

**Report of the External Review Committee for the
Core Curriculum at Harvey Mudd College**

December 17, 2017

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Executive Summary

Our report is intended to provide an external perspective that will aid the Harvey Mudd community as it works to improve what is a truly distinctive component of the Harvey Mudd education. The Core Review Planning Team has made an excellent start with the development of a new Goals Statement for the Core. Our report is intended to build upon that statement of goals.

Here are some of the key observations and recommendations developed by the review team:

Completion of the Core need not be done entirely in the first three terms. Putting the entirety of the Core at the beginning of the HMC experience, and compressing the amount of content students must absorb during that relatively short time, may reduce the effectiveness of the Core Curriculum.

The Core should support the HMC mission (as laid out in the HMC *Mission Statement*), but it need not respond fully to every aspect of the mission. There is an opportunity to reconsider how work in the Core supports the college's mission; with the understanding that the Core need not be entirely responsible for the mission, (i.e. the major curricula and the HSA courses also play a critical role in meeting HMC's mission).

Decisions about the design of the Core should be preceded by an articulation of key learning outcomes with a focus on a plan for assessment of student achievement of the outcomes. This is a not-to-be-missed opportunity to do meaningful and useful assessment, with assessment hardwired into the teaching and learning process to enable evaluation and ongoing improvement of the new Core.

Leadership of the Core should be expanded to include a multi-disciplinary committee, in addition to the director, consistent with the character of the Core. Their responsibilities could include coordinating course offerings, overseeing the assessment of student learning in the Core, using assessment findings to guide improvement in the Core, and shepherding initiatives that enable creativity and experimentation in the Core.

Student well-being should be a central guiding principle for design and delivery of the Core curriculum. The goal of furthering student flourishing should guide the work to improve the Core and it must also be explicit in whatever new Core develops at Harvey Mudd. This goal is the responsibility of the entire Harvey Mudd community, and an area in which faculty and staff can explore meaningful collaborations.

I. Preface

The External Review Team received materials from Harvey Mudd College in early November and visited the HMC campus on November 12-15, 2017. The observations in this report are based on the team's review of the Core Self-Study, additional materials provided by the Core Review Planning Team and the Director of Institutional Research and Effectiveness, public information obtained from the HMC web site (including the College Catalog), and information obtained in interviews with students, faculty, alumni, and administration during the campus visit. The team provided a review of the draft Goals Statement on November 30 and this report contains an updated version of that review (see Section III).

The report is structured in the following way. Section II summarizes and questions some assumptions regarding the Core that the review team observed in our readings and interviews while on campus. Section III discusses the new Goals Statement for the Core. This section was updated after the faculty vote on December 7 to approve the new statement. Section IV collects recommendations, some short-term and some long-term, for changes to the Core. Section V discusses in more detail the role and importance of student well-being which the review team believes should be a more explicit component of work on the Core. Finally, Section VI summarized the review committee's observations but frames them in terms of the original mandate provided to the review team by HMC when we started our work.

The review team wants to emphasize that Harvey Mudd College is an outstanding academic institution. The Harvey Mudd community, including students, faculty, staff, administrators, and alumni, are all deeply committed to the College and they take great pride in the Core. Indeed, we do not presume to have the answers to the important questions related to the improvement of the Core Curriculum at Harvey Mudd. We do hope that our observations and recommendations serve to initiate fruitful conversations that result in actionable steps toward improvement.

II. Assumptions to Review and Question

Having developed, supported, and indeed cherished the Core for so long, the HMC community seems to have developed shared assumptions about the Core, some of which appear unusual to outsider observers. The points we describe here are all assumptions, explicit or implicit, that seemed to run through the materials provided to the committee as well as our discussions with faculty, students, and alumni. It would be useful for the HMC community to discuss and question these assumptions as part of continued review and revision of the Core. Several of the recommendations in our report begin as challenges to these assumptions.

HMC Assumptions about the Core:

- 1. All of the academic requirements outside the major and the HSA requirement must be part of the Core and completed at the beginning of an HMC education before work in the major.** This is not the case at some of HMC's peer institutions, where a smaller set of introductory core requirements is augmented by further requirements to be fulfilled throughout an undergraduate's course of study. Only some of the courses in the Core are key requirements for most majors. For example, biology need not be required of math or physics majors. Do the virtues of exposing physicists to biology early in their studies outweigh the added pressure of an additional course in the first year? Putting this constraint on the Core almost guarantees that some students will view the Core as "something to get behind you" rather than a learning experience of tremendous value in itself.
- 2. The only way to cultivate a sense of community is for all students to proceed through the entire Core at the same time and in the same sequence.** Would it suffice for all students to participate as a cohort in a subset of the Core Curriculum, or for some overlapping subsets of students to take the Core courses together? The college is already relaxing this assumption somewhat with the introduction of the Gold/Black/Green paths for some Core courses.
- 3. Rigorous study requires a burdensome workload.** This belief seems to confuse quality with quantity. Indeed, "burdensome workload" seems to have replaced "rigorous study" as the enduring student perception of the Core. The well-being of students and a focus on student flourishing are critical steps in shifting the emphasis away from the negative aspects of the Core experience to the Goals Statement that the faculty recently adopted for the Core.
- 4. The Core must be structured so that students take a course from each department at HMC before they declare a major.** It is asserted that students often shift majors as a consequence of exposure to a subject that they would not have encountered were it not a requirement of the Core. Is this substantiated by assessment? Does the benefit of introducing all students to all possible majors before they declare their major of choice outweigh the cost in terms of stress for students?
- 5. All semester-long courses must carry the same credit.** Should Core courses be limited to three units? The credit associated with a course should reflect the effort, the time-on-task, required for the course. If students really are spending more than 12 hours per week on a course (including time in class and time out of class) then a four-unit Core course better reflects the actual workload as experienced by first and second year students in those courses. Altering the credit hours might also enable students to take one less course and still meet the requirements defined for graduation.

There is an overarching belief that HMC graduates are “fearless problems solvers across domains” and that “HMC graduates learn to be ‘natural leaders’ for whom no problem is too big.” The Core Curriculum, with its emphasis on both breadth and intensity, is given much credit for these desirable outcomes. We believe that HMC should work to substantiate the belief that graduates achieve these outcomes and critically examine the assumption that the Core is substantially responsible for student achievement of the outcomes. Adherence to this assumption seems to impede experimentation. There are certainly many positive outcomes for the Core, but the positive value of those outcomes should be documented and then be weighed against the downsides of the Core experience that were reported to us.

III. Goals of the Core Curriculum

On December 7, 2017 the HMC faculty affirmed the following statement of goals to guide the construction of the new Core Curriculum:

The Core Curriculum at Harvey Mudd College seeks to nurture students’ intellectual curiosity and joy of learning, provide them with foundational knowledge and skills needed for further study in STEM disciplines, and begin a critical engagement with the humanities, social sciences, and the arts. In keeping with HMC’s liberal-arts approach to STEM education, the Core engages students in thinking critically about consequential problems and complex issues, making connections across disciplinary boundaries, communicating and collaborating effectively, and understanding how their personal and professional actions impact the world around them.

We offer the following general observations about this thoughtfully-crafted statement.

- 1. The statement appropriately focuses attention on the broad learning outcomes the Core will be designed to foster.** During our visit, some faculty expressed doubts about whether the college is ready to articulate learning outcomes for the Core. But in fact, the draft statement is devoted largely to doing exactly that. The text articulates in broad strokes what you want students to gain from their Core studies; students will “think critically,” “communicate and collaborate effectively,” “understand impact,” etc. We anticipate that this working agreement on the learning you want students to take away from their Core experience will make it much easier for you to figure out what the Core should look like. It will also make it easier for you to articulate the more specific learning outcomes associated with each of these goals that you intend to develop through the new Core curriculum. In the words of organizational consultant Simon Sinek, you are “starting with why.”
- 2. The statement signals the teaching commitments HMC faculty are making.** Curriculum requirements aren’t just requirements for students; they also imply commitments by the faculty. The Goals statement describes the Core learning experiences you plan to provide for your students. So, for example, if the Core “engages students in ... making connections

across disciplinary boundaries,” then you are committing to ensuring that all students will encounter one or more opportunities to do that in the course of completing their Core requirements. It doesn’t require *every* course experience to involve connections across disciplines, of course; nor does it require that the entirety of even a single course be devoted to disciplinary connections. But it does mean that when you finish your curriculum revision, you will have designed one or more specific courses to provide that opportunity. Of course, you will need to assess whether the modifications you make in the Core Curriculum are accomplishing what you intend for your students – but that is another story....

- 3. The statement begins to describe how learning in the Core supports learning in the other components of an HMC education.** The statement makes it clear that the Core is intended to support learning in the major, learning in HSA courses, and learning in the curriculum as a whole, which is all to the good. That said, as you use the statement as a launching point for designing the Core learning experiences and more detailed outcomes, it could be helpful to identify what the *unique* work of the Core is, relative to those other aspects of the HMC experience. A clear understanding of what is unique about the Core in the HMC experience may support your effort to make the Core a more manageable experience for students. For example, “intellectual curiosity” and “thinking critically about consequential problems and complex issues” are outcomes that majors and HSA courses are doubtless intended to nurture as well. You might consider whether the Core will foster these outcomes in a distinctive way, and/or whether the Core is intended to launch these outcomes as “habits of mind” that students are expected to carry with them as they move into further HSA and STEM work.
- 4. The statement appears to move the faculty toward resolving the question of whether the Core needs to advance the HMC mission as a whole.** During our visit we heard different views on whether the Core ought to address all the components of the HMC mission – in particular, understanding of societal impact as well as breadth in STEM and in other liberal disciplines. Some faculty, and many students, expressed an expectation that the Core would address or at least introduce the whole of the HMC mission. Other faculty questioned whether this can be accomplished without overburdening the students. The newly-approved goals statement will allow the Core to embrace both points of view. By indicating that the new Core will “engage students in... understanding how their personal and professional actions impact the world around them,” the goals statement allows for this part of the mission to be introduced, but not necessarily fully realized, in the Core. Further, the Core goals statement implicitly addresses the leadership component of the mission as well. The mission statement presumes that leadership in a STEM field requires breadth as well as depth in STEM. Leadership also requires other competencies that are introduced in the new goals statement – thinking critically, making connections, and communicating and collaborating effectively.

5. **The statement does not commit HMC to introducing students to every possible major before they select, and begin completing requirements for, their own major.** We found opinion of both students and faculty to be divided on whether students should be required to take a course in each of HMC’s departments before choosing a major. The draft statement leaves room for a variety of responses to this issue; it simply says that the Core will “provide [students] with foundational knowledge and skills needed for further study in STEM disciplines” (not necessarily *all* STEM disciplines). This keeps the door open to a variety of alternative revisions of the Core that we will describe later in this report.
6. **The statement communicates curricular intentions both to faculty and to students.** Whether or not you use the same words for faculty and for students, the Goals statement will help orient faculty new to the Core to the larger purposes the Core is intended to serve, and it will also explain to students what they should expect to gain from their Core studies. You might decide that there is merit in using the same statement for all audiences, or you might decide to craft a complementary statement for students expressing the same ideas in different language. In either case, the Goals statement can be an effective communication tool, which reminds everyone why the Core looks the way it does, and which can focus on specific outcomes in both teaching and learning.

As the faculty continues its work on revising the structure, content, and pedagogy of the Core, it may be helpful to hold open the possibility that the Goals statement will be revisited, and possibly tweaked, once the curriculum design is complete. If you decide to treat the newly approved statement as provisional and subject to revision to achieve that alignment, then you may wish to consider the following specific observations on the goals as you have articulated them, in light of the above general observations.

- **“Intellectual curiosity”** – *Is this an outcome that’s distinctive to the Core, or is it cultivated in the entirety of the HMC experience (Observation 3)? It could be both; perhaps the Core needs to establish curiosity as a habit of mind that students then bring to all their studies. If so, it might be good to emphasize this.*
- **“Joy of learning”** – *Again, is this an outcome that is distinctive to the Core, or is it reflective of the entire HMC experience? (Observation 3). This outcome might be a tall order in light of the current way the Core is experienced by students; on the other hand, articulating this as an intended outcome in the revised Core could signal the faculty’s commitment to a more manageable but still quite rigorous experience (Observations 2 and 6).*
- **“Foundational knowledge and skills for advanced study in STEM”** – *This explains how the Core is connected to other parts of an HMC experience (Observation 3). There is ambiguity, however, as to whether it refers to foundational knowledge/skills that are common to **all** HMC STEM majors, or to the present requirement that all students be*

introduced to all departments before choosing a major. If the focus is on foundational knowledge/skills that are common to all the HMC STEM majors (Observation 1), then this will be a shorter list than foundational knowledge/skills needed for each of the HMC STEM majors.

- **“Beginning critical engagement with HSA”** – *This helps alert students that the Core connects to the HSA requirements as well (Observation 3). It does not suffer from the ambiguity mentioned above.*
- **“Thinking critically about consequential problems and complex issues”** – *Same question about this outcome that we raised concerning “intellectual curiosity” and “joy of learning” – what is uniquely Core-like for this outcome (Observation 3)?*
- **“Making connections across disciplinary boundaries”** – *Many faculty during our visit mentioned this as a goal of the Core, and perhaps it is something more likely to happen in the Core than in other parts of the HMC curriculum, which makes it even more important here (Observations 1 & 3). We did not have the opportunity to look in detail at the content of current Core courses to determine the extent to which course topics and assignments provide opportunities for students to do this; note, though, that asking students to complete courses in six different disciplines doesn’t automatically mean that they will make connections across those courses. We hope the design for the revised Core either preserves the kinds of connection opportunities that are already in the current Core, or builds them in if they are not yet there (Observation 2). If you decide you want the same version of the Goals statement to be used with students as well as with faculty, you could consider using language that is a bit more concrete, such as “The ability and confidence to use insights from more than one discipline to analyze issues or solve problems” (Observation 6).*
- **“Communicating and collaborating effectively”** – *We gather that an introductory course in writing is likely to be preserved in the revised Core, and we heard about a number of oral presentation and group project assignments that are also likely to carry over into the revised Core as well, so this outcome seems well-suited to the direction you are heading (Observations 1, 2, and 3).*
- **“Understanding impact of their personal and professional actions on the world around them”** – *This outcome, too, clarifies the relationship between the Core and the HMC mission as a whole. There are many national resources that can be drawn upon to help guide or assist with the conversations necessary to define where and how this civic understanding will be cultivated.*

During the course of our site visit, we heard about some other possible outcomes that might be intended for the revised Core, which you may want to discuss, either in making final revisions to

the goals statement or in crafting your more detailed statement of intended learning outcomes. You don't need to put every possible outcome into the Goals statement, of course, but some of these might be candidates.

- **Basic/introductory understanding of the distinctive contributions and ways of knowing characterizing each of the STEM disciplines offered at the college** – *This goal is a little different from “foundational knowledge and skills for advanced study in STEM.” The way we have phrased it emphasizes the unique perspective on the world that each STEM discipline offers including the big, beautiful ideas that any well-educated STEM practitioner should have the pleasure of encountering. We heard from faculty that some courses in the Core achieve this goal while others are almost entirely given over to knowledge/skills needed for future study, and that faculty regret the lack of opportunity to teach to the beauty of their field.*
- **Confidence when engaging new learning or encountering novel problems; ability to retrieve knowledge when needed** – *Many of the students we spoke with indicated that this was one of the most compelling outcomes of the requirement to take at least one course in each of the HMC STEM disciplines.*
- **Knowledge and skills supporting student flourishing and resilience** – *Several people we spoke with pointed out that experiencing the Core should help students develop skills and concepts for making good decisions about managing workload, remaining healthy, overcoming challenges, and learning from failure. This is also an outcome of the entirety of the HMC experience (Observation 3) but the Core could be the place where these skills, and the self-awareness that they are needed, could be introduced explicitly. It could be argued that “student flourishing” embraces, and makes more possible, the “joy of learning” outcome included in the current draft.*

A Goals statement that articulates the broad parameters of student learning outcomes will be invaluable when you get to the nuts and bolts of designing the learning experiences that the Core will provide. After all, the learning outcomes are the *raison d'être* for the types of educational experiences that will form the Core.

IV. Recommendations Regarding the Structure of the Core

Students, faculty, and alumni all believe that the Core Curriculum is central to the HMC experience. Nevertheless, there is general agreement that the Core is an exhausting and dispiriting slog for too many students. We concur. In this section of our report we present some options for reducing the intensity of the Core, while preserving its value as both an educational and “cultural” experience for Mudders.

We agree with the Mudd community that this is an excellent time to take a long, hard look at the possibility of major changes in the structure of the Core Curriculum and its relation to the totality of the Mudd experience. Whether last year's unrest was a transient event or only the "tip of the iceberg" of discontent with the Core, the HMC community appears eager and energized to re-examine the Core Curriculum. Some of our recommendations require a strategic rethinking of the structures surrounding the Core requirements at HMC, while other recommendations are more incremental with components that can be achieved in the short-term.

A. Incremental and Short-Term Recommendations

1. Define the role of advising in the Core Curriculum

The first-year elective was added several years ago to encourage student experimentation. We heard reports that this effort backfired as students used the elective to jump start work in their anticipated major. One option is to simply remove this elective component. If the elective were removed and the number of units assigned to some Core courses were increased, then students could keep on-track while taking one fewer course each term in their first year. An alternative approach, however, is to consider how the advising process can provide a means for gatekeeping, to keep students on the intended path through the Core as designed by faculty. For example, requiring a mandatory advisor sign-off on students' course selections would provide an added check, for students and faculty, that students are heading in the right direction. Building in this formality signals a commitment to advising as an intentional process for guidance and support.

2. Restore a fourth term of math to the Core (but see Recommendation B.2)

Many faculty and students reported that the math department's efforts to teach calculus, probability and statistics, linear algebra, and differential equations in three semesters have not been successful. This material spans five semesters at MIT (Calculus I, Calculus II, Differential Equations, Linear Algebra, and Fundamentals of Statistics). We recommend adding back a fourth term and reorganizing the structure of the math requirement.

3. Offer some Core courses both terms

Students who drop or fail Core courses fall out of synch with the rest of the HMC Core Curriculum. We recognize that this would require extra teaching resources, but it provides a measure of psychological safety for students in the Core. Perhaps this burden could be reduced by making use of available on-line materials.

4. Make efforts to step back on demands without reducing the content of Core courses

We gather that HMC assumes each unit reflects 3 hours of student effort each week. If this is the case, then problem sets and other outside class efforts should be appropriately constrained. Practices such as twice-weekly problem sets should be avoided (or forbidden). Exams in Core

courses should be coordinated to avoid conflicts. The practice of offering a number of “passes” (no-questions-asked extensions) on problem sets should be expanded.

5. Extend the use of online pre-first-year tutorials

Several departments (*e.g.* Chemistry) have been frustrated by the uneven level of preparation of incoming students. Online modules and/or tutorials available to all incoming students the summer before the first year could help level the playing field. These also become a resource “downstream” when students meet fundamental concepts again in the HSA requirement, in major courses, and in their capstone project work.

B. Strategic and Long-term Recommendations

1. Rethink the Core from the ground up

Many faculty commented to us that this is the time to reconsider the HMC Core experience, to question assumptions, to revise requirements, to chart alternative paths through the revised requirements, and in particular, to consider ways to alleviate the stress students experience during their first three semesters at HMC. This process should start with the intended goals and outcomes of the Core in mind and making those goals and outcomes explicit. Revising curricula across a diverse set of courses – a difficult task at best – is more likely to succeed if learning outcomes have been articulated in advance. Designating a small, representative group of faculty (perhaps augmented with students and alumni) to work on the design process could yield unanticipated options while also building consensus around change. This group could be temporary to provide initial leadership for revision. The group could also be part of a standing Core committee addressed in the next recommendation.

2. Establish a faculty “Core working group” to shepherd all on-going aspects of the Core curriculum.

We were surprised to learn that there is no standing committee of the HMC faculty with fundamental responsibility for the Core curriculum. The Core curriculum is sufficiently important and complex to deserve constant supervision and assessment provided by continuous and multi-disciplinary leadership. This group would be responsible for approving the content of Core courses in collaboration with the relevant departments, for coordinating content, assignments, and exams across Core courses to limit pressure on the students, for organizing and carrying out and evaluating experiments in the way the Core requirements are fulfilled, and generally for responding to problems as they arise. One of this group’s responsibilities would be to consider and perhaps implement the recommendations provided in this report.

3. Spread the Core over the whole four years

Consider the implications of distributing the requirements presently in the Core instead over the full four years of the HMC experience, particularly if the Core is intended to be of equal

importance as the major to a student's overall learning and development. As we noted earlier, it would be helpful to question the assumption that the entire Core must precede the major. A survey of how peer institutions structure their core could yield insights into how this can be done. We have already noted that HMC is unusual in identifying the Core with all graduation requirements outside the major and the HSA requirement. Instead, identify those courses that constitute the "core of the Core" and consider offering opportunities to delay other courses now in the Core until the junior or senior year. For example, students might be given the option to complete biology, chemistry, and the last terms of physics and math later in their career at HMC. Choice can still be included. For example, some engineering students might choose electrodynamics for their last physics course, while others might choose statistical physics. The fourth term of math (see Recommendation A.2) might allow similar flexibility.

4. Establish an experimental Core-studies group or incubator for curricular experimentation

One of the impediments to making changes in the Core seems to be that changes, viewed as permanent, must be implemented for all students at once. Furthermore, changes require an overwhelming consensus of the HMC faculty. Instead, consider planning experiments or pilots in the structure of the Core that engage a group of ~25 students selected (perhaps self-selected) at entrance and followed through their HMC careers. For example, experiments might include options devised in response to Recommendation B.3, or they might include a seminar on the social implications of science and technology, or a joint introduction to the joys of chemistry and biology. These experiments, devised, overseen, and evaluated by the Core working group, would be a test-bed for new ideas and could provide the evidence necessary to achieve consensus for change among HMC faculty.

As part of this process, we see value in a more careful study of previous curricular iterations within the Core (e.g. the interdisciplinary lab). We understand that such curricular pilots or experiments can be resource intensive, but assumptions about resources required can often become a hurdle in itself. Thus, we encourage articulating the intended goals and desired outcomes of such pilots and experiments first and then working backwards (e.g. using a logic model¹) to design a sustainable mechanism for achieving those goals and outcomes.

V. Student Flourishing: The Commitment to Students' Well-Being as Part of the Core Curriculum

In re-examining the Core curriculum at Harvey Mudd, faculty have the opportunity to address how learning in the core curriculum is intricately tied to students' social and emotional

¹ One good resource is Kellogg Foundation's Logic Model guide: <https://www.wkcf.org/resource-directory/resource/2006/02/wk-kellogg-foundation-logic-model-development-guide>

development. Broadly speaking, it is an opportunity to ask how the Core affects students' mental health and well-being. Evidence from the self-study and from the external review visit indicates that a culture of overwork and academic stress negatively affects students' experiences in the Core. For example, as noted by external reviewers from Cal Tech, two of the highest areas of agreement around the core are closely connected with well-being. "Core is a heavy load that leads (possibly unnecessarily) to burnout and overwhelm" and "Core reinforces a shared culture...among many faculty and students – the tendency to do more and more, to work very hard to the exclusion of all else, to center one's identity mainly in one's academic work while sacrificing other interests and identities" (pg. 4 Spring 2017, External Report). Student and alumni comments regarding the Core suggest a sense of the curriculum as brutal (e.g. "Core is hell," "it's awful and overwhelming"), but also an appreciation for how that intensity binds students together and pushes students to reach beyond their preconceived boundaries. The question for faculty in the revision process is how to maintain an appropriately high level of academic challenge while providing the support students need to experience Core as intellectually and socially fulfilling without being "soul crushing" or "such a terrible experience" (see pg. 5 Spring 2017, External Report). In our interactions with students for this review, a number of students mentioned or agreed with how stressful an illness can be because it can be difficult to catch up once if they get behind. This suggests an acute amount of stress for those students who do fall ill, but also a latent stress among many more students due simply to the *possibility* of becoming ill.

To be clear, the intent of the Core curriculum is not to serve as an intervention for students with mental illness or severe anxiety. There are specialized resources for the relatively small population of students with particularly severe psychological conditions. However, the presence of mental health is not the absence of mental illness.² This suggests shifting the mindset of student well-being from one that is primarily reactionary in terms of responding to negative emotions or conditions to a mindset that proactively promotes flourishing and a sense of purpose. Both responses are needed at HMC (as they are at every college campus), but the latter seeks to promote well-being for all students. Such a paradigm shift could be foundational to achieving one of three key priorities identified for the Core among students, faculty, alumni - "inspiring a sense of curiosity and excitement for what is possible in a discipline." It is also implicit in the newly-approved statement of goals; it is hard to experience the "joy of learning" in a state of overwork and overwhelm. Through this lens the Core can at once be an intensely rigorous intellectual experience and also fundamentally holistic, where students' personal development is viewed, in part, as a function of their cognitive development. Yes, students are largely surviving the Core, but how much better might their learning be if they were thriving in the Core? The

² See CLM Keyes, 2005, "Mental Illness and/or Mental Health? Investigating Axioms of the Complete State Model of Health," *Journal of Consulting and Clinical Psychology*, 72(3): 539-548)

following recommendations are offered as considerations for purposively attending to students' personal development and well-being as part of the Core.

Recommendation 1: Develop a baseline understanding of students' social and emotional health

It is hard to improve upon the unknown or unspecified. Thus, obtaining a meaningful baseline of students' sense of social and emotional well-being (e.g. "flourishing") may be useful in establishing an evidence-based approach for discussions of developing a Core committed to whole student development. As noted in the self-study by faculty, "The struggles that students confront at Harvey Mudd may not be measurable or quantifiable; they may not have as much to do with grades as they do with emotional or personal well-being." Well-being can seem nebulous, but that is often because at the institutional level, faculty and administrators often lack good ways of talking about mental *health* in the same way that certain indicators of mental illness seem obvious (e.g. visits to the counseling center, alcohol or drug use infractions, academic probation). Nevertheless, a number of standardized measures related to well-being, and particularly to indicators of personal and social development, exist largely due to extensive scholarship in field of positive psychology. The Director of Institutional Research and Effectiveness will be an excellent resource in reviewing existing instruments and/or developing instruments customized to HMC for this purpose.

Along with gaining better baselines for how all students are managing, it would be helpful to develop a clearer assessment of which students are truly struggling. The attention accorded to this topic was helpful in the self-study; at the same time, conversations during the external review suggested the concept of "struggling" could be more fully operationalized. Greater specification of this construct might include indicators beyond receiving a grade of C- or lower. For example, this construct could also include information regarding students who have dropped courses, students who received two or more advisories, students on academic probation or other disciplinary actions. Part of gaining an understanding of students' well-being at Mudd is understanding which populations of students might be flourishing more than others. In this sense, the discussion of well-being and its relationship to the Core can be viewed as part of HMC's commitment to equity.

Recommendation 2: Reconceptualize student well-being as an intentional part of the core

The HMC Core currently includes one unit of physical education. The existence of such a requirement, particularly at liberal arts colleges, is typically a vestige of a commitment to students' well-being. Though this requirement has been slowly eliminated by many institutions, Mudd has an opportunity to rethink what such a commitment to well-being in the Core curriculum means in the twenty-first century. How might this requirement of the Core be better used to serve the needs of HMC's current students? For example, students in both the self-study and during the external review lamented not having time to reflect on what they are learning and

how it applies to their life or to social issues. Reflection could also be conceived as an opportunity to allow students the space to connect the dots between who they are as individuals, as learners, and as citizens to what they are experiencing in the classroom. For example, the physical education requirement could be reimagined as a “Critical Reflection” seminar, to bookend or complement the “Critical Inquiry” course. Another model could be to use this space in the curriculum for targeted peer mentoring for all students, where peer mentors are trained to facilitate group discussions regarding social and emotional well-being, coping skills, and accessing resources.

Recommendation 3: Create better alignment of professional and peer support

It is evident from both the self-study and the external review visits that resources are being allocated to support students helping each other, both academically and socially. Students assist each other with academic work through Academic Excellence (AE) support and individual tutors recruited through the writing center. Additionally, the PALS program embeds peer mentors into the residence halls to provide additional programming and support for students. All of these programs meet a particular element of students’ needs, but it could be beneficial to envision a comprehensive student support program in which resources are aligned and outcomes for peer support are made explicit. For example, peer support could be envisioned as a team model in which students are assigned to teams that include specially trained mentors. Additionally, the notion of the sophomore slump came up in conversations as a real phenomenon at HMC. Peer resources could be targeted to addressing this issue more directly.

We also recommend consultation with student life staff, not only in pursuing prospects for a more holistic approach to peer support, but also to consider ways of enhancing collaboration between faculty and professional staff in providing support to students who are struggling but not necessarily in full-blown crisis. Our site visit provided us with limited opportunity to examine existing patterns of partnership or collaboration, so there may be more happening here than we are aware of. But on the face of it, an integrated system of communication and support for students who experience setbacks due to illness, family circumstances, or other non-academic issues may help ameliorate student stress and prevent temporary challenges from becoming an intractable downward spiral.

Recommendation 4: Make the commitment to well-being explicit

As we indicate elsewhere in this report, the opportunity to be explicit about intended outcomes of the Core should be an important part of the re-examination and re-visioning of the Core curriculum. As part of this process, there is also the potential to be explicit about HMC’s commitment to student well-being in the Core. This may be conceptualized as personal and social development, social emotional well-being, or simply as well-being. For example, notions of “confidence building,” and “empowerment to take on any problem” came up in conversations with students and faculty as key capacities that emerge from the Core, as did the importance for

students to experience “joy” in learning and to “flourish.” In addition to the possibility of identifying well-being outcomes, HMC can consider visible initiatives such as those created by the Resilience Consortium – a consortium of elite institutions that are addressing the unique pressures of high-achieving students in rigorous educational environments.³

VI. Summary and Concluding Remarks

In its original charge to the External Review Committee, Harvey Mudd College presented five guiding questions. We used those original questions as the starting point for our review of written materials and also to frame questions during our meetings on campus. In this final section of our report, we return to those guiding questions and summarize our observations and recommendations inside that framework.

How well does the Core address the three priorities identified through surveys of the HMC community?

The first priority identified in the survey states that *the Core should inspire in students a sense of curiosity and excitement about what is possible in a discipline.*

The sense of the committee is that the Core does not currently inspire students and does not generate curiosity or excitement about the disciplines, at least while the students are experiencing the Core. There is definitely pride in accomplishment and ownership of the disciplinary knowledge retained from study in the core. However, student pride in accomplishment is tinged with resentment.

Two courses do have an increased emphasis on this priority in the Core: PH23-Special Relativity and CS5-Introduction to Computer Science. These are not constrained to meet a service role nor are they on the major path for most HMC students. The math courses, on the other hand, are constrained by demands of content coverage and must serve all majors at HMC. The faculty in the Mathematics Department describe teaching experiences in which coverage overshadows any other goal. Indeed, the mathematics faculty’s affect concerning the Core bore a surprising resemblance to the students’ affect when discussing the negative aspects of the Core.

Biology had taken a hybrid approach and designed a course that connects biology to mathematics and computer science. They are not constrained by disciplinary demands. They take the approach of showing HMC students how biology is connected to other disciplines instead of focusing on the discipline itself.

HMC could go in very different directions depending on whether the focus is on the first four words or the last three in this statement of priority. If you change the goal to “Inspire curiosity

³ <https://resilienceconsortium.bsc.harvard.edu/>

and excitement about learning” or “Inspire curiosity and excitement about their education at HMC” then the need to address a range of disciplines is gone and you have flexibility to focus more on the student than the discipline.

The second priority identified in the survey asked if the Core helps to ***build interdisciplinary facility***.

Discussions with students and survey responses from students and alumni indicate that the Core does help students develop the ability to retrieve disciplinary knowledge as well as the confidence to attack new problems regardless of discipline. HMC students report confidence in their ability to attack difficult, interdisciplinary problems, though it is not clear whether this ability is acquired in the Core or later in the HMC experience. The value of this as a possible outcome of the work in the Core should not be discounted. It is not clear, however, that what is gained in the Core is strictly “interdisciplinary facility” and it will be important for the faculty to clearly define and assess this as a learning outcome for the Core.

The Core should ***provide a “technical toolkit” that acts as a foundation for advanced study in STEM***.

This is perhaps the strength of the Core curriculum most widely acknowledged by the HMC students, faculty and alumni. If, however, the “technical toolkit” comprises merely a list of disciplinary content knowledge that students own and can recall whenever and wherever necessary, then we would question the long-term value of this aspect of the Core. If a broader view is envisioned: that one of the most important goals is the ability and confidence that one can retrieve and renew prior learning, then students who complete the Core would indeed be well-prepared for advanced study in STEM (and beyond).

Making the tools in the kit more explicit, highlighting perhaps some of the key skills and abilities (and mindset), which are not the province of any particular discipline, may help the faculty identify opportunities for improvements in the Core. Reframing the toolkit as a clear list of learning outcomes – what HMC students will know and be able to do when they complete the Core – may be one of the most important steps toward improving the Core.

Identify obstacles and enablers in/for the current Core.

The commitment of the Harvey Mudd faculty is the one absolutely essential “enabler” for the improvement of the Core. The work of the Core Review Planning Team is the most recent demonstration of the faculty’s deep commitment to the Core. The new goals statement for the Core, especially if it can become a shared understanding of the learning outcomes for the Core, is key to focusing faculty efforts.

The distributed ownership of the Core is both a strength and a barrier to improvement. The review committee believes that a multi-disciplinary working group or advisory board, in addition

to a dedicated faculty leader, should provide continuing leadership for the assessment and improvement of the Core. The Core Review Planning Team may be a starting point.

The service role mandated for the mathematics component of the Core is a barrier to a desire to incite curiosity.

One barrier that seems to be hindering change in the Core is the belief that there is one perfect Core waiting to be discovered. If the HMC faculty include flexibility and adaptability as design criteria for the Core, then “perfect” is less of a barrier. The first priority identified in the survey of the faculty said that the Core should inspire curiosity and excitement about the possibilities in the disciplines. The faculty who develop and deliver the HMC Core need to feel this same sense of excitement if excitement is going to be part of the student experience in the Core.

If HMC decides to revise the curriculum, how can it address three questions:

- Is there too much in the Core?
- Does Societal Impact live in the Core?
- Can the Core be inclusive and supportive?

The first question should be asked in a slightly different way: Is there sufficient time allotted to the work of the Core? There is power in making it clear that the Core is not something to be put behind you, nor is it a barrier to be overcome in order to move on to the more significant work in the major. The review committee would not say that there is too much in the Core, but the requirement that the Core be completed in three semesters should be relaxed.

Regarding the second question, the Core cannot meet all of the goals stated in the college’s mission. Students interviewed during the committee’s visit did state that one of the reasons they chose to study at HMC was the value assigned to societal impact. Students expressed disappointment that social impact was not part of the Core, but the committee believes that it is better to make the purpose of the Core and its contributions to the mission clear. The new goals statement for the Core states that the Core will “begin a critical engagement with the humanities, social sciences and the arts.” and the Core “engages students in ... understanding how their personal and professional actions impact the world around them.” The review committee supports this view that the work of the mission does not end in the Core.

Regarding the third question, the Core must be inclusive and supportive and we believe that a commitment to student well-being should be an intentional part of the work to improve the Core. The fact that courses and curricula must adapt, continuously, to the needs of current students should not be a surprise or viewed as a crisis. The academic goals of the curriculum need not change. The structures and supports and the pedagogical toolkit need to adapt.

What is missing from the HMC analysis?

A focus on learning outcomes and student achievement of the learning outcomes. The review committee read the learning goals for the Core adopted by the HMC faculty in 2016, but we did not find evidence that the faculty are using that goals statement or assessing student achievement of the learning goals in any significant way. Support from the Director of Institutional Research will be critical to making this possible.

HMC has begun statistical analysis of student struggle and this analysis should continue. There are dimensions of struggle beyond grades and these should be taken seriously. The study of student workload, in the time-use study Workload and Health at Mudd, is an important step. The analysis presented did not show changes in struggle over time. This should be a regular part of the analysis of the impact and success of the Core.

We sense that over the past several decades, the HMC faculty have experienced reform of the Core as a “punctuated equilibrium” in which episodes of revision seeking a “perfect Core” are followed by periods of growing frustration. Instead, we suggest – and several of our recommendations propose – that the renewal of the Core be viewed as a continuing process of experimentation, assessment, and evaluation, able to respond more nimbly to changing conditions.

How can HMC move forward?

The college opened discussions last spring when classes were cancelled for two days. Those discussions should continue and students should be truly partners in the work to improve the Core. The faculty advisory committee could play a central role in continuing the difficult conversations, but staff who provide support for students as well as current students and recent graduates should also play an important role in this work. The Harvey Mudd community, including students, staff, faculty, and administration, must participate fully in the conversations.