practice and tenure track faculty. Different programs will have different needs, but every program should have a significant fraction of staff with relevant practical experience in the field. These programs should not require large investments in time from tenure track faculty, whose primary responsibilities lie with the traditional academic programs.

5.4 How should courses be set? Can students enroll in any graduate course or only program courses (and those cross-listed)?

Notre Dame guidelines stipulate that a minimum of 30 credits are required to obtain a master’s degree. Each program must define its curriculum and have this approved. This is best handled by the individual programs.

5.5 Should students in these programs be separated in classes from other graduate students or should they be mixed?

All four existing programs utilize existing graduate courses for their students. This is necessary for the programs to be financially viable, given the costs associated with hiring sufficient staff to independently teach all the courses in the curriculum. As noted above, having professional and academic graduate students in the same class can be beneficial as it can help expand the number of course offerings a department can make by getting a critical mass of students in a class. Professional students also bring a different perspective to the class, which can enhance the learning of everyone. If, however, the professional students do not have the proper background of prerequisites for a particular class, their presence will detract from the learning
of other students. The background, preparation and performance of professional master’s students in graduate courses should be tracked and used in program evaluation. If professional master’s students are not performing well in classes, then admissions policies need to be changed or the program needs to separate its students from other graduate students.

5.6 How should these students be treated in terms of professional development programming, membership in GSU, etc.?

This issue did not come up much with the people the committee talked to, probably because the committee did not formally talk with graduate students. From informal discussions with students, however, we know that this is an important issue with students. Professional students in the Law School and the MBA program have their own institutions and identities and do not necessarily feel an association with academic graduate students. The professional master’s students are a little different, because they take classes with academic graduate students and are often closely associated with a department. Many professional master’s students consider themselves to be “graduate students” and current university policy is to extend the same benefits to them as are extended to other graduate students. Currently, students in ACMS, Global Health and MSPL receive the same benefits as other academic graduate students. Because the ESTEEM program is not formally part of the Graduate School administrative structure, its students do not receive all the benefits other graduate students get, such as professional development support (although the committee was told that ESTEEM students are never turned away when they ask for these services) and they do not participate in the Graduate School commencement ceremony. Administratively, it makes sense to extend the same benefits to professional students as are extended to all other graduate students and for the administrative structure of ESTEEM to mirror that of the other programs.

5.7 Should existing graduate students be allowed to enroll in professional master’s programs?

This was one of the most contentious issues the committee encountered. Some PhD students have expressed interest in concurrent enrollment in a professional master’s program, mainly MSPL and ESTEEM. Currently, one PhD student is concurrently enrolled in the ESTEEM program and another PhD student is set to enroll in the MSPL program upon completion of their PhD. Among the arguments in favor of concurrent enrollment are that it is good for the student, that having this option will help recruit better graduate students into the PhD programs, that having students in a research group with more professional skills will help the group as a whole, and that we already allow PhD students to pick up an academic master’s degree along the way toward their PhD. Several people argued that as long as the advisor who is paying the stipend thinks it is a good idea, then it should be allowed. Liz Rulli was consulted and stated that concurrent enrollment does not violate any
federal agency funding guidelines. Arguments against allowing concurrent enrollment are that students will be distracted from their thesis research, that time to degree will increase, that as soon as students finish their master's degree they will drop out of the PhD program, and that the longstanding policy of the graduate school is that students on a stipend are expected to dedicate full time to the pursuit of their degree. It was noted that there are several universities that combine PhD programs with professional degrees, most notably PhD/MD programs, but also PhD/MBA programs. In all the cases the committee is aware of, the student focuses on one degree program at a time and does not enroll concurrently in either program. Given the many conflicting viewpoints on this question, the committee believes that the topic requires further study. There is no disagreement on allowing students to first obtain a PhD and then obtain a professional master's degree, and so this type of dual degree program should be pursued and a working group formed to establish guidelines. The working group should also address the question of whether students should be allowed to pursue a PhD and professional master's degree concurrently and, if so, what the policies and guidelines should be.

**Recommendations: Operation and governance**

11. Future professional master's programs should adopt the governance structure model found in Appendix II. The ESTEEM program should come under the administrative structure of the Graduate School, similar to the three other professional master's programs.

12. Programs should establish a strong external advisory board of people in the fields their students are being trained for.

13. Instructors teaching in professional master's programs must have relevant experience in the fields served by the programs. This can be achieved through use of professors of the practice or by ensuring that tenure track faculty have the appropriate background. Programs need to ensure that teaching in professional master’s programs does not result in an undue time burden on tenure track faculty.

14. Curricula for professional master’s programs need to be defined and approved up front and degree audits need to be done to ensure compliance.

15. Students in traditional and professional programs will be mixed in classes, but admissions standards and prerequisites need to be clearly stated and administered such that the professional students will be successful in these classes. Student performance in these classes should be part of the program assessment to ensure that admissions policies are working.

16. From a student organization standpoint, professional master’s students should be treated the same as academic graduate students.
17. A working group should be created to establish a mechanism for the creation of dual PhD / professional master’s programs that allow students to gain admittance to the PhD program and be assured that after completion of the PhD they will be admitted to the professional master’s program. The group should examine whether to allow concurrent enrollment in PhD and professional master’s programs.

6. Finance

6.1 Should these be revenue producing, revenue neutral or subsidized by the university? If these programs generate revenue, should there be guidelines for how the revenue is used? Who is liable in the case of financial failure and who gets the funds if the programs succeed?

Everyone the committee spoke to stated that these programs have to at least be revenue neutral, and ideally will generate some revenue that can be put back into academic programs. Based on the models of the existing programs and experiences nationwide, however, sponsoring Colleges should not expect that these programs will become sources of significant revenue. In addition to being unlikely, revenue maximization should not be the main consideration when structuring these programs. The governance structure provided in Appendix II recommends that the Deans who are responsible for the programs have financial responsibility for the programs. That means they must make up for shortfalls, but that they can use surplus revenue at their discretion.

6.2 How much “overhead” should the university and other bodies (i.e. the Graduate School, programs who teach a number of these students) charge for the services they provide?

One of the repeated comments the committee heard was that the true cost of these programs must be accounted for and covered by the programs. Aside from direct costs like staff salaries and supplies, there are a number of “hidden” costs associated with these programs, including increased demand for student housing, parking, and classroom space. More students on campus means that there are added demands on support services such as the Career Center and the Graduate School. Finally, there will be added demands on faculty time and effort. Programs need to be fully cognizant of the true costs of their activities and identify how those costs will be covered.

Current policy is that the university recovers 15% of base tuition and the programs keep the remaining 85% of the tuition revenue generated. The committee was unable to find the basis for the 15% return to the university, nor is it clear if these funds get specifically designated to go to programs in support of these students or if
they go back to the general operating budget. The governance structure in Appendix II recommends that the Graduate School recover nominal fees for services rendered in support of the programs.

**Recommendations: Finance**

18. Colleges that sponsor these programs should have complete financial control over revenue and costs. Each program should prepare a yearly financial report and share this with their advisory board and oversight committee. Transparency in finances will help allay fears that these programs are only being operated to generate revenue.

19. A cost accounting study should be undertaken to see what the incremental cost to the university is for professional master’s students, and if the 15% tuition recovery is appropriate. As part of this study, the service and infrastructure resources of the university most used by professional master’s students should be identified. This information should be included in proposals for any future programs.
Appendix I – Charge to Committee

Charge to the PSM Committee

Committee Members: Don Howard (Humanities), Ed Maginn (Engineering and Chair), Dave Severson (Science), and Christina Wolbrecht (Social Sciences).

Rationale

In 1995 the Committee on Science Engineering and Public Policy (COESEPUP) of the National Academies released “Reshaping the Graduate Education of Scientists and Engineers,” calling on universities to rethink the training of graduate students in the STEM disciplines to include more training in communication, more experience in teamwork, and more internships. In the same year S. Tobias, D.E. Chubin, and K. Aylesworth published Rethinking Science as a Career in which they questioned whether a doctorate was necessary for many careers and urged the creation of a new master’s degree. These recommendations found positive responses two years later (1997) when the Keck Foundation provided $50,000,000 to establish the Keck Graduate Institute of Applied Life Sciences within the Claremont Colleges Consortium and the Sloan Foundation provided funding to two research universities to establish three new professional master’s degrees at each institution (with $125,000 per degree program). The Sloan Foundation expanded this to include other universities with seed funding until 2004. In 2001, the Council of Graduate Schools began a partnership with the Sloan Foundation and oversaw the extension of these programs to “master’s focused” colleges and universities (2001-2005). In 2003-2004, the Sloan Foundation began working with university systems to promote the PSM degree. In 2006-2007, the Sloan Foundation funded the creation of the National Professional Science Master’s Association (NPSMA) to support PSM programs. In 2007, Congress passed the America COMPETES Act that authorized NSF to provide grants to create or sustain PSM programs. The following year (2008), the National Research Council issued a report, “Science Professionals–Master’s Education for a Competitive World,” that endorsed the PSM degree. In 2010, the CGS convened a year-long study to formulate guidelines for the degree. Today, there are 246 recognized PSM programs covering 11 different fields of study in 114 universities (www.scientemasters.com). The eleven fields are: biology/biotechnology (75 programs), environmental sciences (52), mathematics and statistics (23), computational sciences (23), computational molecular biology (19), physics and geological sciences (18), medical related sciences (15), chemistry (12), forensic sciences (5), nanoscience (3), and national defense (1).

These programs have only recently been established at the University of Notre Dame. The first was the ESTEEM program. In more recent years we have established professional master’s degree programs in Applied and Computational Mathematics and Statistics, Global Health, and Patent Law. None of these programs has the official PSM designation, although I have urged them to apply. Global Health is in the process of applying. The creation of these programs has raised concerns for some
faculty about the nature and value of the programs. It is against this background that I have appointed the committee.

**Charge**

The committee is free to explore the entire range of issues related to the PSM and related degrees, but I would like for you to report on at least the following aspects of the programs.

First, is this degree adequate to do what it is intended to do? The degree was originally launched with the recognition that a bachelor’s degree did not provide enough technical training for a scientist or engineer and a Ph.D. both lacked enough professional training and demanded more technical expertise than was required. Is this degree a suitable mechanism for meeting the needs of a knowledge-based economy? Does it offer the right blend of technical training and professional preparation?

Second, how important is it for Notre Dame to offer such training? We have made significant efforts to develop our capacity to have an impact on our local and the global economy in recent years. Are these programs a constituent element of that effort? How significant are they for that effort?

Third, what motivations should stand behind such programs? ESTEEM is intended to help generate new businesses and industries. MIT and Stanford are the gold standards. A 2003 BankBoston report showed that MIT graduates and faculty had established 4,000 companies, employed 1.1m people, and generated an annual world sales of $232b. If these were added together, they would constitute the 24th largest economy in the world. Where are we? The programs in ACMS and Patent Law are intended to meet demonstrated needs in society and the University. The program in Global Health was set up to address health issues throughout the world as part of our Catholic mission. There can be other motives as well. Some might argue that these programs serve as recruiting opportunities for our Ph.D. programs. Others might count on generating revenue from these programs to support other initiatives. What motives do you consider important?

Fourth, what should be the relationship between these programs and our research enterprise? Are they separate or do they have a symbiotic relationship that can enrich both?

Fifth, what mechanisms should we consider to safeguard quality? For example, I have indicated that the Graduate School would measure the Patent Law program by its success in helping graduates to pass the patent law bar examination on their first try. The program should have a similar record to the Law School. I have expressed my concern to Global Health that they need to protect themselves from becoming a program that only admits students who were turned down by medical schools and
are looking for a way to bolster their application the following year. Is this a valid concern? We will certainly track placement records, but what should be a good measure? Is successful entrance into medical school a good benchmark? This issue is complicated because we need to measure both academic quality and professional achievement. We can not use one set of criteria without the other.
Appendix II – Governance Structure

The following is a proposed governance structure proposed by Dean Greg Sterling following the creation of ESTEEM but prior to the creation of other professional master’s programs.

A Governance Structure for Professional Graduate Education at Notre Dame

A number of important professional graduate degree programs currently exist at Notre Dame: the Masters in Business Administration, the J.D. degree, Masters Degree in Architecture, and the new M.S. degree in entrepreneurship offered by the Colleges of Science, Engineering and Business (ESTEEM). These programs are all signature programs in which the faculty of the respective Colleges bring focused knowledge and expertise to the crafting and execution of these programs. These programs are all administered outside the Graduate School but would benefit from the expertise, knowledge, and wisdom of not only the Dean of the Graduate School, but the Council of Deans. We propose a new structure of governance for all future Professional Graduate degree programs in which the Deans of the Colleges and Schools – Science, Engineering, Arts and Letters, Business, Law, and Architecture – as well as the Dean of the Graduate School, all come together to review proposed professional graduate programs, review existing professional graduate programs, and help to develop synergy, criteria for excellence, and creative thinking around the pursuit of excellence of these programs.

The proposed governance structure would comprise a Council of the Deans of all of the Colleges and Schools. This Council would review each professional graduate program proposed at the University: new professional Masters programs and any other professional degree programs other than the conventional disciplinary PhD and thesis MS programs. The Council would review each new program for excellence, structure, requirements, administration, and recruitment. The new program would be presented to the Council by the Director of the program and the Dean or Deans of the College(s) in which the program would reside. Following the recommendations of the Council, the program Director would revise or amend the program structure and re-present for approval and signoff of the Council. After approval by the council, the proposal for new professional graduate programs would proceed to Academic Council. The director of the professional degree program, in some cases the director may carry the title of associate dean, would report to the Dean of the appropriate College where the program resides. In the case of multi-college programs, like ESTEEM, the director reports to an executive committee, chaired by one of the Deans. In such cases, the chair of the executive committee rotates between colleges.

Existing professional degree programs would be subject to a 3-5 year review by the Council. Only Deans of the Colleges and Schools will serve on the Council, which will not have an allowance for Assistant or Associate Deans to serve as proxies. The benefits to flow from the formation of this Council are many. The Council will serve to promote best practices. The interactions promoted by such a Council may serve to promote creative and innovative programs, including new interdisciplinary initiatives.