

HMC 2020 Strategic Planning Workshop #2 *Optimizing Our Impact on Society*
Wednesday, October 18, 2006



The second HMC strategic planning workshop began with a remarkable presentation by Dr. Freeman Hrabowski, the president of the University of Maryland, Baltimore County. Indeed, the end-of-session comments (faculty gave his talk an average score *above 5* on a five-point scale) made it clear that Dr. Hrabowski's vision was an inspiring and energizing call to action on how Harvey Mudd can most effectively contribute to the societies and communities of which we are all a part.

The workshop discussion sessions focused on eight themes: higher-ed outreach, entrepreneurship, diversity, community service, K-12 outreach, leadership, research impacts, and ethics. From the many ideas generated during the morning break-out sessions, after lunch a narrower and more focused set of action items emerged for further discussion. The complete, scribed records of morning and afternoon sessions, as well as the post-session summary reports, are available from the workshop's website <http://www.cs.hmc.edu/hmc2020society/> as of 10/19/2006.

From these notes, we have identified a set of five *action themes*, each containing a number of specific proposals. Because it is a first draft, however, we **WELCOME** comments, additions, deletions, or other feedback on this document to dodds@cs.hmc.edu or mary_williams@hmc.edu

Action Theme 1 *An experiential education requirement*

The idea of in-the-field, hands-on, and experiential education unifies some of the most enthusiastic proposals within many of the individual discussion topics. Enthusiasm for experiential education, to be sure, is not at all new to HMC. Our clinic program and student research typify the best in experiential learning at the college and, to boast a bit, anywhere. These two programs happen (1) primarily, though not exclusively, at our Claremont campus and (2) at the intersection of all HMC students' educations.

In contrast, experiences in entrepreneurship, study abroad, and K-12 outreach (to name a few) are important *opportunities* and *possibilities* for students to achieve the educational goal of understanding the impact of their work on society. Not every student will pursue entrepreneurial

experiences with the same passion. Not every student will opt to study abroad. To support HMC's mission statement and dynamic opportunities such as these, we might consider an *experiential education requirement* that provides a set of "cafeteria-style" options, perhaps generalizing existing clinic and student-research requirements:

- Requiring all HMC students to fulfill three (e.g.), out of several possible experiences.
- Possible experiences might include (1) clinic, (2) student research at HMC, (3) student research elsewhere, (4) an industrial internship, (5) an entrepreneurial internship, (6) study abroad, (7) a semester of assisting in a K-12 classroom, (8) other educational outreach, (9) long-term involvement in a community service project, (10) focused leadership training and practice, (11) a student-proposed project that meets the in-the-field and experiential objectives of this requirement.
- A set of defining characteristics for these "experiential" requirements might include (A) *genuine* projects, i.e., assignments or problem sets would not be a primary part of the workload, (B) *long-term* commitment, perhaps of at least a semester or full-time summer, (C) a well-articulated *focus*, e.g., a semester's volunteering at several different places might not meet this goal, and (D) a significant *work product* reflecting a deliberate synthesis of the project's experiences.
- Majors might require one or more of these, e.g., engineering would require clinic.
- HMC might require that one or more of these be off-campus or outside the U.S.

Themes of experiential development for faculty and staff were far less prevalent, but not absent: a *prof swap* idea arose, distinct from existing sabbatical opportunities in which teaching often does not play a role. In *prof swap* faculty from two institutions would change places for a semester, each taking on the teaching load of the other. While there would be drawbacks in continuity and committee-work, advantages include sharing pedagogical strategies and different cultural approaches to teaching and learning, as well as broadening recognition for HMC. Although *staff swap* is likely not possible because of the HMC-specific nature of most positions, we advocate staff involvement and participation in the on-campus and local-community experiential initiatives and outreach programs. Release time and encouragement will help ensure the joint participation of all segments of the HMC community – staff included. The strategic-planning workshops themselves demonstrate the value and effectiveness of such complete, college-wide participation.

Because experiential education is already so deeply ingrained at HMC, questions of how such a requirement would integrate into existing programs naturally arose. An engineering professor at the workshop noted that the administration of clinic projects already runs impressively smoothly – such success can be a model, but should not be compromised by experiment. Of note, too, are overlapping goals with the current Integrative Experience requirement; reconciling those similarities and differences has not yet been considered. Finally, there is a strong feeling that changes to the college's curricular requirements should not increase the existing workload for students, faculty, and staff. As a result, this proposal must be considered in light of others, e.g., the Student Research Center, an Outreach Center, and the leadership and entrepreneurial objectives of an Innovation Center, as well as curricular changes involving scheduling, workload, the core courses, and major requirements.

Action Theme 2 *Revisiting HMC's honor code and mission statement*

Mission Statement As pointed out by one trustee, the Harvey Mudd College mission statement has seemed to improve, rather than weaken, with the perspective of the last 50 years. It has been a distinguishing facet of an HMC education, and certainly no change to it will be taken lightly. Yet the process of redefining who we are as a community certainly requires revisiting the mission statement.

A proposal brought forward by a student-led group advocates explicit mention of social responsibility and global engagement to the mission statement. Others feel that the themes of social responsibility and global engagement are sufficiently represented by the existing phrase “so that [students] may assume leadership in their fields with a clear understanding of the impact of their work on society.” As a result, one possibility that emerged might be an institutionally-sanctioned explanation that fleshes out the HMC mission statement, but that would not require a rewording of that statement itself.

Honor Code In discussing the question of ethics and the education and modeling of ethical principles, several clarifications and additions (but not fundamental alterations) of the HMC Honor Code were proposed. One thought was to make the honor code a touchstone for ethical considerations throughout the curriculum and campus. As such, the honor code would extend its strong emphasis on academic integrity and avoiding plagiarism into the research lab, clinic workroom, and HMC coursework by

- Including a “workshop on whys” within first-year orientation that has faculty and students together reflect on the reasons and rationale underlying the HMC honor code.
- Requiring a short statement on the broader impacts, e.g. NSF-style, of clinic and research projects, with particular attention to ethical issues as warranted.
- Explicit mention of responsible data-gathering techniques and the ethical practice of science and engineering.
- Integration across the curriculum (e.g., as part of HICC) of ethical exercises that further the respect for different backgrounds and sets of assumptions, e.g., written assignments in which individuals argue *both* sides of a contentious issue cogently.
- Introducing faculty and staff to the honor code more formally when they join the community; this did not happen for many of the discussion participants

One participant contrasted the seriousness with which the community holds the academic-integrity portion of the honor code with a perceived informality in concern for the honor-code phrase “thoughtful respect for the rights of others.” A renewed commitment to this piece of the honor code, it was felt, might have an impact beyond ethical issues into those of campus climate and Harvey Mudd’s culture.

Action Theme 3 *Establishing centers for outreach, research, innovation*

One common theme of Workshop 2 was the need for institutional support in the form of staffed offices or centers to enable various kinds of activities, such as community and educational outreach, undergraduate research, and entrepreneurial and leadership projects. Worthwhile activities of this sort require time and money, and institutional support for these activities could be manifested most tangibly in the form of additional staff that might allow faculty to focus their time and effort more judiciously. Four organizations of this type are described below.

Outreach Many HMC constituents expressed a strong desire to see HMC more active in community service, and particularly, educational outreach to primary, secondary, and tertiary institutions. Outreach not only makes holes in the “Mudd bubble,” thereby helping to fulfill our mission of producing socially-aware and responsible citizens of the world, but also improves the image of HMC as an institution that seeks to make an impact on our community. If HMC seeks to be a premier educational institution, sharing with and learning from other institutions should be a common occurrence. In particular, educational outreach to K-14 institutions (primary schools, secondary schools, and two-year colleges) targeted to both students and teachers would both raise the quality and increase numbers of prospective HMC students. HMC’s proximity to many high-need and ethnically diverse neighborhoods in southern California places us in a unique position to make a difference. The idea of a traveling “science bus” for outreach sparked imaginations. As of 10/24/06, engineering professor Bob Schaffer has already spearheaded the implementation of this outreach effort.

A good deal of outreach currently takes place at Harvey Mudd, but it largely happens in an ad hoc manner, and is frequently carried out by staff, students, faculty, and alumni acting as volunteers. If community service or educational outreach is to be part of a menu of required educational experiences, HMC will need adequate support to ensure that the barriers to student participation in such activities are as low as possible and that the quality of the student experience is high. Support staff could assist in finding and publicizing outreach opportunities to students, seeking, writing, and administering grants, forming and furthering relationships with community groups, arranging transportation for participants, and providing administrative and logistical support. As a first step, a community outreach website could be established. This website would list existing opportunities and resources. It could also allow others - from the 5C’s or the larger community – to add their activities or resources.

Undergraduate research There was serious discussion at the workshops about making HMC *the* premier institution for high-quality student research. The educational value of research is extremely high—in addition to the technical knowledge that students gain, our students also learn about problem solving, teamwork, and communication. Research can also address humanitarian and technological needs of our society. As such, HMC might guarantee that every student has access to a research experience (on or off campus) during the four years of the HMC experience. To enable this sort of institutional commitment to research, an Undergraduate Research Center could help faculty administer and obtain grants, catalog and publicize research opportunities, organize connections between faculty within and outside of HMC, organize student talks, arrange for student travel to conferences, arrange summer room and board, etc.

These short descriptions might also be considered support for the Office of Undergraduate Research and Service (OURS) proposal that predates this workshop by many months. That proposal describes in greater detail the administrative, faculty, and financial support that would need to accompany the guarantee of a research opportunity for each undergraduate during their time at Harvey Mudd College.

Aeronautics Center A group of alumni and supporters¹ of HMC's Bates program and the college's long tradition in aeronautics proposed the establishment of an interdisciplinary Aeronautics Center, which would serve multiple purposes to enhance the Harvey Mudd student experience. An Aeronautics Center would coordinate its activities with academic departments and with the career center, development and admissions offices, and public relations office to enhance the unique profile of HMC.

Specific activities of the Aeronautics Center might include the following:

- Specially tailored aeronautics classes attracting students from HMC and the other Claremont Colleges.
- Academic counseling and mentoring for students oriented toward aero and space graduate studies and careers.
- Community outreach, involving HMC student volunteers, to help K-12 teachers cultivate their students' interest in science, math, and aeronautics.
- A unique flight experience adapted to the needs of HMC students and to the realities of the modern flight environment.
- Support for aero-related engineering clinics, student research, and other college projects.
- Archiving and preservation of HMC's extensive aerospace heritage and library resources.
- Enhanced participation of alumni in the college experience of current HMC students.
- Leadership training and personal growth, afforded by hands-on practical experience and by the uniquely motivating and demanding aerospace environment.
- Support for atmospheric studies as they apply to environmental science.

Harvey Mudd College has a long tradition of involvement in aeronautics. An Aeronautics Center would provide a focus for continuing this tradition for the benefit of future Harvey Mudd students. The professional expertise, experience, and considerable profile of the alumni of the aeronautics program will be valuable resources in planning for a future Aeronautics Center.

Innovation Many valuable activities at HMC do not neatly fall under the categories of research, teaching, service, or a single disciplinary focus. Workshop participants considered a clearinghouse of support – an *Innovation Center* – for entrepreneurial activities, research projects for which there is no single faculty advisor, off-campus research, large multi-disciplinary projects, and participation in high-visibility competitions. Such a center might

¹ John Brimble, Merton Canady, Don Chamberlin, Dan Davids, Wendell Goring, Leticia Kurashige, Gary Schantz, and Nancy Smith signed this proposal for an Aeronautics Center; Iris Critchell coordinated the group and delivered the document to the workshop cochairs.

connect students with alums for internships or involvement in seeding entrepreneurial endeavors. The center could also sponsor student-generated design competitions or provide space and administrative support for large, student-led, cross-departmental efforts, e.g., developing an entry for the DARPA grand challenge for autonomous driving.

Action Theme 4 *Achieving a more diverse HMC*

To a first approximation, HMC students are a strongly cohesive, unified group of students who share a passion for science and mathematics, enjoy the challenge of hard work, and bond during the intensive common core. Yet within this unified group of “Mudders” there are serious concerns about respect and tolerance that interfere with (and mock) the college’s mission. These problems have a strong negative impact on the current students who feel their cultural identities do not conform to this “Mudder” image. As such, they also threaten the college’s ability to attract and educate a more ethnically representative and socially diverse student body.

Creating a campus that is equally accepting of all its members is consistent with the college’s mission and honor code. “Diversity” means many things to many people: first-generation college student, African-American, female, Latino, gay, conservative, religious, Korean. However, African-American and Latino scholars are particularly underrepresented on campus, and suggestions for ways to increase their representation on campus were a major focus of many of the discussions concerning campus diversity. Furthermore, it has been pointed out repeatedly that the Latino population is the most rapidly growing group in California. As a college that consistently draws a large percentage of its students from within the state, we need to find ways of to increase our numbers of Latino students.

The discussions on campus diversity fell into two themes, each of which led to several specific action items. The first set of ideas focused on the academic programs at HMC and how they might be re-examined to support a more diverse student body, and the second set of ideas addressed broader concerns about campus climate.

Admissions criteria, academic support, and alternatives through the core

Pre-admissions strategies – Identify and partner with local high schools serving large numbers of African American and Latino students. Develop resources to help prepare high-school students for admission – “premediation”. Globally increase the pool of through K-12 outreach programs. In addition, there was a strong feeling that HMC should have admissions literature -- and a college website -- that is inviting to students of Latino and African-American backgrounds. This should include packets of information tailored to these (and other) groups that highlight resources, courses, and programs they might want to consider further.

Admissions strategies and criteria – Admissions staff might be increased, perhaps in a focused way to help recruit students from a variety of backgrounds. More student involvement could also broaden the net we cast for applicants, e.g, programs like the “Golden Koi” ambassadors to students’ high schools. We need to evaluate the correlation between students’ high school grades

and test scores and their success at HMC to ensure that we are applying meaningful and appropriate selection criteria. One participant suggested seeking out “extraordinary ability” over “extraordinary preparation.” Specifically, we need to learn how to identify students who are capable of succeeding at HMC despite having attended less academically-intensive high schools. As another participant noted, “there isn’t a lot of correlation between SAT scores [and success at Mudd] – there’s more of a correlation between being a freshman in West and ITRing.” Considerable concern arose over the calculus requirement because it can be a barrier for low-income or disadvantaged students. Finally, we should make more effort to recruit and support transfer students, as Latino students and African American students frequently enter college through the junior college system.

Pre-matriculation strategies – HMC could provide no-cost summer courses for students before their freshman year to help them transition to the academic rigor and intensity of Mudd. Specifically, we should offer a rigorous course in calculus, which might allow us to admit students who did not take calculus in high school. Summer math (taken after the first-year) could also be provided at no cost to a pool of the most economically disadvantaged students. A complementary model might strengthen and lengthen the existing Summer Institute program to achieve these same objectives.

Strategies for success at HMC – The rigidity and intense pace of the curriculum at HMC challenges all of its students. HMC should pay particular attention to how it can help students from different groups to succeed. As the keynote speaker observed, passing a student with a minimal grasp of the material into a higher-level class does not help that student. Opportunities for alternative pacing should be built into the core. Our goal should be to provide the opportunity for all students to stay “on track” as much as possible, perhaps with a requirement that they catch up by the end of the summer prior to sophomore year. Such a synchronization point (regardless of exact timing) might help avoid having distinct academic communities develop along parallel tracks within the curriculum. There was a strong consensus that we should not dilute the content or academic rigor of the core – just increase the flexibility with which students proceed through it. Finally, the concern was raised that some core courses (or entire semesters) are designed to be “weed-out” or “filter” courses, though this might reflect the perceived rigor of the entire curriculum rather than the intent of any particular course.

An active mentoring program of both students and faculty could provide a day-to-day source of support for underrepresented students, especially through the early semesters at Harvey Mudd. Because faculty recruitment from underrepresented groups might require more time than student recruitment, leveraging individuals from elsewhere on the 5Cs and from the HMC staff and non-minority HMC faculty might help.

Campus Climate

Some members of the HMC community feel that (1) the climate at HMC is closed, insular, and unaccepting of difference, (2) narrow assumptions about what it means to be a Muddier, a scientist and successful abound, and (3) offensive and inconsiderate images are tolerated because “if you object, you’re not one of us.” Other members of the community feel that the campus climate is extremely welcoming. To some extent, whether or not one belongs to any

underrepresented group plays a significant role in one's perception of the campus climate. Given these deep differences, changes in the campus climate will be slow and hard won. During the workshop, several ideas were raised to help begin the process.

Increasing the diversity of faculty, staff and trustees - The process of moving towards a more diverse campus must start by setting clear and attainable goals. One of those goals should include increasing African American and Latino representation among the trustees, faculty, and staff. Many participants noted that the proportion of women faculty has increased dramatically recently, but that there is still little ethnic diversity in the faculty. An external auditor of faculty searches may help us identify biases in our hiring practices of which we may be unaware. We should be aware of what impressions we make through our web site, job ads, and other public materials. We should investigate and learn from other institutions that have succeeded in increasing diversity on their campuses.

Increasing the diversity of students – Although student recruitment and retention is considered in detail above, an additional challenge is to ensure that the campus as a whole is prepared to support these students outside of the classroom. One idea that recurred within several discussion groups was to have themes associated with dormitories, e.g., a frosh dorm or a Latino dorm (or floor). This would provide the students with an environment that supports them through living with students sharing common interests. There are many organizations that provide support for diverse students. While we can encourage HMC student involvement with these groups, they do not provide the complete solution. First, because most of the students affiliated with the groups are not HMC students, resources to support the specific challenges and stresses that accompany the HMC experience may not be available. Second, we simply cannot rely on these external structures to have much impact on our campus. It is imperative that we identify and implement programs that make the broader HMC community more welcoming to a diverse student body.

Diversity training – Those who have participated in a formal diversity-training program attest to the tremendous value these programs confer. Even those who considered themselves empathetic to the challenges of being “different” say they gained insights and learned strategies by which to become more supportive. Offering or mandating diversity training to all members of the HMC campus would directly impact the campus climate, and would make a strong statement that the community values a more diverse campus.

Action Theme 5 *Clinics involving “socially responsible” deliverables*

A very popular idea (62 votes) that came out of the morning session was to identify and encourage clinic projects that produce end products whose primary benefit is to a community, rather than a company. It was noted that such phrasing might imply that current clinics are somehow *not* socially responsible – this is not at all the case, to be sure. This idea is closely aligned with the mission statement – clinics targeting social engagement will encourage people to think broadly about the possible impacts of their work. Notably, student enthusiasm for this idea was quite high, leading to the idea that these projects might be fully developed by students, including soliciting and identifying funding sources. Such development would provide an

excellent hands-on opportunity to build both leadership and entrepreneurial skills. These clinics might be high-profile and appealing projects designed to raise the profile of the college and to attract students drawn to socially conscious efforts. Examples include considerable overlap with Workshop 1's themes, e.g., green design of landscape or structural facilities (on or off campus), sustainability design, plans, and implementations, water- or energy-conservation efforts, the building of community resources or parks, etc.

There were strong concerns about how such projects might be funded and administered. Within each department, the number of available students determines the number of clinic projects. Making some projects *pro bono* will result in a net loss of revenue to the college and the department in question. To avoid this impact, we could require that these projects be sponsored, though not necessarily by the beneficiaries. Potential *angel investors* include foundations such as the Gates and Google Foundations, local or national agencies such as the Water District and the NIH, and corporations such as Exxon and Coca-Cola, previous sponsors of such projects. Another idea was that the clinic fee could be tied to the ownership of the intellectual property, with Mudd retaining (and potentially profiting from) IP rights arising from pro-bono clinics. There was also a suggestion that we offset the costs of these clinics through increasing costs for industry-sponsored clinics.

Another scenario considered a separate, campus-wide office that would administer socially-targeted clinics, rather than ask a single department to shoulder this task. Student participants and advisors might similarly be drawn from any major field of study. Arguments supporting this model include the fact that many such projects are inherently multi-disciplinary and that the awkward funding considerations described above would be easier to address. The clinic model is a very effective pedagogical instrument and the *pro bono* program should follow it as closely as possible. As an example, interacting with a client is considered an irreplaceable part of the clinic experience. It would be important to ensure that each project had such a client and that the end product would be used and incorporated by a genuinely interested party.

Participation in these socially responsible clinics might be voluntary, so that students would not be required to forfeit the opportunity to develop relationships with a corporate sponsor. It was also pointed out that we must avoid having two classes of clinics, i.e., we don't want students "with and without halos." Another recommendation arising from this discussion was that every capstone experience – clinic or research – should include a statement of social impact, similar to the "broader impact" statement now required by the National Science Foundation in all of its proposals. Such a statement would include, for example, the handling of the wastes generated through the project and the ultimate disposal of any deliverable, as appropriate. Finally, if a program were implemented to identify and manage socially engaged clinic programs, many participants felt it appropriate to provide a mechanism by which members of the HMC community could identify and propose socially engaged research projects as well.