

Final Performance Report
Grant Number: ED 50012-03

A Final Performance Report to the National Endowment for the Humanities:
“Bridging the Gap Between the Humanities and Sciences: An Exemplary Education Model
of Core Text, Humanistic Education”

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ABSTRACT OF BRIDGING THE GAP ACOMPLISHMENTS AND FINDINGS

PROJECT DESCRIPTION AND GOALS

Taking its cue from C. P. Snow's famous *Two Cultures* argument and ACTC's (formerly the American Academy for Liberal Education's) own "Assessing Trends in the Liberal Arts Core" project, ACTC brought together nationally respected experts in the sciences and the humanities with faculty from eight (later expanded to ten) institutions to develop humanistically-based, general education core curricula and courses in three, two-week summer seminar sessions, from June 2003 through June 2005. Participating institutions sent teams of two humanists and one scientist, one of whom was an administrator in a general education program to the seminars. These faculty returned to their campuses, both to develop course models and to conduct faculty dissemination and training projects. Important to accomplishment and success was the possibility of establishing on campuses the ground work for conversations between science and humanities faculty for purposes of understanding each others fields and, more particularly, for changing the content and, possibly, structure of general education courses and curricula. The title of the project was "Bridging the Gap Between the Humanities and Sciences: An Exemplary Education Model of Core Text, Humanistic Education" or BTG for short.

PROJECT ACCOMPLISHMENTS OVER THREE YEARS:

- The project promised three years of seminar readings in core texts of both the humanities and sciences coupled to sessions of course development through faculty cooperation. It delivered these all three years.
- The project promised to work with 7 institutional teams; it delivered work with 10.
- BTG promised to work with a minimum of 21 faculty; it worked directly with 44.
- The project promised three years of two faculty meetings on campus for purposes of implementation (that is, 21-30 meetings); it delivered, at a minimum, 43 meetings. The actual figure is almost certainly much higher.
- BTG projected impact upon faculties at participating institutions that extended well beyond the team participants; the project delivered this impact as evidenced by both the collective meetings and the development of courses which involved "non-team" faculty members from participating institutions.
- The project promised two gen-ed prototype courses per institution infused with core texts from the humanities and sciences (i.e., 14 courses); it delivered 50 courses, 39 of which were gen-ed/core, 29 of which are permanently adopted into gen ed/core programs. Other courses are in development stages, to be completed outside the parameters of this project's time frame.
- The project proposal hoped for but did not promise structural change in campus, general education curricula, in line with core text readings of the sciences and humanities and through cooperation between science and humanities faculty in the formulation of courses and curriculum. The project delivered structural change in three (3) to four (4) institutions, and deep course effects which impacted the entire core faculty in one (1) or two (2) others.

CAUSES OF SUCCESS

This project had to be a three-year project.

Three years gave time:

- a) for the summer seminar workshops to prove to participants' satisfaction that the principles of developing "science-and-humanities" core text courses could work to engage both humanists and scientists in intellectual cooperation across the full scope of foundational scientific and humanistic disciplines;
- b) for cooperation and cooperative practices in constructing core courses and curricula to develop between humanities and science faculty ; these practices and courses incorporated the intellectual cooperation and principles of using "science-and-humanities core texts" in differing institutional cultures (e.g. team-teaching meetings vs. faculty development modeling sessions for institutions which relied on individual instructor efforts);
- c) for development of *structural* general education curriculum changes either within the context of existing core structures or by changing the structure entirely; this is an entirely different accomplishment than single course, single-authored general education, majors or electives courses.

Core curricula are cooperative ventures requiring the understanding and assent of many faculty and cannot be developed with any prospect of success or permanence with only one year's time.

Several key facts indicate that the causes asserted above are almost certainly "true" causes of success:

A significant shift in where in the curriculum course development took place is noticeable. In Year I nearly half of the courses developed were in electives or majors, by Year II development in that area was reduced to ¼ of courses, and by Year III only 1/20th of courses were developed in electives or majors.

Conversely, each year the percentage of new course development increased in the core, general-liberal education category, and this percentage involved not only humanities-humanities or science-science faculty cooperation, but humanities-science faculty course building.

In several institutions by the third year -- either by faculty vote or through the spread of core texts through faculty curricula in core programs -- core text, humanities-and-science curricula or core text curricula in the humanities became the structural model of delivery for general education.

At our annual conferences over three years, core text science/humanities papers increased from eight (8) in 2004 to twenty-seven (27) in 2006, and core text humanities-science panels increased from four (4) to (11).

In sum, humanities and science faculty, through faculty development meetings, were learning over three years' time how to construct "humanities-and-science core text, core curriculum courses."

**Final Performance Report
Grant Number: BH 50049-05**

“Bridging the Gap Between the Humanities and Sciences: An Exemplary Education Model of Core Text, Humanistic Education”

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Association for Core Texts and Courses
7/31/06

In the fall of 2002, ACTC proposed a “national, curricular project, ‘Bridging the Gap Between the Humanities and Sciences: An Exemplary Model of Core Text, Humanistic Education.’ This curricular development and demonstration project’s basic purpose [was] to bring humanist scholars and scientists together to develop required or widely taken general liberal education courses based in humanities’ core-text discussions about the value, meaning, and importance of human ideas and actions throughout the West and the World...’Bridging the Gap’ [was to] build a consortial network of institutions redesigning liberal education, humanistic core text courses to incorporate and reflect upon the sciences and their relation to the humanities. ‘Bridging’ will be an ACTC demonstration-and-dissemination, faculty-and-curriculum development project.” (Original Bridging proposal, p. 1). The proposal was accepted by the National Endowment for the Humanities and letter from Chairman Bruce Cole, dated May 8, 2003, announced the grant award of \$ 229,000 for this three-year project. Eventually, an additional supplementary award raised the overall award level from NEH to \$ 244,000.

PROJECT ACTIVITIES

The project proposed to work in conjunction with eight institutions to build models of faculty cooperation through humanities-and-sciences curriculum development. Originally, our proposal called for eight participating institutions. Subsequently, after differences between the funding request and NEH’s award were sorted out, ACTC ran a national applicant competition to assess which institutions would be most likely to benefit from and succeed with the structure of seminars, faculty development, and course development that ACTC envisioned. Eventually, ACTC fully funded seven institutions. All seven of these institutions were committed to cost-sharing the administrator’s costs of the seminars, as well as the faculty/course development of the project. On the principle that the project was already a cost-share effort, ACTC accepted two other institutions on a cost-share basis, Samford and Seton Hall, who cost-shared almost all of their faculty members’s participation. When ACTC’s Liberal Arts Institute moved to Saint Mary’s College in California, after the first year of the project, ACTC welcomed three Saint Mary’s participants on the basis of a full cost (share) for representatives from SMC. Thus, the number of participating institutions ultimately reached ten.

The project accomplished its goal of introducing pilot course development and curriculum development that bridged the faculty and core-text gap between the humanities and sciences. Performance of the grant project along lines indicated by its work plan, reports by participants, discussions with our project evaluator, and subsequent anecdotal communications with participants indicate the project accomplished what it set out to do.

There was a spectrum of success. There was a range of “fully invested” institutions and faculty members to “lightly committed” institutions and faculty. Faculty development and course development proceeded at different paces in different institutions. Interestingly, the most

successful of institutional reforms and faculty seem to have been the two institutions which committed more in cost share than any of the other original institutions.

ACTC went to considerable lengths to publicize this grant project. At each of our annual, international conferences (04-06), we both invited science-and-humanities speakers and featured “Bridging the Gap” panels. ACTC’s active participation in the grant and its encouragement of science-and-humanities papers had definite effects not only on participants, but on the wider membership of ACTC. In 2004, there were eight (8) Bridging-the-Gap participant-authored papers in four (4) Bridging panels, involving two (2) non-Bridging ACTC members on those panels. In 2005 there were eighteen (18) Bridging-the-Gap authored papers in eight (8) panels, involving eleven (11) non-Bridging ACTC members. In 2006 there were eleven (11) Bridging-the-Gap authored papers in six (6) panels, involving 16 ACTC non-Bridging members, and there were five (5) panels on “science-and-humanities” core texts which had no Bridging-the-Gap participants, but involved sixteen (16) other ACTC conference participants in those panels. Thus, core text science/humanities papers increased from eight (8) in 2004 to twenty-six (27) in 2006, and core text humanities-science panels increased from four (4) to (11).

Annual Conference: Science-and-Humanities papers and Panels

	BTG-authored	non-BTG-authored	# of sci/hum panels
2004	8	2	4
2005	18	11	8
2006	11	16	11

Articles in the annual ACTC newsletter were devoted to the project. Websites were mounted on the ACTC website and on some of the participating institution’s websites. In 2004 Page Laws of Norfolk State University and Marian Glenn and Kristina Chew, Seton Hall, cooperated to present Bridging papers at the fall meeting of the Association for General and Liberal Studies. ACTC’s project director and team leader, Phil Sloan, plus project participants Marian Glenn (Seton Hall) and Chris Metress (Samford University) gave a presentation at a well-attended panel session at the AACU in January of 2006.

In addition, scholarship was affected. Chris Sindt (Saint Mary’s College) reports, “I have recently completed a sequence of poems, “The Circle,” using in large part language and ideas from the readings of the second-year of Bridging the Gap. In addition, my [post]-dissertation research on the symbiotic bonds between poets and natural objects has now evolved, particularly through the influence of Phil Sloan, a more historically grounded approach that has led me to begin a study of the relationship between natural history and modernist poetry.” Rod Hughes (Saint Bonaventure) has taken a sabbatical to develop new course based on BTG materials.

AUDIENCE

The basic audience or “unit of analysis” of this project was college and university institutions and their “teams,” not specific individuals. These institutions and teams were characterized by a purpose of the grant: “to bring humanist scholars and scientists together to develop required or widely taken general liberal education courses based in humanities core-text discussions about the value, meaning, and importance of science...throughout the West and the World.” The letter of announcement/solicitation of the project (sent in November 2002 while NEH was still considering the proposal) was sent out to two groups of individuals: (a) names of provosts,

AVP's, or deans who were in place in institutions which ACTC had contact with through its international conference, and (b) individuals who the director was familiar with who had attended the ACTC conference. Beyond this group, ACTC did notify non-ACTC affiliated institutions through the same letters and levels of contact.

The letter attempted to narrow institutions in several ways: the letter contained the proposed syllabus for three years, called for institutions to commit teams of humanists and scientists, required cost-sharing for the administrator on the team, and required the fulfilling of an application packet that included a narrative argument that "an applicant institution is committed to and will succeed in...integrating humanistic and scientific core texts into existing or to-be-piloted general education curriculum."

Applications were received not only from ACTC affiliated institutions, but also from institutions which had no prior connection to ACTC. ACTC accepted eight institutions, two of which were not affiliated with ACTC, and three of which were seed institutions, previously asked to join the grant application. NEH decided the grant could fund seven, but with some cooperation from institutions, ACTC was able to expand the initial set of accepted institutions to nine, through a willingness on the part of two institutions to pay for most of the costs of project participation on their own. One year later, Saint Mary's College became the home of ACTC and was admitted to the project, entirely paying its own way. Thus the final total of participating institutions was 10.

A breadth of institutions and affiliations was one of the goals of the project, for ACTC maintained that the project was applicable in many different kinds of institutions.

The then-used Carnegie Class descriptions described our institutions as (1) doctoral/research institution, (6) masters/comprehensive institutions, (1) baccalaureate college, and (1) associates degree or community college. The affiliations were (2) publics/(8) privates, 2 state, 6 Catholic, and 2 Protestant institutions.

Participating Institutions, Carnegie classes and affiliations

	Carnegie	Affiliation	Public/Priv
Benedictine University	comp	Cath	priv
Mercer University	comp	Bapt	priv
Norfolk St. University	comp	State	publ
Samford University	comp	Bapt	priv
St. Bonaventure University	comp	Cath	priv
St. Mary's College of California	comp	Cath	priv
St. Olaf College	bac	Luth	priv
Seton Hall Univ	res/doct	Cath	priv
Truckee Meadows CC	assoc	State	publ
University of Dallas	comp	Cath	priv

As indicated below (p. 21), under a discussion about the readiness of institutions to receive the seminars, aside from conforming to the application requirements, we note that the institutions ranged considerably in the extent of current core text applications. Seven of the institutions required core courses in their general, widely-taken core curricula (Benedictine, Samford, St. Bonaventure, St. Mary's, Truckee Meadows, and the University of Dallas.) Three had no such requirements. Of the seven that had core course requirements, three of these schools required no core texts in those courses. That is, professors were essentially free to choose any texts that they wanted so long as they conformed to course descriptions. (For example, a professor could assign a textbook or nothing but secondary literature on ancient culture) Of the those that had no core

course requirements, all three did have “alternative tracks” through general education requirements that were core text based (Mercer and St. Olaf, and an honors program at Seton Hall). Two of the institutions had required, common core science courses, but neither of these involved core texts. None of the institutions had teams of teachers across the humanities and sciences teaching together, though Benedictine, Mercer, St. Bonaventure and Seton Hall did have science teachers who taught specific (usually introductory) common courses in a curriculum.

A way to characterize this group of institutions is to say that they ranged in having a number of the pieces of a required, core text, core, humanities-and-science curriculum (which might or might not be common), but none had an active cooperation of humanities and science professors producing, jointly, humanities-and-science core text courses. Mercer was probably the most advanced; Norfolk was probably the least. There was a “bulge” of “common core curriculum” institutions, but it would be legitimate to say that two of these were common core in name only. True, our three alternative track institutions had core text programs, but alternative tracks are set up with “fire walls” inside institutions which have much broader distribution or nominal core programs. Viewed a bit skeptically from either side of the wall, the fire walls, which make the programs into alternative tracks, are set up so as to distinguish and separate them from the more regular program of general education studies. Seton Hall was the most extreme case in point; the Honors program was all required courses for the first two years; the general education program was all distribution courses for the first two years.

The grant application called for a ratio of 2:1 in humanists:scientists on institutional teams. Figures in the section on accomplishments, below, demonstrate that basic ratio was achieved. Indeed, in one year, the ratio became almost 1.5:1.

Demographics of participating institutions:

- 1 institution was from the Northeast
- 1 institution was from the Mid-Atlantic
- 1 institution was from the Southwest
- 2 institutions were from the Midwest
- 2 institutions were from the West
- 3 institutions were from the South

This distribution can be correlated to appropriate regional accrediting agencies. One institution was an HBCU.

Ultimately, the sex of participating individuals broke down as follows:

	Male	Female
Year I	15	11
Year II	18	10
Year III	17	10

Teams were determined by participating institutions, not by the project director. Lists of participants are included in the appendix.

ACCOMPLISHMENTS OF THE SCHEDULE AND PLANNED ACTIVITIES; USE OF PLANNED PERSONNEL; OMISSIONS AND CHANGES:

The project director, Scott Lee, has used and edited reports from each of the institutions to produce this report, most of the time without indicating quotations, but, in fact, directly using the materials of those reports. The reports are, in part, responses to questions and criteria advanced to team leaders from each institution by the project director. He wishes, therefore, to acknowledge the authorship of those sections pertaining to each of the institutions:

Benedictine University: Patrick Flynn
Mercer University: Mary Ann Drake
Norfolk State University: Page Laws
St. Bonaventure University: Roderick Hughes
St. Mary's College of California: Christopher Sindt
Samford University: Christopher Metress
Seton Hall University: Marian Glenn
Truckee Meadows Community College: Tell Gifford
University of Dallas: Kathleen Burk

St. Olaf College did not submit a report this last year. Rick Fairbanks reported the first year, Chuck Huff the second.

Goals of the project:

While the potential of this project was great – a capacity to reform on a campus the humanities and science structures of widely taken general education programs – the actual goals of the project were ambitious but more modest:

- The overall goal of the project was “to integrate science core texts into a humanistic conversation within general education curricula. Thereby, the project [would] foster better understanding of the relations between humanistic and scientific modes of inquiry” (proposal, p. 9). It is to be noted that this goal assumed a burden by those skilled in humanistic conversation to integrate the science texts. It did not assume a burden by those skilled in lab, experiment or lecture to integrate humanities texts.
- Nevertheless, the project deliberately incorporated the attendance by teams of three humanities and science faculty from nine (9) participating institutions at the Bridging the Gap *two-week seminars in June* for readings in core texts of the sciences and humanities and for projected development of courses and curricula using these or similar texts on three different themes. The original award by NEH called for full financing of 7 teams. The Seminar themes were:

Year I: Motion and Natural Law in a Philosophical and Political World

Year II: Life: Origins, Purposiveness, and Transformations

Year III: Technology, Art, Values, and the Problems of Technoscience

- Support was supplied by institutions for the designated administrator to participate and for planning and implementing curricular reform. Support was supplied by institutions for allied faculty enculturation for bridging the gap activities between science and humanities faculty once faculty returned to campus from the seminar.

- Course reform was the basic target goal. The entire three-year set of seminars was conceived of as developing models (pl.) for practical integration of the workshop's readings with reformed general education curricula. Institutions were asked "to commit to integration of seminar materials into general, liberal education as part of participating in the grant" (11) and to commit to "an 'integration' plan...to develop some core text course integration of the science and humanities texts" (32). Our proposal and applications for participating institutions anticipated integration of materials into existing structures (10) and a promise of *two pilot courses* to be run within the general education curriculum. Structural as well as course reform potential was foreseen on three grounds: ACTC's encouragement to applying institutions to think of this project as a means to structural reconsideration of general, liberal education; size and scope of the project offering opportunities for change well beyond one given course; new relations between faculty from different disciplines and areas would open opportunities for structural as well as course development (10).

Overall, the project delivered more than it promised but there were a few shortcomings, too. These are detailed below.

Staff, Seminars, and Team attendance at Seminars:

- Our project team leaders, Phillip R. Sloan (University of Notre Dame) and Peter Kalkavage (St. John's College) led the project and seminars all three years. Their genius structured the readings of the syllabus. Our evaluator, Patricia Cook (first of St. John's and later the U.S. Naval Academy) and our Project Director attended and participated in all three years' of activities and seminars. Our volunteer survey researcher, Geraldine Mooney, of Mathematical Policy Research, helped to produce a questionnaire that was administered anonymously by our project evaluator to all our participants each three years. And, our evaluator's reports were submitted on time to NEH for all three years.
- Each year's syllabus drew on core texts from the sciences and humanities, from ancient to modern (at least Enlightenment) times. Final syllabi, which did not differ greatly from the original proposal, are available in the appendix.
- Each year's seminar conformed to the basic proposed structure of two morning sessions for readings and textual discussions, plus reserved time for course/curriculum proposals – discussed commonly and in with individual teams and project leaders. Each seminar contained experiments or observational sessions. Two of the seminars were supplemented with play performances or readings relevant to the materials. All seminar/workshop syllabi contained sessions for curriculum development. See syllabi.
- *Through careful budget management and cost sharing by added institutions, we increased the number of participating institutions to 9 in year I and to 10 in year II & III.* NEH funding had, originally, indicated that funding for seven institutions was expected.

Because of the increase in institutions, it appears every original project goal was met or exceeded. However, individually, a few participating institutions failed to meet the project goals.

- Because of the increase in institutional participation, the attendance by faculty at the seminars exceeded the originally planned 24 faculty participants per year, as well, of

course, the originally funded 21. Depending on circumstances, the three years of seminars for 9-10 institutions, ended up with between 26-28 participating faculty.

Year I, 8 institutions sent teams of 3; one institution sent a team of 2; 7 of 9 institutions were interdisciplinary across humanities and science faculty;
 Year II, 8 institutions sent teams of 3; one team member backed out the day the team was to depart; one team member left the first day for reasons still unexplained, resulting in 2 teams of 2; all teams were and remained interdisciplinary across humanities and science faculty;
 Year III, 7 institutions sent teams of 3, 3 sent teams of 2; one team did not send a humanities-and-science team.

- *The project did bring together humanists and scientists into fruitful core curriculum course building and curricular reform, and the project had considerable, if not complete success, in enlisting tenured/tenure-track faculty in its cross-disciplinary discussions and curriculum development. Below is a chart by year of humanist/scientist participation with the number of tenured faculty listed:*

	Humanists/Scientists		Number of Tenured/Tenure-track Faculty
Year 1	19	7	22 out of 26 total participants
Year 2	18	10	25 out of 28 total participants
Year 3	16	11	25 out of 27 total participants

Meetings Back on Campus, After Seminars, With Team Members and Campus Faculty

Meetings of Bridging participating faculty with faculty and administrators on campus tended to serve two purposes: familiarization with the project and planning implementation. At least 43 meetings were held across campuses over the three years. The actual figure is almost certainly higher. The following table of faculty/course development meetings is based on an extensive chart, in the appendix, of reported meetings by institution over the three years of the project.

Summary Table of Campus Faculty/Course Development Meetings

	# of institutions meeting	# of institutions with multiple meetings	# of institutions with interdis. humanist(s)/scientist(s) meeting
Year I	9/9	6/9	8/9
Year II	9/10	5/10	8/10
Year III	8/10	6/10	7/10

In Year I representatives from each of our 9 participating institutions returned to campus to lead faculty development seminars and begin implementation of course/curricula development:

Nine representatives of nine campuses returned to have at least one meeting with faculty on campus; on 8 of 9 campuses the meetings were interdisciplinary across the humanities and sciences faculties:

At six of nine campuses, the meetings were multiple and were specifically directed toward course development;

In Year II representatives from 10 institutions returned to campus; institutional representatives at seven (7) institutions, then, met with campus faculty and administrators to plan implementation or to familiarize faculty further with Bridging activities:

Representatives from one (1) of the universities in BTG met to *revise the entire curriculum along core text lines; the faculty Senate, then, voted for development of three new courses.* (BTG representatives were deeply involved in the faculty meetings preceding the vote and used the BTG curricula to illustrate a core text curriculum in their faculty presentations.)

Representatives from two (2) of the institutions met with administrators and faculty to plan implementation of course design.

Representatives from one (1) of the institutions met with faculty and administrators to plan (scientific) textual introduction into an established core text, common core humanities seminar.

Representatives from (1) institution met to consider expanding a great books course sequence to accommodate science texts.

Representatives from (1) institution met with one faculty member to discuss introduction of science readings in a biotechnology laboratory.

Representatives from (4) institutions met with faculty, two in elaborately planned faculty development programs, to introduce the concepts and some texts of Bridging for discussion. One of these meetings was meant to prepare the ground for faculty re-development of a languishing scientific inquiry course.

Year III representatives from 10 institutions returned to campus; institutional representatives from eight (8) institutions then met with campus and faculty administrators to plan courses or to familiarize faculty with Bridging activities.

Representatives from four (4) institutions met to plan specific courses.

Representatives from one (1) institution met with the entire core faculty to adopt principles of course construction: all courses, henceforth, must contain core texts and some core texts must be history of science or science core texts.

Representatives from one (1) institution met to plan a text specific seminar with many faculty for purposes of piloting a use of a scientific text in a humanities seminar.

Representatives from two (2) institutions met with faculty across humanities and science disciplines to report to faculty on project.

As is evidenced from the above, familiarization about the project through the faculty teams proceeded as planned by the project. A chart in the appendix derived from reports by team leaders, indicates that at least 12 meetings in the first year were familiarization meetings, some of these blending into implementation meetings. As will be seen immediately below, faculty returned the first year to campus to construct, nearly half the time, non-gen ed courses. But at least six implementation (faculty cooperation) meetings were held that had general education courses in view; the actual number is almost certainly much higher. The meetings proceeded apace along the lines described above, shifting in proportion over time from familiarization to implementation.

Curriculum and Course Development

- Curriculum and course development followed several varying patterns and applications. In one case, a whole curriculum was revised by introducing new, commonly required, core text courses; (though no science texts were introduced, Bridging syllabi and faculty were central to establishing this new curriculum). In some cases, curricula were revised by “infusing” core texts into already established courses. In other cases, common courses were completely or partially revised in light of the project. And, finally, in some cases courses which were not commonly taken but which were available in general education curricula were revised. Some courses of each of these were “prototypes.” Some were “permanent.” Also, some new majors courses were developed. Finally, *who taught* courses began to change at some institutions; scientists and humanists cooperated to teach courses; or courses were paired across a curriculum, requiring the coordination of humanities and science faculty.

Year I: number of courses launched:		New	Textual Infusion	Prototype	Permanent
Core/Gen ed	Whole Curricula Revised				
	Honors	3			3
	Regular Common Req'd core		3	3	
	Regular Distribution	1	1	1	1
	Alternate Track through Core				
Electives/Upper Level	2	4	2	4	
Majors		1		1	
Course Totals:		6	9	6	9 = 15
Course in development but not launched		7			

Comments: All courses, here, were by sections of the professors who attended BTG. This was to be expected. Textual infusion counts only courses that used specific BTG texts. Other courses were developed (found in the appendix) which used humanities and sciences core texts, but not texts found specifically in our seminars.

Year II: number of courses launched:		New	Textual Infusion	Prototype	Permanent
Core/Gen ed	Whole Curricula Revised				
	Honors		2		2
	Regular Common Req'd core	2	4	2	4
	Regular Distribution	3*			3
	Alternate Track through Core				
Electives/Upper Level		1		1	
Majors		3		3	
Course Totals		5	10	2	13 = 15
Courses in development but not launched:		8			

Comments: The total represents an *increase* in courses offered on campuses across the nation which were shaped by BTG, for all of the 15 courses in Year I were still running and Year II represents *new/revised* courses. Courses increased in numbers and in effects on whole curricula for two reasons: first, courses in development in the first year came on line this year, and the number of faculty who had attended BTG increased. *Seton Hall's core text infusion of Honors courses completed a transformation of the whole honors curriculum.** Two of the courses in this column were team-taught: one by a BTG faculty member from the humanities, another by a *non-BTG* chemist. The decrease in pilots relative to the increase in permanents is almost certainly attributable to confidence in the merits of the summer seminars coupled to the success in first year implementation. It is suggested that readers of this report examine Cook's evaluations for further probabilities along these lines.

Year III: number of courses launched:			Textual		
		New	Infusion	Prototype	Permanent
Core/Gen ed	Whole Curricula Revised	1	6* +1	1**	6+1
	Honors		3		3
	Regular Common Req'd core	2	4	2	4
	Regular Distribution		1		1
	Alternate Track through Core		1		1
Electives/Upper Level		1			1
Majors					
Course Totals:		3	17	3	17 = 20
Total Courses All Three Years		15	35	11	39 = 50

Courses in development but not launched: 2 new honors courses, 2 prototype core curriculum courses, and one "common topic" initiative involving cooperating faculty from (humanities) freshman seminars and scientific inquiry courses in the core.

Comments: One course prototype proposal was voted down by a curriculum governance committee; the course never ran. One BTG school continued to urge its part time and non-tenure track full time faculty to incorporate core texts from the humanities and sciences in its humanities course, but it did not require this nor review syllabi for cooperation.

* These six courses represent the "absorption" of six non-BTG faculty members in one institution into the project of infusing their particular core courses with science and humanities core texts. These six faculty coupled to the five BTG faculty gave the core text/science and humanities faculty a majority in the core faculty – a majority which affected both the actual courses taught and the votes on criteria for core course construction. The +1 course under infusion and permanent represents a course that moved out of "prototype" being taught by a team of three professors (at SBU) into a required, core course being taught by all professors; as such this represents a spread of the project well beyond the boundaries of the total team members of the project. We have treated this one course as "new" precisely because it moved from one section to many and one team of professors to all in the core program. ** One prototype course, on the other hand, is a course with content mandated by faculty committee, and will ultimately, after fine-tuning, be taught to all on freshman by all faculty on campus. Two other courses, not yet in prototype form, are to be brought into prototype shortly; they are not listed, here. The two regular, required common core courses are similar to the six courses above, but they are classed here as not constituting a "whole" core change because they involve only small portions of the faculty.

All courses listed are new; most are outcomes of earlier “in development” course plans. Some institutions simply skipped the “prototype” phase; Seton Hall simply infused its required honors courses in pace with the development of the seminar. Others developed prototypes which were meant to be “permanent” yet act as models for “same” course development by other faculty. This was clearly the case at Samford with its two IDSC scientific inquiry courses developed by participants Metress and Dobbins, and at SBU where the five members having suffused their core courses with core texts from the sciences and humanities, then persuaded six other faculty members to follow suit.

Total in-place course delivery of Bridging the Gap: 50

Total planned courses still to be implemented: 4

On an average number of courses per institution basis (either 50/7 or 50/10), these totals are way beyond any requirement that institutions had to meet in regard to the grant funding and solicitation agreements. The funded original number of institutions for this project was seven (7), the actual number of participating institutions, 10. Each was supposed to have generated, minimally, two new or “infused” courses. As funded, the project could have expected 14 new courses; as a question of participation, it could have expected 20 new courses. Thus, it is arguable that the project as a whole exceeded its course production by between 2.5 and 3.5 times its minimum goals.

- Of the 10 total participating institutions:

8 produced new or infused courses; of these institutions
 6 were “fully” supported by the NEH grant monies
 2 were largely supported by their own cost-sharing

Of the 8 institutions which produced new or infused courses, 6 produced curricula and courses in excess of the two-pilot minimum course development expected of institutions:
 5 produced wholesale change or important structural modifications in their core curriculum programs which incorporated humanistic and scientific core texts;
 (see evaluation, below, p. 20 ff.)

1 produced no change in a culture or curriculum structure, but did produce new sections of courses in excess of two taught by its faculty members within the general, liberal humanistic education courses.

1 produced no tangible change in its culture or curriculum structure, but did work upon part and full time faculty to change the common humanities course into a core text course using science and humanities core texts.

1 produced new courses, but did not do so in its core/gen ed courses

2 institutions produced no changes at all in their courses

1 of these entered the project in the second year

If institutions which met the minimum of two courses are taken as the unit of measurement, then the project fell short of its original goal of producing two pilots in general education in seven institutions, by one institution. The project did, however, vastly exceed the two-course minimum in five institutions.

More importantly, Bridging the Gap had structural, not just course, consequences for curricula. At Seton Hall, the introduction of scientific texts whole cloth from the project infused the entire required honors curriculum, while at Benedictine the principle of using core texts of the sciences and humanities in the core was ratified by faculty vote, while prior to this ratification 11 of the 20 professors teaching in the core infused every section of their core curriculum courses. At St. Bonaventure, the syllabus of 102, with its core text readings derived from this project, became standard for all core sections of that course. At Seton Hall, core text pilots are in place that are fully intended to be pan-institutional and at Samford models, particularly applicable to revising the Scientific Inquiry common course, have been developed for faculty to use in revising their own sections.

It appears, further, that the project had tangible core text, science-and-humanities effects upon courses outside general education curricula in two other institutions, though these did not meet the criterion of two pilots in general education.

Some consideration might be worthwhile, here. If one looks at the project and says “well, it didn’t quite meet its institutional goal,” that’s one view; if one looks at the project and says, “well it accomplished 6/7ths of its goal,” that’s another. If one notes, “the project delivered wholesale structural changes in curricula which it hoped for but never promised,” that is another view. The point, here, is simply that this is a *practical and productive* project and that its accomplishments against its goals – in excess and in deficiency – should be seen in that light of the exigencies of institutional cooperation and action fostered by the grant.

EVALUATION

Evaluation of this project should proceed along three lines of inquiry:

- 1) Was the intellectual content of the seminars sufficiently rigorous to promote thoughtful questions that spanned the humanities and sciences, and was the content such that both scientists and humanists were drawn into intellectual and pedagogical discussion and cooperation?
- 2) If there was success in achieving faculty cooperation in discussion and course planning, what about the project structure made this possible?
- 3) If there was successful cooperation and planning, what about the project structure made the development of courses and curricula possible?

1) Seminars: For purposes of analysis, the author of this report will assume that the rigor and thoughtfulness of the three seminars was such that the seminars did promote cooperative, intellectual and pedagogical discussions among scientists and humanists. Selections of explicit analysis of seminar content and effects upon team members drawn from our Project Evaluator’s three years of reports are provided below (p. 22ff.; for fuller statements, see appendix.)

2) Faculty Cooperation: The original plan of the project called for *teams* of three faculty from institutions to attend: one person was to be an administrator, two to be humanists, one to be a scientist. Most of the institutions met this criterion.

Each team was to have a *team leader* who, over the year, was responsible for reporting to the project director in two semi-annual reports what each institution had accomplished. The administrator (in most cases also the team leader) was committed to three years of attendance.

The structure of the teams, with team leaders reporting to the project director, seems to have enabled participants who were enthused about the project to return to their campuses to organize campus meetings involving senior administrators and many faculty from both the humanities and sciences.

The original letters announcing the project insisted on “an indicated commitment by administration to support the development and implementation of, at least, two ‘humanities and science’ core text courses of the institution’s own devising in the general education curriculum.” And “the authorizing official certifying the institution’s application is understood to be certifying ...levels of support for participation within the project” including “Support for two mid-summer planning sessions for implementation of two core text humanities-and-science courses” and “support for implementation” of the courses.

Pointedly: those institutions that conformed with this outline of attendance and support were the teams whose institutions were most deeply affected by the project.

In particular, Seton Hall University, Samford University, Mercer University, St. Bonaventure University, and Benedictine University all set up numerous meetings with faculty on campus over the life of the project. (See chart in appendix). These were the institutions that were most deeply affected by the project.

The concept of a “team” did clearly have effects which facilitated or, at least, led to the accomplishment of project goals:

The cultural divisions between humanities and science faculty did not automatically lead to a cut off of communication once teams returned to campus. Examples of continued team cooperation abound in the five institutions mentioned above; let two stand for all: David Garza, first year chemist and Chris Metress, English professor and team leader for three years, continued to cooperate into the third year, eventually co-teaching a science course using primary core texts. David Dimattio (physics), Kevin Vogel (biology), and Rod Hughes (philosophy) continued to work together for three years, though only Hughes attended all three sessions, on a team-taught pairing of courses in writing and science at St. Bonaventure. But cooperation among teams did continue in institutions that were less successful, too. The University of Dallas team which (along with St. Olaf) experienced the most disruption in team membership and leadership, nevertheless twice had humanities and science faculty members meeting to develop general education core text/project-inspired courses. Saint Mary’s College, which entered the project in its second year, had its team work together to produce a summer “institute” in which Harvey’s *Circulation of the Blood* was read by over thirty faculty members.

Even in institutions where the divisions between sciences and humanities faculty were strict, the formation of teams produced results. Norfolk State University’s Honors program is largely ignored by scientists, and even the involvement of Norfolk’s one scientist proved problematic in terms of continuous cooperation. Still, the humanists who attended continued to work together to introduce texts from the project and texts like those from the project into their humanities courses. This was one of the project goals. And, they worked to influence other faculty, as well. Truckee Meadows Community College produced little in the way of results, but participants, including a senior administrative official who is a scientist, swear that the project had effects in faculty discussions and perceptions of what is possible on campus; perhaps an indicator of this is that the project director has been invited to the campus to speak with faculty about the project in the coming year. The implication is that the effects of the project might yet be realized.

Team leaders were clearly important to both leading the success of the project on campuses and monitoring the success of the project by the project director. Repeatedly, team leaders took the initiative, enlisting their team colleagues first, in developing wider faculty meetings and, later, in developing curricula. *Exercise of leadership back on campus was true in 9 out of 10 institutions, whether institutions eventually adopted course changes or not.* For example, at Norfolk State, which had only some success, Page Laws nevertheless reported to wider faculty about the project and repeatedly attempted to enlist the faculty of science's buy-in to the project. At Saint Mary's College, Chris Sindt organized a 30-member faculty institute on adopting a text into a course. At more successful institutions, team leader rose through meetings either to lead major initiatives or to lead whole programs: Marian Glenn of Seton Hall became a prime advocate for core text curricular reform of the general education program, there. At Benedictine three members became leaders on campus of initiatives that involved its materials and course aims or evolved out of this project. Patrick Flynn, Benedictine team leader, applied for and was appointed director of the Core program at Benedictine.

Each of the institution's team leaders provided detailed reports to the project director on the progress of developments on campus and the only time a report was not received was when a team leader left his institution for another and the central administration of the BTG college did not appoint a new team leader for the third year.

Success in this project was highly correlated with stability of leadership in teams and team members. Two institutions that produced no real course change in the general education program all saw either their campus senior administrators and/or team leaders change hands or decline to attend early Year I or II sessions. Instability of leadership seems strongly correlated to faculty unwillingness or inability to do more than make sectional or majors/electives course changes. One team was continually "devastated" by rotating membership. Another team not only suffered change in team leadership (which also removed the one senior administration official who was interested in the effort) but failed to meet the three-member team two out of three years.

Teams were subject to changes which were outside the scope of the project to control. The configuration of teams was internal to the project, but the staffing and reception of those teams at the campus was dependent on the circumstances of financing, cultural dispositions between humanists and scientists, specific programmatic participation, and hiring and leaving of faculty and administrators. Of the teams that produced weaker or partial or no fulfillments of the expectations of the grant, two had strong science faculty who either would not send tenure track faculty to the grant, or who argued, without evidence supplied to the project director, that they were already doing BTG activities. One of these same institutions had an alternative track core text program which might seem ideal for infusion. But the team leader representative from the college was not the administrator of the core text program and he was powerless to persuade the program director to join in the dance. The program, thus, remained exclusively focused on humanistic texts, while, ultimately, the team leader left the college immediately after the second seminar. Another institution, whose Provost signed for the college's participation in the project, left after the first year of the project. With the office vacant and a new president in place, there was no one of sufficient authority to push for two pilot courses. This same team, then, rotated the team leader and each year different team members appeared at the seminars. Each of the team members, subsequently, were hired away or left, though they had tenure at the institution they represented at BTG...

The overall picture that one sees of the BTG design of teams and subsequent meetings with larger faculty on campus is one of major accomplishment at five institutions and cohesion of team purpose and course proposal development within teams at three other institutions. Faculty

development projects were not simply “informative” to colleagues about the project back on the more successful campuses; they were creative and original in conception, though clearly related to the project. Two examples suffice: Samford, through the work of Metress in English and Dobbins in Biology, ran a faculty development project in the second year on “Genetics and Information Flow” based on core text readings which attracted ten professors from disciplines crossing the humanities and sciences. Samford also developed other such faculty development meetings. Benedictine ran faculty development/information projects in the first year, and by the third year had converted enough of the faculty in the core program so that a vote ratifying the mandated use of core texts and, out of these, science core texts in the required core courses was successful.

Individual faculty roles on teams in linking faculty development to course development tended to differentiate along lines of science and humanities fields. Generally speaking, about half the scientists in the project gave one year to seminar participation, but once enrolled, they gave three years to course development. It is difficult to believe that former members would have persisted in either meetings or course development had not the project continually returned to campus with new materials for the sciences. Humanities faculty, on the other hand, tended to remain on teams longer than their science colleagues. They clearly gained the confidence of the science faculty, for repeatedly our humanities team members returned to campus to work with science (former) team members to build team-taught courses. Together, quite often, these humanities and science faculty cooperated to produce campus-based faculty development meetings. When they did not, generally, humanities faculty led the way in this area, frequently by introducing the concept of using specific texts of science in core curriculum courses to their humanities and administration colleagues.

Also, faculty course and curricular planning meetings, initiated by our teams, clearly spread well past the implications of building one or two pilot courses. Seton Hall’s team came as an Honors program team, desiring to reform their core honors sequence. They left as advocates and catalysts for change on the University’s entire campus from a distribution system to a core text, required core curriculum. Mercer University’s team is drawn from an alternative track, great books program. They returned to campus to plan not only the strengthening of their own program, but the development of core text, BTG courses in the broader general education program.

Allied to the spread of the project’s outcomes well past one or two courses was the assumption of leadership posts in general education programs by our faculty members after having been members of this project. At Benedictine, Jean Marie Kauth became director of the Writing Across the Curriculum project and courses and introduced four texts from the project into these courses; she developed models of curriculum, including these texts, which must be followed by faculty in teaching writing. In the words of the Benedictine team leader, Patrick Flynn, “Frankly, it is my view that without the contributions of the ‘B-T-G’ project to the creation of the Across-the-Curriculum Writing Program, the Program would never have been approved by the faculty. The science faculty and administration would never have bought into the basic tenants of the Program.” Al Martin, a biologist, became the co-director of the Community Mission project, a review of Benedictine educational principles. Martin developed a program of review based in core texts of the Benedictine tradition which he states, “The series [of meetings by 25 faculty members at each meeting], based on unifying concepts or texts, was viewed by us organizers as ...based on the ACTC model.” Patrick Flynn became Director of Benedictine’s Core program. At St. Bonaventure, David Dimattio, physicist, became Dean of Clare College, the core program

of SBU.¹ And, at the University of Dallas, Kathleen Burk became the Associate Dean of Constantin College; she is currently deeply involved in the beginnings of a core curriculum review.

Clearly, there was a causal connection between familiarization, implementation planning, and eventual course outcomes. Not all meetings resulted in revision, and some courses were developed without meetings, but clearly we can say, no meetings (as required by the project design and application process), no project success.

There was a weakness in meeting planning which could be addressed in future projects: *planning should have included having non-participating faculty attend or observe participating faculty's courses for one or two class periods.* This attendance would include preparatory discussions and exchange/provision of materials. Such a requirement would strengthen faculty buy-in.

3) Curriculum and Course Building: *Based on the course-building minimums of two-pilots per institution, the number of courses generated by this project vastly exceeded minimal expectations (by as much as 2.5-3.5 times).* Based on the budget allocation by NEH of the original grant for seven participating institutions, the figure of 6 institutions producing new or infused courses (above, p. 12-15 in the analysis of courses produced each year) fell short of goals by one institution, but of the remaining four institutions, the content of some instructors' required humanities courses were moved toward core texts and science materials and two more did produce new BTG-inspired courses.

The project was longitudinal; that is, it took place over three years. Examination of changes in project effects over three years is very revealing.

A significant shift in where in the curriculum course development took place is noticeable. In Year I nearly half of the courses developed were in electives or majors, by Year II development in that area was reduced to ¼ of courses, and by Year III only 1/20th of courses were developed in electives or majors. (See tables above on course development, p 12-15.)

Conversely, as might be expected by a project aimed at general, liberal education, each year the percentage of new course development increased in the core, general-liberal education category and this percentage involved not only humanities-humanities or science-science faculty cooperation, but humanities-science faculty course building.

The reasons for these shifting proportions are not far to seek: faculty members after Year I, inspired by the project, could return home and immediately change their non-gen ed courses. But core courses require the cooperation of faculty across disciplinary and departmental boundaries; therefore, it takes time to convince faculty, to change the core culture, and to implement core, liberal arts, humanistic courses.

¹ The link is direct. In response to the project director's written question, "Did BTG enhance, in your view, your application for chair of Clare?" Dimattio responded: "Yes. The BTG has been recognized as a prestigious opportunity for Clare College. The BTG experience allowed Clare College to be displayed on a national level. The fact that I was an integral part of representing Clare College emphasized my commitment to the liberal arts and sciences tradition of our core curriculum." Email correspondence, 7/27/06

Further, from Year I to Year III, there was a steady accretion of effects from the project which culminated in structural change of whole curricula.

Structural change in whole curricula is represented by how to count courses as either “whole” curriculum revisions or implied partial, course by course revisions. (Again, see chart above on course development, p. 12-15.) We know there was structural change that was brought about by this project, at least in part, in Seton Hall’s general education program, for it had a general distribution system, changed it to a core curriculum based in core texts by faculty senate vote, and testimony of project participants indicates that Bridging the Gap provided curricular models for faculty from the entire university to understand and react positively to the change.

Interestingly, Seton Hall also provides an “infusion” model of introducing core texts from the sciences. Here, faculty returned with syllabi and proposals from the seminars that eventually permeated all required courses for the Honors program, while also inspiring two new optional ones. The net effect is to change the very nature and structure of that Honors core.

Benedictine provides a different, “principled leadership” model: a group of five dedicated faculty attended BTG over three years. They returned to teach in their core, which has common core courses but was in the habit of leaving much of the textual matter to individual faculty decisions. Through course infusion of core science and humanities texts, and through meetings with individuals teaching in the program, eventually 10 of the 20 faculty teaching all four courses of that core humanities sequence infused their courses with texts from BTG. Further, the team leader became the core director, and in February of 2006 secured a vote of core faculty to (a) require that core texts be taught in every section of the core humanities program and (b) that some of those core texts be history of science texts or scientific papers. As indicated above, the principled leadership was part of the changes in the Writing Across the Curriculum courses under Kauth’s directorship and the Community Mission review under Martin’s stewardship.

Samford University represents still a different model, a bit of a borderline case, clearly impacting structure in an evolutionary way if not changing it in a “revolutionary” way. Samford faculty, through extensive faculty development meetings, have involved the arts and sciences faculty in considering the results and implications of BTG. These meetings have ultimately led to cooperative arrangements by faculty across the disciplines. They have, also, modeled course development and improvement in required core courses, with humanities faculty occasionally teaching science materials (Newton, Euclid and others), and science faculty teaching humanistic materials. And finally, they have developed a faculty committee to link science and humanities courses through required shared topics.

A final case would be St. Bonaventure’s Clare program, which in some ways used the *liberal arts tradition of the trivium and quadrivium* to link two courses, a writing course and scientific inquiry course, through the development of methodological questions about definitions, hypotheses, logical reasoning, scientific proof and so forth. This model may, in fact, become the required form of faculty cooperation with these two courses and, in any event, it has also been used to create a learning community of students.

Thus, over time a project such as Bridging the Gap can truly affect the structure of entire core curricula so deeply that an entire institution’s culture of higher, general liberal arts instruction will change. But time, time, time – three years of it – is required to effect such change.

Unquestionably, institutions “ready for change” were very much a part of the success of this program. But just as clearly, these institutions were not necessarily ready for “humanities and

science faculty cooperation” or “core text infusions throughout the curriculum.” Directionality toward cooperation and core texts appears to be a real consequence of the cooperative nature of the seminars and their intellectual weight. These features persuaded members to go back to campus with enthusiasm.

Again, the expansion from the seven funded institutions to the ten total participating institutions was made possible through extensive cost sharing by three institutions eager to be part of this project. The willingness by some institutions to pay considerably more than other institutions to participate in this project was a sign of “readiness” and an expectation on the part of institutions, upon review of solicitation letters, that the project was likely to have the intellectual, cooperative, and curricular solutions to problems. Seton Hall was willing to pay mostly on account of its honors program; this was where the promises of course development were made. Thus, the decision by Seton Hall to transform its general education program into a core text required program, while fortuitous, was almost certainly an outcome of the curricular and cooperative model that Bridging the Gap displayed to attending faculty. More intentionally, one of the institutions which received full funding gave an indication in its final report of the directionality of the program for them: the team leader at Benedictine wrote that Benedictine knew it wanted to join the sciences and humanities into a core, but that faculty didn’t know how to do it.

Of the seven institutions which would have been part of this grant had no cost sharing occurred, three (3) produced extensive change in their general education cores, two (2) produced sectional/pilot changes in courses, and (2) produced little or no change in courses. On the other hand, of the three (3) institutions willing to cost-share extensively their participation in the project, two (2) of the institutions produced the greatest structural and course change and the greatest degree of cooperation between humanities and science faculty. And the one (1) institution which joined in the second year did produce a prototype course, but is currently in a series of planning stages quite typical of the more active programs that were in the project for three years. In this latter case, this is a “core curriculum, core text” institution, so that if the present planning processes bear fruit in the future, then an argument would be created that the project had effects whether an institution was “core text” oriented already or only circumstantially open to such an orientation. Mercer, with the spread of its core text efforts by an “alternative track” faculty into the general education program, tends to confirm this supposition.

Seminars: The seminars or workshops, lasting two weeks, were the foundation of the project’s attractiveness for they involved humanities and science faculty in cross-disciplinary discussions about texts and in cross-disciplinary initial planning about returning to campus to meet with faculty and to plan curricula...

The project had an evaluator, Patricia Cook, who has evaluated the project for three years. Extended extracts of her evaluations, are reproduced in the appendix, but a very few passages, immediately below, might convey the building connection between intellectual content of the humanities, of the sciences, and of cooperative curriculum building:

Excerpts of evaluation by Patricia Cook:

Year I

Discussions of Readings

...This session was the intellectual climax of the seminar. We discussed how Isaac Newton wove the various strands of natural philosophy of Copernicus, Galileo, and

Descartes into a comprehensive solution to the issues of celestial mechanics. Perhaps the greatest moment was when one participant “demonstrated” Newton’s Proposition I , Theorem I (roughly that a line joining one heavenly body to another sweeps out equal areas in equal times) at the blackboard. This is an extremely elegant proof with a beautiful construction. Everyone worked through the steps together, discussing their mode of understanding and/or assent to each move in the argument. This, it was said, is what it is to make a persuasive case and what it is to really understand an argument. ...

The demonstrative mode is perhaps neglected in contemporary pedagogy. Many of us had never tried to demonstrate a theorem for an engaged audience. We had neglected earlier opportunities in this seminar (e.g., to demonstrate propositions of Euclid)...Now it seemed to us that demonstration involved unparalleled rigor on the part of both the demonstrator and the (interactive) audience. Though time-consuming and difficult, many participants believed that this demonstrative mode belongs in our college classrooms to create a benchmark for what it is to clearly understand a thing....

Curriculum Workshops

During the final two days of the conference, participants from the same institutions met in their groups of three and discussed concrete plans for adding at least one of the seminar texts to their existing courses. Seminar Director Dr. Lee encouraged groups to devise precise tactics for integrating the texts into current courses, and sought suggestions from participating institutions for developing new humanistic curricula that utilize the insights gained from the seminar experience with these primary texts....

I observed only one wholly unanticipated and remarkable phenomena at these group meetings: many faculty members are so insulated by their department affiliations that they know very little about their own school’s core curriculum. Even those who teach in their school’s core program were in many cases uninformed about the exact contents of other core courses. Maybe this would not have been so striking if these teams hadn’t just spent two weeks together engaged in this “bridging the gap” project. In any case, when teams got together and looked closely at their own college’s course materials, someone invariably announced, “I didn’t know about that.” Hard science professors were the most isolated. They had never been called upon to participate in core teaching. Physicists, chemists, and biologists often have overwhelming enrollments in service courses or pre-professional courses, and hardly have the chance to teach upper level courses in their own disciplines. Few could imagine being given leave to participate in any real way in an interdisciplinary core program.

At the end of each session, a questionnaire designed by an expert in survey research and questionnaire design, Geraldine Mooney, was passed out to participants. It was returned by participants to the Evaluator, not the Project Director, who later received the results and comments, minus any identifying traces. Each year participants were asked to evaluate texts in terms of their intellectual interest and, then, their pedagogical usefulness as a function of *interdisciplinary* humanities and science course creation. They were, then, asked to evaluate the utility of specific suggestions that arose in the curriculum development sessions.

A very few extracts of responses from the first year may serve to emphasize how the combination of intellectual endeavor and curricular calculation was having its impact, even in the first year.

An extract from the answers about intellectual interest reads:

“With an eye to understanding the histories of physics and astronomy, and the development of the ‘scientific method,’ I found Euclid, Galileo, and Descartes to be most intellectually interesting. What interested me most about Euclid was the way that he proceeds in the *Elements* – his effort to demonstrate particular ‘enunciations’ from very few postulates. I was impressed to see Ptolemy in the *Almagest* and Newton in the *Principia* pursuing substantially the same method.....”

An extract from the answers about which texts would be best suited to interdisciplinary core courses reads:

“*Timaeus* as cosmology; Ptolemy linked with Dante’s *Paradiso*; the *Starry Messenger* and Galileo’s experiments; *Principia* and Euclid to carefully demonstrate one proposition, and Donne, *Against mourning*.”

Answers to what specific suggestions were useful both developed ideas that later came to fruition in curricula, as well as overall methods and principles that informed later course and curricular construction read:

“Phil Sloan’s bibliographic resources for the study of Newton’s *Principia*. Peter Kalkavage’s examples of particular questions to raise, in seminar, about texts such as Euclid’s *Elements* and Ptolemy’s *Almagest* which, at first glance, do not appear ‘discussable.’ Scott Lee’s suggestion to consider integrating these texts into various ‘science for non-science majors’ offered at our school; we had previously only considered integrating them into our ‘western civilization’ courses...”

“The one-on-one meetings on Thursday and Friday of the final week were very helpful in working out specific strategies.”

“The suggestion and practice of working through proofs together and discussing them; the suggestion to stay text-focused.”

“The tone and nature of the conversations (in class, out of class) all contributed in my own formulations”

“I think the experience of doing the science and seeing how the ideas unfolded indicated to me how the integration actually takes place!”

“The benefit (among many benefits) was how Peter continually brought us back to the dialogue between and among authors and disciplines.”

Not excerpted here but available in project archives are remarks that indicate the kind of thinking that our statistics and our evaluator’s reports revealed: namely, that participants after the first year thought about capstone and majors courses; that they were enthralled but deliberate about producing general education, core text curricula. After all, at the point of exiting the first year’s seminar, only they, among all their faculty colleagues, had had the Bridging the Gap experience.

It is to be remembered that the extracts above come from unidentified respondents, two-thirds of whom were humanists. Meanwhile, we should bear in mind Cook’s observation on the isolation of science faculty from their own institution’s core.

For two years, then, as documented by this report and filed reports from our project's campuses, faculty worked together to produce curricula both across the scientific and humanistic disciplines and with materials derived from the sciences and humanities.

Two years later, the participants and evaluator are now involved in a project which has led them to think about the links between the humanities and sciences and course construction for three sessions. While some of the tone of reflection was surely a function of the specific topics of the seminar, still Cook's evaluation and her record of faculty response demonstrate a kind of maturity of both speculative and practical thought that was not *possible in the first year*:

Excerpts from Cook's Evaluation of Year III

The question of technology that was specifically addressed in the third summer seminar was seminal to the "Bridging the Gap" project as a whole: To what degree should study be directed to utilitarian ends? Shakespeare's *Tempest*, Bacon's *New Organon*, and Swift's *Gulliver's Travels* suggested important ways of addressing this question. Is inquiry into nature a sort of explication of God's works, or should it include an attempt to improve the human condition? Shouldn't self-examination lead us to the ultimate position of power, namely, being able to control our use of our powers? Can intellectualizing be taken too far, so that we "elevate" human civilization like Swift's hovering island only to find we can't function in the practical realm?... Not only is technology seemingly self-justifying and self-perpetuating, it has a way of coming to control us. The things we create – Kafka's torture machine, Hawthorne's alchemy - in the end turn out to be "creating" us. Hans Jonas makes a parallel argument in *The Imperative of Responsibility*. Jonas argues that the Baconian project has revealed its insufficiency by proving unable to regulate itself. Is this inevitable?...

...I could find no participant who did not feel changed by the readings and discussions. Everyone seemed to encounter the limitations of their own disciplines that had to be complemented by disciplines, as it were, "on the other side of the gap". All participants seemed to feel the need to revise higher education curricula in such a way that student inquiry encountered the world as a whole. Although the director's stated goal of the project was actual curricular infusion, the evaluator began to think that the consciousness-raising of the immediate participants might be an equally significant result. Curriculum changes can remain superficial unless the zeitgeist is prepared to accept and perpetuate what underwrites the changes. It may be that the individual convictions and illuminations reported by participants constitute actual changes in the spirit of the times. Thus, even before any formal assessment of actual curriculum revisions, the evaluator believes the project to have been a splendid achievement.

The project director is not prepared to say that a zeitgeist has changed. But he is prepared to say that there is strong, compelling evidence and argument that "Bridging the Gap Between the Humanities and Sciences: An Exemplary Model of Core Text, Humanistic Education" changed on many campuses the culture of core curricula, the intellectual and cooperative relations between faculties from the humanities and sciences, the frequency of teaching of core texts in the humanities and sciences, and that it provided individual and collective inspiration and methods to teachers of students in core curricula so that both teachers and students could perceive real glimpses of "the world as a whole." The project director is also prepared to say that these achievements could not have been accomplished had the National Endowment for the Humanities not had, at the time of our proposal submission, an option to submit a proposal for a project of three years' duration. ACTC is grateful for that lengthy and trusting support.

The project director wishes, particularly, to thank Barbara Ashbrook, program officer who provided valuable advice both during the proposal development stage and the length of the project. Part of the success of this project belongs to her.

CONTINUATION OF BRIDGING THE GAP

ACTC is currently executing a Fall 2007 conference involving between 45-55 institutions; one-half of this conference is devoted to the outcomes and implications of the Bridging the Gap project. Demonstrating the seminar workshops will be Phil Sloan, one of our team leaders. Faculty participants will demonstrate curricular developments, and numerous faculty members from the Bridging the Gap project will be leading humanities and sciences teams of faculty in Bridging the Gap-like seminar readings at this conference's end.

ACTC will be completing its BTG website which should link various institutional websites of the project that are devoted to Bridging, but will also provide examples of curricula developed by participants and participating institutions.

From this conference, we expect to recruit new institutions for a new Bridging the Gap proposal to NEH. ACTC is also presenting results two weeks later at a general plenary session of the Association of Integrative Studies.

ACTC plans a "Bridging the Gap" project for the Social Sciences and Humanities.

LONG TERM IMPACT AND CONCLUSION:

The project was built to have "long term impact." Construction of core curricula tends to move incrementally, artistically, and in an evolutionary fashion, not in landslides, in machine-manufacturing mode, and in revolutions. That said, ACTC's Bridging the Gap does seem to have had "revolutionary" effects at one institution (Seton Hall) and evolutionary effects at three (Benedictine, Samford, and, possibly, St. Bonaventure.) It has had artistic effects coupled to spreading incremental changes at Mercer. Its artistic effects were confined at Norfolk's Honors program to its team's participants' courses. We have seen the same at Saint Mary's but spreading, incremental effects may, yet, take place, there for discussions with various administrators of programs are still underway, and the pilot course in which Manter and Sindt team used Harvey, will come before a "Collegiate Seminar Board" vote on universal adoption, this coming year. Truckee Meadows Community College will be working with the project director in the winter of this year on faculty course development. The University of Dallas is an interesting case. Apparently, there have been no achievements and half of the faculty who participated in the UD teams have left the institution. Most of those who left were, unfortunately, the best disposed toward the project. But, oddly, there is still a good chance of long-term impact. Kathleen Burk, team leader for the last two years, has, as mentioned above (p. 20), become Associate Dean of Constantin College and the new President and the Board of UD have backed a core curriculum review. Something may yet come out of that, especially as UD is sending two representatives to ACTC's fall conference which involves outcomes of BTG.

"Spin-offs" have been discussed above under the topics of Bridging participants becoming faculty leaders (p. 20) and immediately above under "continuation."

It appears very likely that ACTC's membership has begun to perceive ACTC as the place of "science-and-humanities" core text, core curricular change. As noted above (p. 3), conference attendee participation and the number of panels on "science-and-humanities" topics has grown by three times in three years.

Without question, the ability of ACTC to interest institutions and individuals in the upcoming fall conference is part of the long-term impacts. ACTC will present the structure and findings of this project, in abbreviated form, as we have in this report.

Conclusion: Darwin's last chapter of *the Origin of Species* begins "As this whole volume is one long argument, it may be convenient to the reader to have the leading facts and inferences briefly recapitulated." So, here, with this report. This report is one long argument leading to an important conclusion:

After one year, faculty produced a few pilots and half of their efforts in curricular innovation were in majors and elective courses, even though the project was aimed at and formed to produce curricular change in general liberal education. The reasons for this are obvious; in a one-year time frame, science and humanities faculty could only affect courses that they were individually responsible for. As the project extended, the proportion of general education courses developed or changed by the project increased, while the proportion of electives decreased, to the point where in the third year, 19/20ths of the course creation was in core text, science-and-humanities core curricula. Where at the beginning there were no structural implications after the first year, by the third year the structure of, at least, three and probably five of our institutions had been profoundly affected. Meanwhile faculty cooperation shifted over three years from meetings designed to familiar on-campus faculty with the BTG project to course planning meetings involving not only humanities-humanities or science-science faculty cooperation, but humanities-and-science faculty course building.

Despite specialization and rewards for it in the lives of all academics, it is not only possible, but probable, that humanists and scientists can work closely together to build core curricula (not just gen ed courses) based in humanistic readings of scientific and humanities texts, but this is only likely to succeed with long-term impact when the scientists and humanists are supported by a project that is sufficiently long and articulated in its duration that institutions and participants will have time to develop the relations of intellectual understanding and practical cooperation that result in development of courses and integrated materials. In brief: short projects, short effects, long-term projects, long-term effects – at least where core curricula made of core texts are concerned. ACTC is especially grateful that NEH chose to support Bridging the Gap for its three-year duration.

APPENDIX

National Endowment for the Humanities and the Association for Core Texts and Courses

Bridging the Gap Between the Humanities and Sciences: An Exemplary Model of Core Text, Humanistic Education: A Three-Year, National, Liberal Education Curriculum Project to Build Humanities-and-Sciences General Education Courses Based in Core Texts through the Cooperation of Humanities and Science Faculty

2003-2005

St. Johns College, Annapolis, Maryland
Motion and Natural Law in a Philosophical and Political World
June 1-13, 2003

Participants

Benedictine University

Patrick Flynn, Director Institute for Science and Values
Dr. Jean-Marie Kauth, Rhetoric
Martin Tracey, Philosophy

Mercer University

Mary Ann Drake, Interdisciplinary Studies
Thomas Huber, Biology
Edward F. Thomas, Philosophy

Norfolk State University

Nuria Cuevas, Administration (did not attend)
Robert Danek, Humanities (replacement)
Page Laws, English and Director Honors Program
James L. Toy, Coordinator Laboratories, Physics

St. Bonaventure University

Michael Chiariello, Dean Clare College and Philosophy
David DiMattio, Physics
Roderick Hughes, Philosophy

St. Olaf College

Deborah Anderson, Psychology
Rick Fairbanks, Associate Dean, Humanities
Maggie Odell, Religion

Samford University

William Collins, Political Science
Christopher Metress, Coordinator Cultural Perspectives
David Garza, Chemistry

Seton Hall University

Kristina Chew, Classics, Writing, Honors Program

Colleen Conway, Religious Studies
Marian Glenn, Biology

Truckee Meadows Community College

John Adlish, Biology/Dean (did not attend)
Rena Denham, Chair, Humanities and Fine Arts
W. Tell Gifford, Humanities

University of Dallas

Margaret Elizabeth Brown-Marsden, Biology
Claudia MacMillan, Associate Dean
Lance Simmons, Philosophy

Seminar Leaders:

Peter Kalkavage, St. John's College
Phillip R. Sloan, University of Notre Dame

Evaluator

Patricia Cook, St. John's College

Project Director

J. Scott Lee, Association for Core Texts and Courses (jscottlee@prodigy.net)

National Endowment for the Humanities and the Association for Core Texts and Courses

Bridging the Gap Between the Humanities and Sciences: An Exemplary Model of Core Text, Humanistic Education: A Three-Year, National, Liberal Education Curriculum Project to Build Humanities-and-Sciences General Education Courses Based in Core Texts through the Cooperation of Humanities and Science Faculty

2004

University of Notre Dame, IN
Life: Origins, Purposiveness, and Transformations

May 30 – June 11, 2004

Participants

Benedictine University

Patrick Flynn, Director Institute for Science and Values
Alfred Martin, Biology
Fannie Rushing, History

Mercer University

Mary Ann Drake, Interdisciplinary Studies
Thomas Huber, Biology
Paul Lewis, Christianity

Norfolk State University

Page Laws, English and Director Honors Program
James L. Toy, Coordinator Laboratories, Physics
Stephanie Walker, English and Foreign Languages

St. Bonaventure University

Michael Chiariello, Dean Clare College and Philosophy
Kevin Vogel, Biology
Roderick Hughes, Philosophy

St. Olaf College

Chuck Huff, Psychology
Rick Fairbanks, Associate Dean, Humanities
Gary Stansell, Religion

Samford University

William Collins, Political Science
Christopher Metress, Coordinator Cultural Perspectives
Betsy Dobbins, Biology

Seton Hall University

Kelly Shea, English
Colleen Conway, Religious Studies
Marian Glenn, Biology

Truckee Meadows Community College

Ed Burke, Biology

W. Tell Gifford, Humanities

John Reid, Assistant Dean of Arts and Public Service

(left project the first day)

University of Dallas

Kathleen Burk, English

Joseph Nika, Biology

St. Mary's College of California

Christopher Sindt, Dir of MFA

Lisa Manter, Literature

Keith H. Ogawa, Psychology

Seminar Leaders:

Peter Kalkavage, St. John's College

Phillip R. Sloan, University of Notre Dame

Evaluator

Patricia Cook, St. John's College

Project Director

J. Scott Lee, Association for Core Texts and Courses

(jscottlee@prodigy.net)

**NEH-ACTC “Bridging the Gap” Seminars
Year Three: St. Mary’s College of California
“Technology, Art, Values, and the Problems of Technoscience”**

The workshop this year will explore the connection between science and the humanities through the themes of nature and art, beauty and power, the good and the useful, and the goals and problems of a technological society.

We will also explore recent curricular developments at institutions within the project and plan for the final year’s developments and dissemination of results.

Benedictine University

Patrick Flynn, Director Institute for Science and Values
Jean-Marie Kauth
Alfred Martin, Biology

Mercer University

Mary Ann Drake, Interdisciplinary Studies
Paul Lewis, Theology

Norfolk State University

Page Laws, Honors Program
James Toy, Physics
Stephanie Walker, Writing Program

Saint Bonaventure University

Michael Chiariello, Clare College Director
Anne Foerst, Computer Science and Theology,
Roderick Hughes, Philosophy

Saint Mary’s College of California

Christopher Sindt, MFA Program
Lisa Manter, English Department
Keith Ogawa, Psychology Department

St. Olaf College

Gary Stansell, Religion Department
Deborah Anderson, Psychology Department

Samford University

Christopher Metress, English
Betsy Dobbins, Biology
Steve Donaldson, Mathematics and Computer Science

Seton Hall University

Marian Glenn, Biology,
Jürgen Heinrichs, Art History

Truckee Meadows Community College

Tell Gifford, Department of Humanities
John Adlish, Dean Arts and Humanities
Ed Burke, Biology

University of Dallas

Kathleen Burk, Associate Academic Dean
Douglas W. Hadley, Philosophy
William J. Germann, Biology

Staff

Patricia Cook, Evaluator
J. Scott Lee, Project Director, ACTC
Peter Kalkavage, St. John's College
Phillip R. Sloan, University of Notre Dame

jscottlee@prodigy.net

Year I: Location: St. Johns College

Motion and Natural Law in a Philosophical and Political World

Day 1: “Science, Wholeness, and Beauty: the Classical Mathematical Cosmos.”

This session will introduce participants to the idea of the liberal arts, the ordering of knowledge, and the tensions between a purely rational analysis of the cosmos and the demands of observation. This section also brings to the fore the importance of aesthetic criteria in scientific understanding.

Morning: Platonic Cosmology: Selection from **Plato**, *Republic*, Books VII 524a to 530 e. (Any edition is fine, Bloom’s preferable; Plato on the ordering of the Liberal Arts); Plato, *Timaeus*, Kalkavage translation 27a-47e2; 53c-56e; 86b1-92c9.

Afternoon: Mathematics as a Way to Truth: **Euclid**, *Elements*, Greenlion edition: Book I, Definitions, Common Notions, Propositions 1,4,5. Book V, Definitions 1-13; enunciations of Props. 1-2; Book VI, Definitions, Prop. 1, 2, Book VII, Defs 1-5, 20 only

Laboratory, 7:30 PM: **A laboratory visit to a planetarium at St. John’s will demonstrate the observed motions of the planets and the heavens.**

Day 2: “Saving the Phenomena”: Making Rational Explanation Account for Appearances

This section brings to the fore the problem of experience and its analysis. We open with Aristotle’s opposition to the Platonic mode of treating experience in order to illustrate the way in which nature can also be approached through a qualitative “physical” analysis of nature that gives primacy to sensory experience. The second session then illustrates the way Ptolemy’s Hellenistic astronomical treatise represents a synthesis of the approaches of Plato, Euclid, and Aristotle to create an exact predictive mathematical model of the heavens. We see Ptolemy’s attempt to take into account the claims of experience, Aristotle’s physical assumptions about motion and rest, and the idealizing mathematical treatment of phenomena of Plato and Euclid.

Morning: The Aristotelian approach to nature: Readings, all in McKeon edition: **Aristotle**, *Physics*, Book II. chps. 3-4 (194b16-196b 10); chp. 7, 8 (198a12-199b33); *De Caelo*, Book I, chps. 1-2 (268a 1-269b.18); Book II, chps. 13-14 (293a15-298a20); Book III chp. 2; (300a 20-301b35); Book IV, chp. 1 (307b 30-310a 15); *Metaphysics*, Book 12, chps. 7-9, (1072a20-1075a5).

Afternoon: Integration: Ptolemy’s system of the World: Readings, **Ptolemy** *Almagest*, opening discourse and Book I (as found in Crowe, 42-65); Selections from Book III, iii. We will work through the geometrical demonstration of the equivalence of the eccentric and epicycle-deferent systems to allow participants to see exactly how Ptolemy is using Euclid to generate a system in which the exact observational “phenomena” can be saved.

Laboratory 8:30: **Leave St. John’s for laboratory on naked eye astronomy in the evening. Back by 10:00. The crescent moon; Jupiter, the zodiac.**

Utterly optional laboratory at 4:30 AM. This naked-eye observation may allow us to see Mercury precede Venus into the morning sky before sunrise. Mars also will be visible.

Day 3: “Cosmology, Theology and Poetry: Dante’s Cosmos”

This day will be entirely devoted to **Dante's** *Divine Comedy* as a work of literature, theology, and scientific cosmology displaying the integration of these elements in the great epic of the high middle ages, illustrating how the cosmology of Aristotle, with some aspects of Ptolemaic astronomy, are used as a framework for developing this great medieval epic.

Morning: *Inferno* Cantos 1-2, 34; *Purgatorio* Canto 1; *Paradiso* Cantos 1-6 (Allen Mandelbaum trans.)

Afternoon: *Paradiso* Cantos 10,13, 18-20, 21, 27, 30-33.

Day 4: “Transforming Natural Philosophy I: Reordering the Heavens”

This section focuses on the conceptual restructuring of the heavens by Copernicanism and the wider implications of these changes for literary thought and theology.

Morning: readings in **Copernicus**, *On the Revolutions of the Heavenly Spheres*; read all as found in Crowe anthology: 100-133. Possible supplementary reading: Book III, Chapter 15: Copernicus’ equivalency proofs.

Afternoon: Readings of selections from **Galileo**, *Starry Messenger* (as found in Crowe anthology) and *Dialogues on the Two Chief World Systems* (Short handout to be distributed at seminar); Galileo “Letter to Castelli” (a short version of Letter to the Grand Duchess on science and theology, to be handed out at the seminar).

Day 5: “Transforming Natural Philosophy II: Ratio and the New Science of Motion.”

This unit will analyze Galileo’s novel ways of relating demonstrative mathematics and natural phenomena in his final work. It will also be intended to show the complexity of his new “experimental” discourse. At issue will be the following questions: “What does it mean for nature to be lawful?” “What does it mean for experiment to be necessarily approximate but nevertheless to “prove” a law of nature?” “What is the exact relationship between rational construct and natural phenomena?”

Morning: Galileo, *Two New Sciences*: from the introduction, pp. xvii-xxi; pp. 5-8, “Letter to the Reader” and “Letter of the Publisher,” First Day, pp. 61-69; 79-88; Opening discussion from “Third Day.”

Afternoon: Galileo, *Two New Sciences*; Third Day, “On Local Motion”; “Opening Discussion” and Definitions and Axioms. Read just enunciation of Propositions 1-6 on “Uniform Motion” and the section on “On Naturally Accelerated Motion,” through Proposition II, Theorem II (pp. 153-67); Fourth Day, just pp. 232-34.

Laboratory 4:00 PM: **A laboratory on the Inclined Plane and Pendulum will be used to illustrate the complex ways in which rational construct and experience interact in this simple experiment from physics. (This accompanies the reading of Galileo).**

Day 6: “Transforming Natural Philosophy III: The World as a Rationally Mastered Machine”

This Session is devoted to the larger conceptual revisions of natural philosophy taking place in the early modern period that attempt to synthesize the piecemeal transformations in cosmology, mechanics, and philosophy. In this we will see the explicit development of modern notions of “laws of nature” as distinguished from the Stoic-Medieval conception of “natural law.” The session will also explore the new ways of conceiving the relation of the world to divine action.

This session will again raise in a new way the complex interaction of rational constructs and empirical experience.

Morning: read **Descartes**, *Discourse on Method* (Cottingham edition) (pp. 109-151); selections from *The World (Le Monde)* (pp. 81-98)

Afternoon: Descartes, “Author’s Letter” to the *Principles of Philosophy* and selections from Part II (pp. 223-247), IV (pp. 267-292) of the *Principles*; Selection from *Treatise on Man* (pp.99-108).

Day 7: Mastering the Political World: This session explores the ways the new science of Galileo and Descartes provides a framework for a reconceptualization of a new “science of politics” in the work of Thomas Hobbes.

Morning: read **Hobbes**, selections from *Man and Citizen* (Hackett Publishing), “Author’s Preface,”; “Liberty” chps. 1-3; “Dominion” chp. 7, 12; “Religion” chp. 15 (illustrating connection of the natural philosophy and political theory).

Afternoon: Reading: “Newton’s Philosophy of Nature”:

This session introduces, selectively, the powerful synthesis by Isaac **Newton** of the various strands of natural philosophy previously encountered in readings from Copernicus, Galileo, and Descartes into a comprehensive solution to the issues of celestial mechanics. With this, we will have reached the culmination of the first great break in scientific thought away from classical scientific reasoning. This session will also be concerned to illustrate the ways in which this Newtonian synthesis can be developed in practical ways into current or to-be-developed curricula of our participating institutions.

Readings: Newton, (In Cohen and Westfall, Norton Anthology) excerpts from *Principia* pp. 221-238 (preface, definitions, laws of motion)

Laboratory 9:00 PM: Telescopic Observations: St. John’s observatory and additional provided telescopes.

Day 8:

Morning: Readings: Newton, excerpts from *Principia* Book I, Book III (Rules, Phaenomena,, Moon proof. Law of Universal Gravitation. (in Cohen and Westfall, pp. 238-246; 257-273). We might use Sloan’s commentary (emailed) on this material along with this.

Afternoon: Newton, General Scholium. (pp. 339-341) Queries to the *Opticks* (pp. 184-190). Literary reactions to the Scientific Revolution: **Donne**, “Anatomie of the World,” in First Anniversary, (website printout); Selections from Crowe Anthology: **Pascal**, *Pensees*; **Milton**, *Paradize Lost*; **Addison**, “Ode,” and **Young**, “Night Thoughts.”

Days 9-10 Review of curricula of schools in light of curriculum discussed, here. Discussions and suggestions by all participants will focus on two issues: (1) means of integrating the texts discussed into current courses, (2) suggestions from participating institutions for developing new humanistic curricula that utilize the insights gained from the experience with these primary texts.

NEH Workshop
“Bridging the Gap Between the Sciences and Humanities”
Year Two
Location: The University of Notre Dame
“Life: Origins, Purposiveness, and Transformations”
May 30, 2004-June 11, 2004

The Seminar Readings are arranged in two parts, below: Syllabus and Book List and Reader of Selected Materials.

SYLLABUS

Opening Reception: Sunday, May 30: Location

Day I: Monday, May 31

Morning: The Question of Origins

This session looks at some great questions about the origins of the living state. It opens the workshop with a set of questions that will be followed through the various sections.

Readings: Plato, *Timaeus*, esp. 39e-48e; 72e-92c (Kalkavage edition)

Genesis I, 1-11, NRSV.

Empedocles, *On Nature*, trans. Freeman (Reader)

Afternoon: What is Life? Classical Reflections

Readings: Aristotle, *Parts of Animals* I.v, 644b25-646a (McKeon pp. 656-58)

On the Soul, Book II, chps 1-4 412a1-416b30 (McKeon pp. pp. 554-64)

On Respiration 470b-475b10; 479b17-480b30. (Reader)

Galen, *On the Natural Faculties*, Selection from Book I, (Reader)

Evening Lecture: Peter Kalkavage on the *Timaeus*

Day 2: Tuesday, June 1: Are Organisms by Design or Chance? The Ancient Debate

Morning: Reflections on Chance and Design

Readings: Lucretius, *On the Nature of Things* Book I, Book V.

Galen, *On the Usefulness of the Parts*, trans. M.T. May, Book VI. (Reader)

Afternoon: The Heart

Readings: Galen, *On the Usefulness of the Parts* Book VI, (Reader)

Galen, *On the Natural Faculties* Selection from Book III (Reader)

Vesalius, Selection from *Epitome on Anatomy* trans. L.R. Lind (Reader)

Laboratory: Dissection of the Heart, Lung and Trachea according to Galen.

Day 3: Wednesday, June 2: “Life as a Mechanism”

Morning: Harvey on the Circulation of the Blood

Readings: Harvey, “On the Manner and Order of Acquiring Knowledge” (Reader)

Harvey *On the Motion of the Heart and the Blood*, trans. Willis. (Reader)

Film: *William Harvey and the Circulation of the Blood* (Wellcome Institute)

Afternoon:

Readings: Descartes, *Discourse on Method*, Part V, *The Philosophical Writings of Descartes Vol. 1* (Cambridge UP) pp. 131-41.

Descartes, Selection from *Treatise on Man*. pp. 99-108 (Cambridge ed)

Lavoisier, Antoine “Experiments on Respiration (1777)” (Reader)

Lavoisier and LaPlace, selection from “Memoir on Heat (1780) (Reader).

Evening: Begin showing of film series *The Voyage of Charles Darwin* (7 parts) Parts 1-2

Day 4: Thursday, June 3: Nature as a Work in Progress I: The Darwinian Revolution This session will be devoted to the issues of form, function and transformation. It will begin with readings and a laboratory on morphology and then move into the reading of the *Origin* in the afternoon.

Morning: “Form, Function and Transformism”

Readings: Selection from Aristotle, *Parts of Animals* I. chps i-iv (McKeon pp. 643-56.

Lamarck, selection from the *Zoological Philosophy* Part I (Reader)

Cuvier, Selection from “Lectures on Comparative Anatomy” (1800) and “Natural History of Fishes” (1828). (Reader)

Dissection Laboratory on the Squid and Fish

Afternoon: “Darwinian Transformism”

Reading: Darwin, *On the Origin of Species* 1st ed. (Harvard U Press 1964), chps. 1-4.

Evening: Darwin Film Series Parts 4-5-6

Day 5: Friday, June 4: “Darwinian Transformism”

Morning: Darwin’s Origin II

Readings: Darwin, *Origin of Species*, chps. 9, 13, 14

Darwin, *Origin of Species* 6th ed. chp. (Reader)

Afternoon: Teams meet to discuss integration of what they have read and discussed to this point.

Day 6 : Monday June 7: “Humanity in an Evolutionary Universe”

Morning: Readings: Darwin, *Descent of Man*, 2nd ed. (1874), chps. 3,4,6,8, General Conclusion. (Duplicated Selections in separate offprint)

Afternoon: Evolution and Literature: Contrasting Views”

Readings: Tennyson, “In Memoriam.” (1858). (Norton Critical Edition)

Hardy, Poems “Hap” 1866, “Convergence on the Twain” and “In Tenebris” (Reader)

Day 7: Tuesday, June 8: The Question of Inheritance Morning: Classical Mendelism

Readings: Mendel, “Experiments on Plant Hybridization” (St. Johns College Edition)

DeVries, Hugo, “The Law of the Segregation of Hybrids” (1900) (Reader)

Afternoon: Difficulties in Mendelism and the Theory of Chromosomes

Readings: Morgan, T. H. “Sex-linked Inheritance in *Drosophila*” (1910) (Reader)

Sturtevant, “Linear Arrangement of Six Sex-Linked Factors in *Drosophila*” (Reader)

Laboratory on Fruitfly inheritance and Mendelian ratios.

Day 8: Wednesday, June 9: Mechanism, Reductionism and Purpose: The Contemporary Debate

The point of this final day of actual course work will be to return us to the issues of the first sessions and the “big questions” of form, function, and teleology.

Morning: Modern reductionism and the question of purpose:

Readings: Jacques Loeb, “The Mechanistic Conception of Life” (1912). (Reader).

W. Roux “Contributions to the Developmental Mechanics of the Embryo” (1885) (Reader)

H. Driesch, “The Potency of the First Two Cleavage Cells” (1891) (Reader)

Driesch, H. Selections from *The Science and Philosophy of the Organism* “introduction”, “Elementary Morphogenesis,” “Analytic Theory of Morphogenesis”, “The Problem of Morphogenetic Localization” (Reader).

Afternoon: The Molecular Option:

Readings: Schrödinger, *What is Life?* (1945) (Cambridge U Press edition)

Dorothy Wrinch, “On the Molecular Structure of the Chromosomes” (1936)

(Reader)

Evening: Full Length BBC Film *Life Story*. This dramatizes the work of Watson, Crick, and Rosalind Franklin. It raises methodological and scientific issues, and it also develops in a complex and nuanced way the contribution of men and women to this development.

Day 9: Thursday, June 10: The Double Helix and Beyond

Morning:

Readings: Watson and Crick, the short 1953 papers. (Reader)

Marjorie Grene, “Biology and the Problem of Levels of Reality” (Reader)

Kay, Lily "Life as Technology" (Reader)

Afternoon: **Group Meetings and Assessment**

Day Nine evening: Party & optional reading of selections of Jonathan Tolins "eugenics" play, *The Twilight of the Gods*.

Day 10; Friday June 11: Presentations about Past and Future. End by 2:30 pm.

In accord with the wishes of many of last year's participants, you are encouraged to buy the books and to read ahead for the seminars. We will send to you by mid-March, at your institutional address, a copy of your Seminar Reader. As with all other readings, you must purchase the reader; in this case we would expect reimbursement for the reader at the seminar. The anticipated cost of the reader is approximately \$ 25.00, but that is a "guess-timate." We will notify you of the costs before coming to the seminar.

Book List

Aristotle: *The Basic Works of Aristotle*, ed. R. McKeon (Random House; same edition purchased last year). ISBN 0-375-75799-6

Descartes, *Philosophical Works of Descartes* trans. Cottingham (Cambridge U Press) Vol. 1 ISBN 0 52128807 X. (Same text as used last year).

Darwin, Charles. *On the Origin of Species* 1st edition (Cambridge: Harvard U Press, 1964, ISBN: 0-674-63752-6

Darwin, Charles *Descent of Man* (selected) (Duplicated & Bound in Seminar Reader)

Harvey, William. *An Anatomical Disquisition on the Motion of the Heart and the Blood* trans. R. Willis (Duplicated & Bound in Seminar Reader)

The Holy Bible, NRSV translation (or equivalent). Assume people have their own.

Lucretius, *On the Nature of Things*, trans. Frank Copley (New York: Norton, 1977 ISBN 0393064263.) Price: \$16.35

Mendel, Gregor, *Experiments with Plant Hybridization*. St. Johns College Press. \$ 5.25 Please order both Mendel and Plato, below, through the St. John's College Bookstore in Annapolis.

S&H is \$5.00 for the first book, and additional \$1.00 for each additional book. Please contact:

Christine Hardy, Assistant Manager, St. John's College Bookstore, POB 2800, Annapolis, Maryland 21404-2800;(410) 626-2540 (Phone);(410) 295-5550 (Fax); c-hardy@sjca.edu

Plato, *Timaeus* trans. Kalkavage (same edition we used last year), \$ 10.95

Schrödinger, Erwin, *What is Life?* ed. R. Penrose. Cambridge, CUP, 1992, ISBN 0521427088

Tennyson, Alfred. "In Memoriam," Erik Gray, Ed. 2nd ed. (NY: Norton Critical Edition, 2003) ISBN: 0-393-97926-1

Reader of Selected Materials: Contents

- Cuvier, Georges, Selections from “Lectures on Comparative Anatomy” (1800) and *Histoire naturelle des poissons* (1828) (11 pp)
- Darwin, *Origin of Species* “Historical Sketch” (added in 3rd edition) (8 pp)
- Darwin, *Origin of Species* chp. iv from 6th edition (37 pp)
- DeVries, H. “The Law of Segregation of Hybrids.” (1900) (6 pp)
- Driesch, H. Selection from *The Science and Philosophy of the Organism* (1925) (ca. 25 pp)
- Driesch,, H. “The Potency of the First Two Cleavage Cells” (1891) (10 pp)
- Empedocles, *On Nature* (fragments) Freeman edition (5 pp)
- Galen, *On The Usefulness of the Parts of the Human Body*, Vol I, Book VI. Cornell U Press. (ca. 40 pp)
- Galen, *On the Natural Faculties* Selections from Books I, III (10 pp)
- Grene, M. “Biology and the Problem of Levels of Reality” (1967) (20 pp)
- Hardy, Thomas, Selected Poems (5 pp)
- Kay, L. “Life as Technology” (14 pp)
- Lamarck, J. B. Selection from *Zoological Philosophy*, trans. H. Elliot (25 pp)
- Lavoiser, Antoine and Pierre Simon LaPlace, Selection from *Memoir on Heat* (10 pp)
- Lavoisier, Antoine “Experiments on Respiration” (1777) (10 pp)
- Loeb, Jacques, “The Mechanistic Conception of Life” (1912) (20 pp)
- Morgan, Thomas H. “Sex-Linked Inheritance in *Drosophila* “ (1910) (5 pp)
- P. R. Sloan, Commentary on *Origin of Species* (optional) (30 pp)
- Roux, W. “Contributions to the Developmental Mechanics of the Embryo” (1885) (10 pp)
- Sturtevant, “Linear Arrangement of Six Sex-Linked Factors in *Drosophila*” (1913) (5 pp)
- Vesalius, Andreas, Selection from the *Epitome of Anatomy* (1543), trans. L.R. Lind (2 pp)
- Watson and Crick, “A Proposed Structure for DNA” and “Genetical Implications of the Structure of DNA” (6 pp)
- Wrinch, Dorothy, “On the Molecular Structure of the Chromosomes” (1936)(18 pp)

Final Syllabus
NEH-ACTC “Bridging the Gap” Seminars
Year Three: St. Mary’s College
“Technology, Art, Values, and the Problems of Technoscience”

The workshop this year will explore the connection between science and the humanities through the themes of nature and art, beauty and power, the good and the useful, and the goals and problems of a technological society.

Pre-Reading: Leon Kass, “Introduction” and Chap. 1 “The Problem of Technology and Liberal Democracy” in *Life, Liberty and the Pursuit of Happiness*. This is to raise a set of general issues for this workshop.

First Week

DAY 1 (Monday): Nature, Cause, Art as Know-How, and the Human Good

AM: Reading: Plato, *Gorgias*, (Nichols ed.)

PM: Aristotle, *Physics*, Book 2 (chapters 1-3, 8); *Nicomachean Ethics*, Book 1 (chapters 1-7), Book 6 (chapters 3-8); *Poetics*, chaps. 1-14, 25 (McKeon edition)

EVENING: Lecture “Technology as Liberal Art” Phillip Sloan

DAY 2 (Tuesday): Invention, Beauty, and-Divine Limits on Making

Am: Reading: Plato, *Timaeus*, 27c-29D; 35a-36B (Kalkavage edition)
Laboratory on the monochord

PM: Cicero, “On Invention” Books 1-5 (p. 3–17), 7-9 (pp. 19-25), 11-14 (pp. 31-41) (Loeb Classical: also available as e-text)

Dante, *Divine Comedy*, “Inferno,” Cantos 1, 2, 5, 26, 34; “Purgatorio,” Cantos 1, 10, 11, 12 (Mandelbaum –Bantam edition)

Reynolds, *Discourses on Art*, “Discourse 7” (Duplicated)

DAY 3 (Wednesday): Expanding Techne: The State as a Work of Art

AM: Machiavelli, *The Prince* (Mansfield Edition)

PM: Shakespeare, *The Tempest* (Penguin)

EVENING: Robert Weiner “Leonardo Da Vinci” (one-man act)

DAY 4 (Thursday): The Mastery of Nature

AM: Bacon, “The Great Instauration” and *New Organon*, Bk. I

PM: Bacon, *New Organon*, Bk. II, Aphs 1-21; *New Atlantis* (Hackett edition)

DAY 5 (Friday):

AM: **REVIEW SESSION: Institutional Developments in Last Year and Planning for Next.**

PM Laboratory on Genetic Mapping in Bacteria (Waring Blender Experiment)

Readings: Laboratory Outline in *St. Johns Manual: Evolution and Genetics* , pp. 187-201 plus separate laboratory writeup. First Reading of Jacob and Monod “Genetic Regulatory Mechanisms in the Synthesis of Proteins” *St. John’s Evolution and Genetics* pp. 129-43.

Second Week

DAY 6 (Monday): **The Critique of Mastery**

AM: Jonathan Swift, *Gulliver’s Travels* (opening Letter, “A Voyage to Laputa”); (St. Martins)

Rousseau, *Discourse on the Arts and Sciences* (Hackett)

PM: Huxley, *Brave New World* (Perennial Classics edition)

DAY 7 (Tuesday): **Making Scientific Facts**

AM: Latour and Woolgar, *Laboratory Life*, chps 1-3 (Princeton)

François Jacob and Jacques Monod, In *St. John’s Manual* with Sloan detailed outline. Second detailed reading.

PM: Laboratory on Results of Blender Experiment

REVIEW SESSION: Institutional Developments in Last Year and Planning for Next.

DAY 8 (Wednesday): **Science, Morality and Politics**

AM: Franz Kafka, “In the Penal Colony” (Barnes and Noble)

Hawthorne, “The Birthmark” and “The Artist of the Beautiful” (Dover)

PM: Jonas, *The Imperative of Responsibility*, chps. 1-3

EVENING: M. Frayn *Copenhagen*. (Group reading of the Play)

DAY 9 (Thursday): **Technology and the Human Good**

AM: Jonas, *The Imperative of Responsibility*, chps. 5-6

PM: Kass, *Life, Liberty and Pursuit*, chps. 3, 4, 5

Philip Kitcher, *Science, Truth and Democracy*, chps. 13–14 (“The Luddites Laments” and “Research in an Imperfect World”)

EVENING: Party

DAY 10 (Friday): **REVIEW: Institutional Planning for use of Year 3 materials**

DISCUSSION OF ALL THREE YEARS: Possibilities for future seminars

Please plan on staying through Friday 3:00 PM.

BOOKS TO BE ORDERED: (IN SEQUENCE READ)

- Kass, L. *Life, Liberty and the Defense of Dignity* (San Francisco: Encounter, 2002) ISBN 1-893554-55-4
- Plato, *Gorgias*, trans. J. Nichols (Ithaca: Cornell U Press, 1998) ISBN: 0801485274
- Aristotle, *The Basic Works of Aristotle*, ed. R. McKeon (New York: Modern Library, 2001) ISBN: 0375757996
- Cicero, *De Inventione* [On Invention] (Cambridge MA: Harvard U Press, Loeb Classical Library, Harvard, Trilateral Press. ISBN 0-674-99425-6; an alternative without Latin facing opposite is available from Amazon as a pdf download for \$ 1.99.
- Plato, *Timaeus*, trans. P. Kalkavage (Newbury Port: Focus Press, 2001) ISBN 1-58510-007-2
- Dante, *The Divine Comedy*, trans. A. Mandelbaum, (New York: Bantam, 1982)
“Inferno” (ISBN 0-553-21339-3), “Purgatorio” (ISBN 0-553-21344-X)
- Machiavelli, *The Prince* trans. H Mansfield, 2nd ed. (Chicago: U Chicago Press, 1998) ISBN 0226500446.
- Shakespeare, *The Tempest*, ed. P. Holland (Baltimore: Penguin, 1999) 0-14-071485-5
- Bacon, *Selected Philosophical Works*, ed. R. Sargent (Indianapolis: Hackett, 1999) ISBN 0-87220-470-7.
- Swift, J. *Gulliver’s Travels* ed. C. Fox (New York: St. Martins, 1995) ISBN 0-312-06665-1
- Rousseau, J. J. *Basic Political Writings*, trans. Cress, ed. P. Gay (Indianapolis: Hackett, 1987). ISBN 0-87220-047-7
- Huxley, J. *Brave New World* (New York: Perennial Classics Editions, 1998) ISBN 0060929871
- Maistrellis, N. (ed.) *Genetics and Evolution: Readings and Experiments for Senior Laboratory* St. Johns College Bookstore, 1993. (Order direct from St. John’s College Bookstore)
- Latour, B. and S. Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton: PUP, 1986), ISBN 0-691-02832-X
- Kafka, F. *In the Penal Colony and Other Stories* (New York: Simon and Shuster, 1995) ISBN 0020218079
- Hawthorne, N. *Hawthorne’s Short Stories*, edited by Newton Arvin. New York: Knopf, ISBN 0-394-70015-5
- Jonas, H. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age* (Chicago: U Chicago Press, 1984), ISBN 0-226-40596-6 (HB only)
- Frayn, M. *Copenhagen* (New York: Anchor, 2000) ISBN 0385720793
- Kitcher, P. *Science, Truth and Democracy* (Oxford, 2001) ISBN 0-19-514583-6

BOOKS TO BE ORDERED, IN ALPHABETICAL ORDER

- Aristotle, *The Basic Works of Aristotle*, ed. R. McKeon (New York: Modern Library, 2001) ISBN: [0375757996](#)
- Bacon, *Selected Philosophical Works*, ed. R. Sargent (Indianapolis: Hackett, 1999) ISBN 0-87220-470-7.
- Cicero, *De Inventione* [On Invention] (Cambridge MA: Harvard U Press, Loeb Classical Library, Harvard, Trilateral Press. ISBN 0-674-99425-6; an alternative without Latin facing opposite is available from Amazon as a pdf download for \$ 1.99.
- Dante, *The Divine Comedy*, trans. A. Mandelbaum, (New York: Bantam, 1982)
“Inferno” (ISBN 0-553-21339-3), “Purgatorio” (ISBN 0-553-21344-X)
- Frayn, M. *Copenhagen* (New York: Anchor, 2000) ISBN [0385720793](#)
- Hawthorne, N. *Hawthorne’s Short Stories*, edited by Newton Arvin. New York: Knopf, ISBN 0-394-70015-5
- Huxley, J. *Brave New World* (New York: Perennial Classics Editions, 1998) ISBN [0060929871](#)
- Jonas, H. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age* (Chicago: U Chicago Press, 1984), ISBN 0-226-40596-6 (HB only)
- Kafka, F. *In the Penal Colony and Other Stories* (New York: Simon and Shuster, 1995) ISBN [0020218079](#)
- Kass, L. *Life, Liberty and the Defense of Dignity* (San Francisco: Encounter, 2002) ISBN 1-893554-55-4
- Kitcher, P. *Science, Truth and Democracy* (Oxford, 2001) ISBN0-19-514583-6
- Latour, B. and S. Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton: PUP, 1986), ISBN 0-691-02832-X
- Machiavelli, *The Prince* trans. H Mansfield, 2nd ed. (Chicago: U Chicago Press, 1998) ISBN [0226500446](#).
- Maistrellis, N. (ed.) *Genetics and Evolution: Readings and Experiments for Senior Laboratory* St. Johns College Bookstore, 1993. (Order direct from St. John’s College Bookstore)
- Plato, *Gorgias*, trans. J. Nichols (Ithaca: Cornell U Press, 1998) ISBN: [0801485274](#)
- Plato, *Timaeus*, trans. P. Kalkavage (Newbury Port: Focus Press, 2001) ISBN 1-58510-007-2
- Rousseau, J. J. *Basic Political Writings*, trans. Cress, ed. P. Gay (Indianapolis: Hackett, 1987). ISBN 0-87220-047-7
- Shakespeare, *The Tempest*, ed. P. Holland (Baltimore: Penguin, 1999) 0-14-071485-5
- Swift, J. *Gulliver’s Travels* ed. C. Fox (New York: St. Martins, 1995) ISBN 0-312-06665-1

Duplicated materials

Reynolds Discourse
Supplementary laboratory materials

It is difficult to list and enumerate accomplishments because such a list gives no sense of the continuity (or discontinuity) of efforts within given institutions. Also, a list gives no sense of the divergence of innovations in response to this project. The chart below is an attempt to provide some sense of both the innovative responses and the continuities of development.

Chart of progress of accomplishments

Seton Hall Univ	= SHU
Samford University	= SU
Benedictine University	= BU
Mercer University	= MU
St. Bonaventure Univ	= SBU
Norfolk St. Univ	= NSU
St. Mary's Collge	= SMC
Truckee Meadows CC	= TMCC
St. Olaf College	= STO
University of Dallas	= UD

The first row of each year is devoted to faculty development. The second row is devoted to course and curriculum development.

The Chart is arranged in a spectrum of accomplishment; though this arrangement could be argued differently, the intent is not so much to “grade” institutions as to provide some sort of easily identifiable way of seeing the project’s impact and accomplishments. Size of the column is only a rough indicator of accomplishment. For example, SHU’s Bridging team returned to SHU, not only to develop courses in the honors program in the first year, but to impact hugely the core curriculum review which, ultimately, resulted in a new core-text, core curriculum which, though not incorporating science materials, nevertheless was based on a core text humanities curriculum for all students, inspired by this project. On the other hand, specific listings of course impacts indicate points of consequence for the project in various institutions.

In the second year, most of the participating institutions chose to send some new faculty to the project. When new members attended, we have listed this as part of faculty development. Some of the fruits of proposals in the previous year began to take shape; this represents one form of continuity. In other cases, implementation was maintained or spread to other professors teaching similar courses. This represents another kind of continuity. A third kind of continuity is represented by the use of our texts, and a fourth by the use of Bridging principles (interdisciplinary core texts touching upon and crossing over from one humanistic discipline to one scientific discipline.) Since the project was aimed at establishing continuity within core programs as an effect of Bridging the Gap, I have **highlighted in yellow** projects which bore fruit or were continuous from the first year. Professors and texts have been highlighted; new texts which were not in our syllabus have not. The second year innovations or professors that were continuous with the third year are **highlighted in blue**. Texts that were drawn from our third year are **highlighted in pink**.

Year I (03-04)

SHU SU SBU MU BU NSU [SMC] TMCC STO UD
 Not participating Yr I

FACULTY DEVELOPMENT MEETINGS

<p>1) According to Glenn, “the use of primary sources permeated Seton Hall’s core revision initiative” then in its second year.</p>	<p>1) Samford University’s Christopher Metress and Bill Collins ran two afternoon seminars for the Cultural Perspective (core text) faculty in the summer on ideas that emerged from the Bridging work in Annapolis. a) The first was on the <i>Timaeus</i> and b) the second on Ptolemy, Copernicus, and Galileo. It was anticipated that the Copernican Revolution will be more</p>	<p>1) Benedictine University faculty returned from the seminar to organize a 24-member, faculty and administration seminar in August, which included the President of Benedictine, six scientists and many humanists. 2) A follow up seminar spent time on the difference between propositions and definitions in Euclid. 3) Another faculty group also read texts on the</p>	<p>1) Mercer University’s team brought back five curriculum proposals to the University which were discussed by [5] various faculty groups. These proposals are listed below under curriculum development 1) The first curriculum proposal, based in the Seminar Syllabus, was to revise the list of recommended readings that are part of Mercer’s</p>	<p>1) The St. Bonaventure team held a meeting with Clare College faculty to propose an integrated link between the Clare College 102 Writing course and the Clare College 111 Scientific Experiment and Study course. Six integrations were proposed between these two courses: 1) Integration of five science papers into the writing</p>	<p>Copernicus’ “Letter to the Pope” was paired with Martin Luther King’s “Letter from Birmingham Jail” for an NSU Honors Program faculty retreat in August. Page Laws presented ideas from the seminar in her address to faculty during the fall semester breakfast kickoff.</p>		<p>Truckee Meadows Community College held meetings with administration, faculty and adjuncts teachers of the philosophy/humanities/Western traditions courses. The effect has been to increase the number of primary sources in these courses.</p>	<p>Rick Fairbanks delivered a lecture to Great Conversation colleagues (an alternative track core program) on Galileo and the Scientific Revolution where discussions in the seminar about the inclined plane and pendulum informed his lecture.</p>	<p>The University of Dallas used the seminar text, <i>Theories of the World from Antiquity to the Copernican Revolution</i>, on campus in the yearly Faculty Book Discussion cross-departmental and cross-disciplinary event. Professors Brown-Marsden and Simmons of the Bridging Seminar led the discussion.</p>
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	<p>thoroughly integrated and taught in the Cultural Perspectives courses.</p>	<p>intersections between the humanities and sciences.</p>	<p>Great Books Program. Mercer's required list already includes Euclid, Galileo, Newton, Bacon and Darwin. 2) The second proposal was to develop a Special Topics Great Books course on Ptolemy. This was undertaken by Edward Thomas. 3) Mercer offers Science Modules of eight weeks' duration. Tom Huber and Ed Thomas were both working on modules to be developed for 2005.</p>	<p>course; 2) a shift of analysis of correlation studies originating from the social sciences in the Science course to an analysis of correlations studies in the sciences; 3) an introduction of formal logic problems and a discussion of definitions in both courses; 4) A use of Bacon to discuss inductive reasoning in the science course; 5) an introduction of sound hypotheses by examining the claims of parapsycholo</p>					
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		<p>4) A Freshman Seminar on Experiential and Scientific Inquiry was being developed by Mary Ann Drake and a chemist, Caryn Seney. This seminar planned to set the <i>Timeaus</i> and <i>Genesis</i> and Euclid and some Psalms together. in Scientific Inquiry in which case studies are used. 5) Finally, Mercer has a requirement in Scientific Inquiry in which case studies are used. Inspired by the Seminar,</p>	<p>gy; 6) An examination in both courses of the role of Analogies, Hunches and the Hypothetical/ Deductive Method</p>				
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			Tom Huber was seeking to develop a case study based on original Mendel papers.						
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SHU SU SBU MU BU NSU [SMC] TMCC STO UD

CURRICULUM AND COURSE DEVELOPMENT (Year I)

1) Seton Hall's team of Marian Glenn (biology), Kristina Chew (classics and writing) and Colleen Conway (religion) developed an upper level course during the summer, for a Spring 2004 offering, called "Heavenly	1) Dave Garza, chemist, immediately began work on a summer course in July and August. In that science course, the students started with Newton and worked back to Euclid. (See year III for continuity) 2) Christopher Metress used	1) Sections of three courses within the four-course core text sequence at Benedictine were used as prototypes for textual integration of the sciences and humanities: these were a) Tracey's, The Mediterranean World; b) Kauth's, The Baptism of			Norfolk State University incorporated "Bridging" materials in 1) five sections of English Honors 101, 2) a composition course, and 3) into the English 207 Honors course on World Literature. 4) James Toy's "Physics of Music" was		A Philosophy of Science course was planned by Rena Denham for implementation in January.	1) Rick Fairbanks introduced texts of Aristotle and Descartes into his Philosophy and Science course, the readings of which were largely in modern philosophers of science. 2) Maggie Odell developed materials for her Biblical God course.	
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<p>Science.”</p> <p>2) Prototype sections for a) the first and b) third course in the Honor sequence were developed integrating the <i>Timaeus</i>, <i>Elements</i>, Ptolemy, and Aristotle’s <i>De Caelo</i>, as well as Copernicus, Descartes, Hobbes and Newton.</p>	<p>Galileo’s 1615 “Letter to the Grand Duchess Christina” in a humanities core texts course at Samford to explore how the gap between the humanities and the sciences began to develop in the early seventeenth century.</p> <p>3) Bill Collins explored how sections of Newton’s <i>PRINCIPIA</i> and Canto 33 of Dante’s <i>Paradise</i> are reflections on the relation of the infinite to the finite.</p>	<p>Europe; and c) Flynn’s ‘Converging Hemisphere’ s.</p>			<p>also employing Bridging-inspired materials</p>				
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SHU

SU

SBU

MU

BU

NSU

[SMC]

TMCC

STO

UD

Year II (04-05)

SHU	SU	SBU	MU	BU	NSU	SMC	TMCC	STO	UD
FACULTY DEVELOPMENT/MEETINGS (Year II)									
<p>Seton Hall sent one new humanist to the seminars</p> <p>Seton Hall University's Faculty Senate endorsed having all undergraduates take three common core text "signature" courses, to begin in Sept. 2007. Glenn writes: "ACTC was a MAJOR influence on the course philosophy, and Seton Hall's participation in ACTC's NEH-sponsored project,</p>	<p>Samford University sent one new biologist attend.</p> <p>Chris Metress (English), with the approval and financing provided by David Chapman, the Dean of Arts and Sciences, set up with Betsy Dobbins (Biology) a week-long bridging-the-gap type seminar during the January Term. The seminar was designed to help science faculty to redesign the IDSC core</p>	<p>St. Bonaventure sent one new, biology professor to the seminar in June.</p> <p>Rod Hughes and Kevin Vogel (humanities and science faculty members) applied successfully for an internal "Martine Grant" to develop during the summer of 2004 and the academic year of 2004-2005 a pair of coordinated 111 and 102 courses, infused by texts in the</p>	<p>Mercer sent one new humanist faculty member to the seminars.</p> <p>2) Mercer's Interdisciplinary Studies department held a seminar to consider expanding the Great Books sequence and invited one of the Bridging the Gap leaders, Peter Kalkavage, to the seminar. Kalkavage's recommendation was that it should be in the direction of including more core scientific texts.</p>	<p>Benedictine sent two new faculty to the seminars in June.</p>	<p>One faculty member returned to the project. Two new faculty members came to the project; one left immediately without giving reasons. TMCC was, thus, represented by one humanist and one biologist.</p> <p>Eddie Burke, Rena Denham and Tell Gifford prepared a faculty-wide workshop on Bridging</p>	<p>SMC sent a team of one scientist and two humanists.</p> <p>This team met with Brother Kenneth Cardwell, Director of the Collegiate Seminar Program (Saint Mary's common, core text curriculum program), several times and planned to introduce these texts through the standard mechanism of faculty discussion and approval for the adoption of texts:</p>	<p>Norfolk State sent one new, humanities faculty member.</p> <p>Page Laws asked a math professor to give a lecture on Fractals for her course entitled 'Tree of Life: the Power of Metaphor in the Arts and Sciences.'</p>	<p>Chuck Huff, psychology, was the new team leader.</p> <p>FNSM chairs (biology, chemistry, mathematics, physics, psychology) met during the fall. Topics have included how to increase As part of this discussion, FNSM and Humanities faculty compiled a list of the Bridging the Gap activities already undertaken at the college. Faculty concluded they were already trying to</p>	<p>Dallas sent two new faculty members; a third who had promised to come and had been at the seminar last year simply did not appear; the two new faculty were one humanist and one scientist.</p> <p>Joseph Nika, biology member of Dallas's team, met with Denis Sepper, one of the faculty of the Philosophy department to discuss potential readings for the discussion</p>

<p><i>Bridging the Gap between the Humanities and Sciences: An Exemplary Model for Core Text Humanistic Education,</i> made the inclusion of science <i>de rigueur</i>.... We used a sample syllabus of core texts as our calling card in speaking with faculty about the aims of these courses, which carry the working title "Odyssey of the Mind, Heart and Spirit"."</p>	<p>course. 2) The seminar took place in mid-January and was planned to involve 10-12 faculty and to focus on "Genetics and Information Flow" (a variant on the materials discussed at Notre Dame). ." In addition to Metress and Dobbins, the seminar included eight other professors from a variety of disciplines: Morgan Ponder (Chair, Chemistry), Julie Steward (English), Brian Toone (Math and Computer Science), Carol Ann</p>	<p>spirit of or directly drawn from the Bridging the Gap project. In addition, experiments from Bridging the Gap were also included in the proposal.</p> <p>The coordinators of <u>each</u> Clare course met with the team members to review the curriculum of that June's seminar, and briefed the team members regarding their possible interest in the seminar material.</p> <p>Later in the summer, Vogel and Hughes</p>			<p>the Gap methods and materials for the college's Spring semester kickoff.</p> <p>Within the strictures that his department will permit, Burke plans to introduce history of science materials in his biology courses.</p>	<p>Harvey's <i>On the Motion of the Heart and Blood in Animals</i>, and also a heart dissection lab.</p> <p>The team met with Jan Term director and discussed ways to invite Jan Term proposals that promote the core texts in science. Christopher Sindt plans to propose a course on <i>Origin of the Species</i> in the January 2007. The Saint Mary's team met with the Director of Graduate Liberal Studies to discuss the prospect of using</p>		<p>bridge the gap.</p>	<p>sessions to be held during the incubation times of the Biotechnology laboratory. In addition to "What is Life?", he planned to assign readings in "It Ain't Necessarily So: The Dream of the Human Genome and Other Illusions" and "Biology as Ideology; The Doctrine of DNA"</p>
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	Vaughn (History/Women's Studies), David Garza (Chemistry), Steve Donaldson (Math and Computer Science), Bryan Johnson (English), and Linda Jentsch (Spanish).	organized workshops led by seminar team members for the interested core faculty. The results of these workshops were presented at a session of the Clare College Council. Both Prof. Vogel and Dr. Hughes are members of this Council.					Bridging materials in a new course to be developed in 2006		
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SHU SU SBU MU BU NSU SMC TMCC STO UD

SHU SU SBU MU BU NSU SMC TMCC STO UD

CURRICULUM AND COURSE DEVELOPMENT (Year II)

1) The "science infusion" of Bridging materials entered its second year in the Colloquia in	• August 26: Dobbins began her redesigned IDSC course, incorporated two texts from the Notre Dame	David DiMattio (last year's science faculty participant in BTG), Kevin Vogel and Roderick	1) A nonlaboratory course titled <i>Scientific Inquiry</i> is prerequisite to all modules.	In addition to further penetration into core courses, Bridging the Gap began to affect delivery of	1) NSU continued to incorporate new bridging-the-gap material into five sections of English 101		TMCC's 1) Core Humanities Program full-time and adjunct faculty responses to the project	Gary Stansell, a summer 2004 Bridging the Gap participant, used his experience to revise his	The orientation programming for new students at the beginning of the academic year
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<p>the Ancient World, and in the early Modern World. The Spring semester concentrated on infusing the Medieval Colloquium. Syllabi for the Honors courses are online at http://academic.shu.edu/honors/.</p> <p>2) Kelly Shea has specialized on science infusions in the English Department. Last June, she worked with colleagues to develop a new course for first-year students, "Literature and the Natural</p>	<p>seminar in her new syllabus (Plato's <i>Timaeus</i> and Darwin's <i>Origins</i>) and one text from the St. John's seminar (Crowe's <i>Theories of the World</i>).</p> <p>2) Metress developed a new unit for his humanities core course., opening with first five propositions of Euclid (plus Proposition 47) to introduce students to pre-Socratic and Socratic philosophy. Students studied the definitions, common notions, postulates</p>	<p>Hughes met to prepare syllabi for "hardwiring" Clare 102 (Core Science course) to Clare 111 (Core Composition & Critical Thinking II course) for the Fall semester, 2005. These two courses will be taught by the three instructors back to back in the morning with an afternoon lab. Selected works used in both courses include: Lucretius, <i>On the Nature of Things</i>; Hardy, <i>Selected Poems</i>—</p>	<p>Tom Huber wrote and shepherded a curriculum proposal to add a content flexible, GBK (great books)-consistent module as SCI 112.00X. This module could be used by any of the natural or physical sciences (e.g., biology, chemistry, environmental science, or physics) to teach a sequence of historic, significant primary research papers. The proposal was approved by the Curriculum Committee and adopted</p>	<p>courses outside the core, in the sciences and philosophy, for courses for the major. Alfred R. Martin, Professor of Biological Sciences</p> <p>a) HUMN 240 - <i>Converging Hemispheres</i>; Darwin, "On the Origin of Species"; The Darwinian mechanism (handout); Tennyson, "By an Evolutionist"; Spencer, "Social Statics"</p> <p>b) BIOL 313, "Darwin, On the Changing of Mind"; Mayer, "Who is Darwin?"; de Beer, "Biology Before the</p>	<p>H, 2) its Honors freshman composition course, and 3) into English 207 H, its Honors world literature survey.</p> <p>4) Ms. Stephanie Walker is using "Bridging the Gap" materials in her two regular sections of English 101 5) Toy teaches the Modern Physics Lab for the sophomore physics majors which is really a survey of experiments related to the twin revolutions of relativity and quantum</p>		<p>ranged from acknowledging the use of scientific texts in humanities courses as a good idea to actually adopting a scientific text or part of one as part of the course reading.</p> <p>2) The Philosophy of Science course ran.</p>	<p><i>Theology of Creation</i> class to include the entirety of Darwin's <i>Origin of Species</i>. His class had only read secondary commentary on evolution before</p> <p>Chuck Huff, a summer 2004 Bridging the Gap participant, used his experience in seeing the use of historical context for texts to revise his <i>Psychology of Good and Evil</i> course (offered this January 2005 term) to use a more historical approach to</p>	<p>traditionally includes a discussion of a short text and a film screened during orientation week. This year Dr. Burk chose the description of the cave from Book 7 of Plato's <i>Republic</i>, paired with <i>The Matrix</i>.</p>
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<p>World.”</p> <p>Seton Hall reported that effects of the infusion of materials began to appear in student essays.</p>	<p>and propositions of Euclid in order to see the connection between Euclid’s methods and the methods of Socrates in Books I-IV of the <i>Republic</i>.</p>	<p>Darwin, <i>Origin of Species</i> Watson and Crick, “A Proposed Structure for DNA”—</p> <p>Selections in the topic guides of 102 are guides for all sections and imply selection readings by all students in the core: including, Cuvier, Georges (1802). Selections from ‘<i>Lectures on Comparative Anatomy</i>’ Lamarck, Jean Baptiste (1809) Selections from ‘<i>Zoological Philosophy</i>’ Mendel, G. (1865).</p>	<p>by the CLA faculty.</p> <p>2) Tom Huber completed the syllabus for a science module course entitled <i>Great Papers in Biology: Genetics</i>. The course is constructed on the case study model, and the case is titled “Mendel’s Experiments on Plants.” Tom has placed a case on the Web, using Mendel as a primary Scientific Inquiry. The web address is: http://sci.mercer.edu/faculty/fac.htm. The syllabus (available through the</p>	<p>Beagle”; Malthus, "An Essay on the Principle of Population"; Lamarck, "Zoological Philosophy"; Lyell, "Principles of Geology"; Darwin, "Origin of Species" chapters I, 2, 3, 4, 6, and 14; Darwin, "Descent of Man" chapter ; Huxley, "On the Relations of Man to the Lower Animals"; Mainstream Religious support for Evolution, pgs. 525-533. Students must also read, study and discuss the original documents of the US Supreme</p>	<p>physics (circa 1890-1930). Toy had the students read two of the original papers (by J. J. Thompson on Cathode Rays and R. A. Millikin on the famous "Oil Drop" experiment to measure the charge to mass ratio of the electron). The experience was enough to convince him to adopt, for next Spring '06, the St. John's College Senior Laboratory manual on "Atoms and Measurement" which contains these papers and others</p>			<p>classic texts. Authors read include Plato, Aristotle, Augustine, Hobbes, Hume, Descartes, Rousseau, Kant, Luther, Rauschenbusch, and Rheinhold & Richard Neibuhr. Texts were rearranged in reading to emphasize the conversation and influence they have had on each other.</p>	
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	<p>'Experiments with Plant Hybrids' Morgan, T.H. (1910). 'Sex Linked Inheritance in <i>Drosophila</i>' Watson, J.D. and F.H.C. Crick (1953). 'Molecular Structure of Nucleic Acids'</p> <p>Additionally, Kevin Vogel employed The "White Can" Experiment as an intro to looking at things with a critical eye as well as Inclined Plane and Pendulum experiments</p> <p>David</p>	<p>project director) incorporates many of the papers we read this past summer from the genetics portion of the readings.</p> <p>3) Eddie Thomas completed his work on a module for Scientific Inquiry on the Ptolemaic and Copernican models.</p> <p>4) Success of the Freshmen Seminar- Experiential/ Scientific Inquiry linked course: Of the six dyads originally set up to link these two courses (humanities and science), the Great Books</p>	<p>Court in: Epperson v. Arkansas (1968) and Edwards v. Aguillard (1987)</p> <p><u>Jean-Marie Kauth, Ph.D., Writing Program Director</u></p> <p>Rhetoric 102: Research Writing for the Biological Sciences (multiple sections):</p> <p><u>Aristotle's Physics; from Harvey's <i>On the Motion of the Blood</i>; from Darwin's <i>Origins of the Species</i>.</u></p> <p><u>Patrick Flynn, Ph.D., Assistant Professor, Philosophy</u></p>	<p>related to other experiments that the NSU students perform.</p> <p>6) Toy dropped the Bridging materials in the Physics of Music course because it threatened to turn it into a "special topics" course when it was supposed to be a course for majors.</p>				
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		<p>Dimattio developed the 102 course independently for teaching at SBU's Perugia campus. He incorporated BTG selections from Galileo, Newton</p>	<p>Program is the only group to survive. Dr. Caryn Seney from the Chemistry department and Mary Ann Drake co-taught their combined two classes: Seney's Scientific Inquiry class and Drake's Freshmen Seminar class. The title of the two combined classes is Faith and Reason.</p>	<p>a) HUMN 250 Contemporary World (multiple sections): Darwin reader by Appleman -- <i>The Origin of the Species</i>; <i>The Descent of Man</i>; Genesis 1-11</p> <p>b) Phil 290 History and Philosophy of Science: <i>Theories of the World from Antiquity to the Copernican Revolution</i>, Michael J. Crowe; <i>Discoveries and Opinions of Galileo</i>, Editor Stillman Drake, "Starry Messenger," "Letter to the Grand Dutchess</p>					
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				<p>Christina,” “The Assayer”; Darwin Reader by Appleman c) Phil 235/335 Modern Philosophy: Descartes (Rene), <i>Principles of Philosophy,</i> <i>Discourse on Method,</i> <i>Treatise on Man</i>; Galileo <i>The Assayer</i>; Excerpts from Lucretius, <i>The Nature of Things</i></p> <p><u>Martin Tracey,</u> <u>Ph.D.,</u> <u>Associate Professor Philosophy</u></p> <p>a) Phil 120 Greek Philosophy: Plato, Gorgias, Republic;</p>				
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Aristotle,
Physics, On
the Heavens
De Anima.

b) HNRS
230 Baptism
of Europe

Aquinas,
Thomas.
Selected
Writings.
Penguin
Classics.
Edited and
translated by
Ralph
McInerny.
New York:
Penguin
Books,
1999.

(Including:
On the
Eternity of
the World)

Fannie
Rusing,
Ph.D.,
Assistant
Professor
History

HUMN 240 -
Converging
Hemispheres
Darwin,
"On the

				Origin of Species" Recapitulation and Conclusion					
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Year III (05-06) “Technology, Art, Values, and the Problems of Technoscience”

FACULTY DEVELOPMENT/PLANNING MEETINGS (Year III)

SHU	SU	SBU	MU	BU	NSU	SMC	TMCC	STO	UD
SHU sent a new faculty member from the arts, Juergen Heinrichs.	Samford sent one new faculty member from Computational Sciences, Steve Donaldson; he had attended faculty development projects, last year. Chris Metress (English) and David Garza (Chemistry) held meetings to discuss the development of their pilot course for IDSC 201: Scientific Methods. This pilot course, modeled on Bridging the	SBU sent one new faculty member, Anne Foerst, of computer science and technology. Chiariello and Hughes returned. Hughes and Chiariello applied for a new Martine Grant. The purpose was to support further introduction of science readings into the Composition and Critical Thinking course (102). Hughes, Dimattio, and Vogel initiated a pilot program to	Lewis, Huber, and Drake met to discuss the sustainability of their work. Dean, Dr. Richard Fallis, of Arts and Sciences asked Bridging faculty to present what they had learned at a faculty meeting in September, 2005. The presentation also included Eddie Thomas from Philosophy, who attended Bridging the Gap the first year.	A Faculty Development seminar series last year. (Approximately one Friday afternoon per month.) About 25 people attended each session. The rationale was to have a presentation (hopefully leading to discussion) by a faculty member of some primary text or component of Catholic/Benedictine teaching. The series, based on unifying concepts or texts, was	Laws, Toy and Walker all attended again. Laws wrote a Quality Enhancement ‘pre proposal’ Proposal (QEP) that called for research into core readings university wide. This QEP is an official part of the SACS reaccreditation process. The proposal was not accepted due to unfamiliarity with core text traditions by the larger body of accreditation committee members.	SMC returned the same three participants as in the first year: two humanists and one scientist In the summer of 2005, Professor Cardwell, Professor Manter, and myself designed the reading for a special Massa Institute in-service on “the heart.” This three-day session for teachers of Collegiate Seminar included readings in Harvey (along with other heart-	John Adlish, dean and biologist, was new to the seminar. Denham organized a rigorous training session for full- and part-time instructors on the use of music in various curricula. Previous Bridgers were to assist Dr. Denham in the instructional aspect of the session slated for January 17, 2006.	St. Olaf sent two members, one science, one humanities, from the first two years.	Burk and Germann crafted a course proposal to aims at our understanding of scientific thought and modes of inquiry, in contradistinction from the humanistic, conveys an appreciation for where scientific ideas come from and how they develop, and explores the interplay between scientific and humanistic thought that has characterized western thought through the ages. The

	<p>Gap's first summer seminar at St. John's College, was to be a model for IDSC reform throughout the core curriculum. It was to use primary texts from the sciences (works by Plato, Aristotle, Ptolemy, Copernicus, Galileo, Bacon, Kepler, Descartes, Newton and Einstein) to explore how theories of motion reshaped our conceptions of the solar system.</p> <p>Metress met with Dean Chapman for debriefing</p>	<p>deliver Clare 111, 102, and 102 Lab to a group of second semester freshman as part of a learning community effort on campus.</p> <p>Hughes applied for and received support for a sabbatical leave which will be used to develop an upper level based in the Bridging reading materials of the last three years. The intention is to have the course team taught by Hughes and one science faculty member.</p>	<p>The same faculty, then, presented a workshop, entitled: <i>Technology, Art and Values</i>. Faculty read, Mendel's <i>Experiments with Plant Hybrids</i> on Friday night and Hawthorne's "The Birthmark". 14 faculty in attendance at the workshop, representing ten departments. In attendance were faculty from: Christianity (2), Communication and Theater Arts (2), Sociology, Mathematics (2), Foreign Language,</p>	<p>viewed by us organizers as a prelude to (to interest faculty in) the Faculty Development workshops based on the ACTC model</p> <p>The Core Curriculum faculty met and voted to require core texts in every core curriculum course and to require some of those texts to be science or history of science texts.</p>		<p>themed works, such as Poe's "Tell-Tale Heart) and included a dissection component.</p> <p>Professor s Manter and Cris Sindt taught a section of "Renaissance, 17th and 18th Century Thought" in the spring of 2006. They saw first hand how Harvey could be aligned with readings by Galileo and Descartes, as well as other stories of exploration and conquest. They plan to propose the permanent inclusion of</p>			<p>course was eventually turned down by a curriculum review committee</p> <p>The Associate Dean of Constantin College has taken the lead in faculty development , planning two activities meant to spur thinking about ways in which the sciences and the humanities can be presented in mutually enlightening ways. The first event took place Friday, 28 October 2005. Members of</p>
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	<p>on seminar.</p> <p>Metress designed a three-day seminar for faculty for Jan Term on Schrodinger's <i>What is Life?</i></p> <p>Later, Metress met with Provost Brad Creed, Associate Provost Mark Bateman, and five other Samford faculty to discuss the university's science and humanities initiatives. Several faculty are involved in a Templeton Foundation initiative on science and religion, and the Provost was seeking</p>		<p>Interdisciplinary Studies, Biology, Psychology (2), Philosophy, and Physics. The consensus was that the freshmen seminar courses and the scientific inquiry courses should agree to a common topic so that voluntary faculty from both programs could include this topic into their classes. The topic would be communally supported with events such as lectures, panel discussions, and maybe even some</p>			<p>Harvey in 2007-2008.</p>			<p>the faculty met for "Dinner and a Play," an idea adapted from the 2005 BTG Seminar at St. Mary's College of California. 17 members of the faculty met for an informal evening during which they read Michael Frayn's 1998 play, <i>Copenhagen</i>. Taking turns reading the roles, everyone present had an opportunity to participate in the dramatic event. An energetic discussion, initiated by the Dean, followed</p>
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	<p>ways to bring together the Templeton faculty and the Bridging the Gap faculty, thus drawing together science, religion and the humanities. As a first step, three of the Templeton initiative faculty will be joining the Schrödinger seminar in January.</p> <p>Dobbins and Roderick Davis from English designed an interdisciplinary course to be offered in the university's honors program:</p>		<p>student research presentations . A committee was formed to advance a proposal for next fall.</p>						<p>immediately and ranged over several topics, including Ethics, Politics, and the Philosophy of Language. All present agreed it was a successful event, and expressed a desire to participate in similar events in the future.</p> <p>The second faculty development event is scheduled for early January, 2006. Taking a cue from 48E-57D of Plato's <i>Timaeus</i>, which presents two key concepts of Plato's</p>
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	<p>“Darwin Made Me Do It: Evolution and Society.” Works included: <i>On Generation of Animals, Parts of Animals, In Memoriam</i></p> <p>Metress and Donaldson designed an interdisciplinary science and humanities course to be offered as part of the university’s honors program: “What are We Talking About: Understanding Language.”</p>								<p>cosmogenic theory, Form and Division, the faculty will assume the role of Plato’s Demiurge, gaining hands-on experience of the interplay of science, art, and philosophy. Visiting the Physics and Art Departments, the faculty will grow fractal crystals with guidance from a professor of physics, and create molded sculptures under the direction of the sculpture professor.</p>
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CURRICULUM AND COURSE DEVELOPMENT (Year III)

<p>1) Juergen Heinrichs and Marian Glenn, are members of the 15-faculty group piloting the first signature course for Seton Hall's new university core curriculum. Themed a Journey of Transformation, this is a core-text based, multi-disciplinary course to be taught as a freshman seminar by full time faculty. Faculty were to be teaching it to each other this spring, and to 250 freshmen in Fall 06, and 1000 freshmen in Fall 07. Marian has</p>	<p>The IDSC science course ran in the fall, with Metress co-teaching the Principia with Garza.</p>		<p>1) Freshmen Year Seminar team teaching with Scientific Inquiry, 2) two science modules based on core texts 3) Lewis developed a Science and Religion course which included selected readings from a text, <i>Bridging Science and Religion</i>. 4) Thomas's lab science module on "Great Papers in</p>	<p>The Across-the-Curriculum Writing Program has been very significantly affected by the "Bridging the Gap" project. Many of the materials from "B-t-G" have been integrated into the design of the RHET and HUMN courses that make up this program. Gaddis, Graham, Mikula, Rushing, and Thornburg all teach excerpts from Darwin's <i>Origin</i>, and Tennyson's <i>In Memoriam</i></p>	<p>Stephanie Walker and first-summer seminarian Dr. Bob Danek continued to include 'Bridging the Gap'-inspired materials in their English 101, English 102 and English 207 syllabi</p>		<p>Gifford and Will Mehm, from Biology, swapped classes for a day as part of the TMCC Faculty Exchange Program; Gifford taught a class on the art of courtly love in Mehm's Human Anatomy class and Mehm taught a class on ethical dilemmas in Gifford's Great Books class. The experiment in class</p>		
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<p>introduced a selection from Darwin's <i>Descent of Man</i> as a possible core text for the course. Juergen is developing visual arts modules for the course. The methods of shared inquiry and discussion-based seminars, that were so effectively modelled in the NEH-ACTC summer seminars, are what we're aiming for in teaching this new core course.</p> <p>2) SHU now has 10 hand made monochords for classroom use, thanks to Mark Daly of St. John's College. These have</p>			<p>Science, Ptolemy's <i>Almagest</i> was approved and scheduled to run in summer 2006.</p>	<p>as part of the HUMN 240, <i>Converging Hemispheres</i> course.</p> <p>Mikula included excerpts from Galileo's <i>Starry Messenger</i> (from the Crowe text) as part of her adult HUMN 240 sections</p> <p>Manca has his students read excerpts from Dante's <i>Inferno</i>, as part of his HUMN 230, <i>Baptism of Europe</i>, sections.</p> <p>As part of their research projects, Montero has his students in HUMN 220, <i>Mediterranean World</i> read</p>			<p>swapping is being tried by other profs.</p> <p>Gifford remarks, "Faculty members at TMCC have continued and will continue developing Bridging the Gap materials in their classes. The proliferation of Bridging the Gap awareness at TMCC has significantly raised the bar on the quality of instruction."</p>		
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<p>been introduced to the first year Honors students (45 students and 3 faculty) as an accompaniment to their reading of Plato's <i>Timaeus</i>. Students use mathematical ratios of string length to construct musical intervals on the monochords by following <i>Timaeus'</i> account of the demiurge's constructing the harmonious cosmos. The monochords will be used in the spring Honors colloquium on the Medieval world to explore musical modes both European and Arabic. In</p>				<p>widely from a variety of classical sources on the internet including Plato's <i>Crito</i> and <i>Republic</i>, and Aristotle's <i>Physics</i>, <i>Metaphysics</i>, and <i>De Caelo</i> (<i>On the Heavens</i>)</p> <p>Toussaint has his students read the entirety of the <i>Republic</i>, as part of his HUMN 220, <i>Mediterranean World</i> sections.</p>					
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<p>the third colloquium, Early Modern Times, sophomore honors students tuned the monochords according to Pythagoras's diatonic scale and played some tunes on them. The solution of tempering the scale for harmonious chromatic progressions was introduced when students took up Mozart's Marriage of Figaro and the Romantic era, and the monochord exercise was extended to compare the Pythagorean tuning with equal temperament. The lesson notes for these exercises are</p>									
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<p>attached.</p> <p>3) In addition to the Honors students, SHU used the monochords in one section of the course Music and Civilization, a survey course in the core curriculum.</p> <p>4) Infusion of science into the four team-taught Honors Colloquia continued, with the new material from the 2005 seminar now supplementing the material from previous seminars. Colleen Conway is a member of the team teaching the colloquium on Ancient Civilizations.</p> <p>5) Kelly Shea, who attended the 2004 ACTC-</p>									
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<p>NEH seminar, is Director of Seton Hall's Writing Center. She continues to teach the core course Literature and the Natural World, one of the options for first-year writing program, and introduce core texts as reading selections to colleagues teaching other sections of this course. In addition, three other faculty -- Jeff Gray, Gita DasBender, and Tim Wenzell -- have taught this version of College English II in Fall 2005, and all but Jeff Gray (on sabbatical) were to teach it in Spring 2006. Text excerpts used</p>									
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include: from Origin of Species by Charles Darwin; "In Memoriam, A.H.H." by Alfred, Lord Tennyson; and Watson and Crick's "A Structure for Deoxyribose Nucleic Acid and <i>The Tempest</i> .									

Excerpts of evaluation by Patricia Cook:

Year I

Discussions of Readings

Why should astronomy be studied as a liberal art? ... (*Republic* 529e): it engages human thought with the prospect of order in the cosmos. It involves a kind of pure intellection that prescind from the messy details of our empirical experience. Most importantly, astronomy frames the tension that propels all philosophical thinking: appearance versus reality, seeming versus truth.

... the cosmology we find in the *Timeaus* qualified by Plato as being merely a “likely story”? How should we understand a cosmology that restricts its account to “what is best” (*Timeaus* 29d,e)? If we don’t live in a cosmos, we live in a chaos. In other words, for the world to be an intelligible place, something like this account must be true....

The study of Euclid was almost universally received by participants as a delightful reminder that mathematics is eminently intelligible, perfectly suited for reflection upon first principles, and a thing of great beauty. Some commented that it helped them to overcome a sort of aversion to math: Euclid’s *Elements* seems to be structured the way the mind actually works.

....“Bridging the gap” is not to be confused with simply adding science and math texts to core humanities programs. Our reading of Dante’s *Divine Comedy* was a case of this point. We considered the *Comedia* as a work of literature, theology, and scientific cosmology which displays the integration of these elements. We noted the cosmology of Aristotle and some of the astronomy of Ptolemy in the background of this great medieval epic. Most of our discussion was directed to the notion of order as both a first principle of natural science and as a theme in Dante’s poem.

...What is the order of the universe as Dante portrays it? Everyone retains his individual identity yet occupies his proper place in God’s providential arrangement. The unfolding of Dante’s poem makes this order intelligible to us, it shows us as readers why souls occupy the places they do.... Mathematical images attend Dante’s cosmology at every turn. The very end of the *Comedy* formulates the question this raises succinctly: Why would “squaring the circle,” a geometric image, be used by Dante to describe our final desire? “...As the geometer who tries so hard / to square the circle / but cannot discover / think as he may, the principle involved / so did I strive with this new mystery: / I yearned to know how our image fit / into that circle, how could it conform...” (*Paradise* XXXIII, 133-138). The suggestion of the poem seems to be that mathematics inspires humans with the proper relation to the good (something Plato might have said). Or perhaps mathematics channels the will, keeps it trained in the direction of seeing the universe as One. Or maybe mathematics expresses the Divinity which is the rational order itself.

One of the most interesting dimensions of this session was our group’s first-hand encounter with what philosophers of science have come to call “instrumentalist” theories – where a theory is supposed to be no more than a device or instrument for making correct predictions about natural phenomena. Such theories are not supposed to be assessed as true or false but rather on the effectiveness of their predictive power. This was highlighted by the inclusion of Andreas Osiander’s (unauthorized) preface to the 1543 edition of Copernicus’s *On the Revolution of Heavenly Spheres*. Osiander’s argument that Copernicus’s system was nothing but a set of extremely effective devices for astronomical calculation, that it made no claims about the Truths of Nature, was no doubt contrived to prevent backlash by ecclesiastical authority against the heliocentric system. But it was useful to us for providing a stark view of Science as having no explanatory function. ...

Having made the distinction between instrumentalist prediction and explanatory science of nature, we had now faced perhaps the deepest question that concerns science: What counts as an explanation? ... We sought to discover Galileo’s ways of relating demonstrative mathematics and natural phenomena in his final work. We also sought to explore the complexity of the new experimental discourse raised in Galileo’s work by conducting simple physics

experiments ourselves. Again we attended to the theme of the relation of the rational constructs of science to the actual world in which we live. Galileo rejected Aristotle's differentiation between violent motion and natural motion and sought a quantitative description of "ideal real" motion. Galileo's work raises the questions of what it means for nature to be "lawful." Experiments never seem to give more than approximate results, yet they are taken to "prove" laws of nature. How should we understand the exact relationship between the phenomena and their putative laws?

In the laboratory we experimented with a pendulum in various configurations, essentially replicating what Galileo himself had done....

First, it seems critical to human understanding that we perform or observe actual physical experiments. Our mistakes can be corrected if we confine ourselves to texts and written problems, but interaction with lab equipment takes us a step further: it refines our (often misguided) intuitions.

Second, we discussed how lab science has become a futile exercise in many cases. Students are assigned a laboratory project for which they figure out in advance what results they are "supposed" to get. Then they proceed to perform the experiment until they reproduce the "correct" result. One way to avoid such "fudging" would be to encourage students to report the data they actually get and have them somehow analyze the potential fallibility of the experiment.

...

The purpose of reading Descartes at this juncture was to see some of the larger conceptual revisions of natural philosophy taking place in the early modern period. Descartes' work synthesizes some of the previous transformations in cosmology, mechanics, and philosophy that we had discussed.. We were also to consider the explicit development of modern notions of "laws of nature" as distinguished from the Stoic-Medieval conception of Natural Law. Further, Descartes' work raises new ways of conceiving of the relation of the world to divine action.

We read enough of Descartes to see the metaphysical roots of his "tree" of physical knowledge with its branches of morals, mechanics and medicine. Knowledge, for Descartes, is practical knowledge; otherwise it is, as he says, "worthless." Descartes wants to make us "masters and possessors of nature." The "provisional moral code" of the *Discourse* aims at the same goal as Descartes' final work (see *On the Passions of the Soul*, end of Part 6) to "secure as far as possible the health and happiness of all mankind." To this end, Descartes requires mathematical certitude at all steps of thinking.

The famous hyperbolic doubt of the *Meditations* secures the foundations of our knowledge. Withstanding the method of doubt are the certainties that I exist; that God exists; and what comes to be called "metaphysical dualism." ...It was observed that this transformation of science made it dramatically successful in Cartesian terms. Cartesian science yielded predictions and solved problems so that advances were made in medicine and technology. It was also observed that Descartes' Method isn't foolproof, even in his own hands: his account of the circulation of the blood (*Discourse*, Book V) is wrong. Perhaps if we were to study that particular example we would gain a clear and distinct understanding of the limits or vulnerabilities of the Cartesian Method. One final observation: some participants advocated Cartesianism on the grounds that it after all does preserve our experience – it recognizes that human souls are immaterial and immortal.

...The original intent for this session was to explore the ways the new science of Galileo and Descartes provide a framework for a reconceptualization of a new science of politics in the work of Thomas Hobbes. The work of Hobbes illustrates the connection between natural philosophy and political theory in an explicit way, but we wanted also to discuss ways in which natural theories can be part of political schemes implicitly.

... This session was the intellectual climax of the seminar. We discussed how Isaac Newton wove the various strands of natural philosophy of Copernicus, Galileo, and Descartes into a comprehensive solution to the issues of celestial mechanics. Perhaps the greatest moment was when one participant "demonstrated" Newton's Proposition I, Theorem I (roughly that a line joining one heavenly body to another sweeps out equal areas in equal times) at the blackboard. This is an extremely elegant proof with a beautiful construction. Everyone worked through the steps together, discussing their mode of understanding and/or assent to each move in the

argument. This, it was said, is what it is to make a persuasive case and what it is to really understand an argument. ...

The demonstrative mode is perhaps neglected in contemporary pedagogy. Many of us had never tried to demonstrate a theorem for an engaged audience. We had neglected earlier opportunities in this seminar (e.g., to demonstrate propositions of Euclid)...Now it seemed to us that demonstration involved unparalleled rigor on the part of both the demonstrator and the (interactive) audience. Though time-consuming and difficult, many participants believed that this demonstrative mode belongs in our college classrooms to create a benchmark for what it is to clearly understand a thing.

...The main question about Newton's Scholium was, why does Newton use language of absolutes (absolute time, absolute space)? Presumably this confers absolute rest or absolute motion on any given body. Yet it seems as if his definitions imply that relative frames of reference would not only be meaningful, they would also be sufficient to Newton's mechanical science. How would we ever be able to identify some frame of reference as absolute?

Astronomy Laboratory

... we were...introduced to the St. John's College Observatory by an astrophysicist on the faculty, Dr. James Beall. We were helped to use the computer-driven telescope, and participants were able to see Mars in vivid yellow-red, and her two moons. This activity was a memorable highlight of the seminar for many of us. Star-gazing can be a dramatic intellectual experience in itself, but the context of the seminar made many of us feel part of an intellectual tradition. Our fresh appreciation for the work of astronomers, together with the sheer difficulty and daunting complexity of making celestial observations, reminded us of the magnitude of the achievements of those whose work we had been reading.

Curriculum Workshops

During the final two days of the conference, participants from the same institutions met in their groups of three and discussed concrete plans for adding at least one of the seminar texts to their existing courses. Seminar Director Dr. Lee encouraged groups to devise precise tactics for integrating the texts into current courses, and sought suggestions from participating institutions for developing new humanistic curricula that utilize the insights gained from the seminar experience with these primary texts.

Drs. Sloan, Kalkavage, Lee and I floated among these meetings of individual colleges with extensive paperwork in hand. Each institution had provided documentation of its core curriculum and mission statement, and had supplied course descriptions. Drs. Sloan, Kalkavage and Lee continued to be invaluable resources of practical plans as well as new ideas. In my capacity as project evaluator, I was repeatedly impressed at the commitment and inventiveness of our participants. Every group left with a fledgling plan for incorporating science texts.

I observed only one wholly unanticipated and remarkable phenomena at these group meetings: many faculty members are so insulated by their department affiliations that they know very little about their own school's core curriculum. Even those who teach in their school's core program were in many cases uninformed about the exact contents of other core courses. Maybe this would not have been so striking if these teams hadn't just spent two weeks together engaged in this "bridging the gap" project. In any case, when teams got together and looked closely at their own college's course materials, someone invariably announced, "I didn't know about that." Hard science professors were the most isolated. They had never been called upon to participate in core teaching. Physicists, chemists, and biologists often have overwhelming enrollments in service courses or pre-professional courses, and hardly have the chance to teach upper level courses in their own disciplines. Few could imagine being given leave to participate in any real way in an interdisciplinary core program.

Plenary Discussion and Evaluation

The group met as a whole on the final day of the seminar. A representative from each school reported on plans, both immediate and long-term, for incorporating texts that bridge the

gap. Suggestions were shared and advice was offered. Some of the more intractable difficulties turned out to be common. There are features of current academic culture that are simply antithetical to the project of helping students encounter the world as an integrated whole. These conditions are not likely to disappear any time soon. But the participants in this seminar had made an excellent beginning.

This two-week seminar had been ambitious with respect to both its content and its outcome. Evaluation forms to be returned anonymously were distributed at this final session. The director also invited an open discussion of the strengths and weaknesses of this conference. Since this was only the first installment of a three-summer series, constructive criticism may be particularly useful....

Excerpts from Cook's Evaluation of Year III

The question of technology that was specifically addressed in the third summer seminar was seminal to the "Bridging the Gap" project as a whole: To what degree should study be directed to utilitarian ends? Shakespeare's *Tempest*, Bacon's *New Organon*, and Swift's *Gulliver's Travels* suggested important ways of addressing this question. Is inquiry into nature a sort of explication of God's works, or should it include an attempt to improve the human condition? Shouldn't self-examination lead us to the ultimate position of power, namely, being able to control our use of our powers? Can intellectualizing be taken too far, so that we "elevate" human civilization like Swift's hovering island only to find we can't function in the practical realm?

...techne knows how, and is geared toward, production (poietike) or genesis. Phronesis is geared toward action, and may involve a specific direction, or critical evaluation. Of *action* we may ask "why?" questions. To what purpose, for the sake of what, is this action taken? Action may be for the sake of discovery rather than production.

Following this distinction, we notice how science might pursue knowledge for its own sake, or it might be practiced as pure technology. Other forms of techne include the rhetorical arts, statecraft, and certain fine arts. Is techne the source of man's deliverance, or is techne in fact dangerous? ... Are scientific "facts" human constructs rather than truths? We can't remove culture from science, as Latour and Woolgar show in *Laboratory Life*. Observations are subject to parallax; what we call "facts" depend upon an interpretive framework we have imposed; ... The technological imperative is beautifully illustrated in the stories of Kafka and Hawthorne. Everything that we are technologically able to do, we end up doing. The characters in these stories seem to be on a trajectory that they can't interrupt.

Not only is technology seemingly self-justifying and self-perpetuating, it has a way of coming to control us. The things we create – Kafka's torture machine, Hawthorne's alchemy - in the end turn out to be "creating" us. Hans Jonas makes a parallel argument in *The Imperative of Responsibility*. Jonas argues that the Baconian project has revealed its insufficiency by proving unable to regulate itself. Is this inevitable?

Leon Kass suggests that we respond to the technological imperative with what he calls "the wisdom of repugnance." The scientist as much as the citizen needs to be able to imaginatively inhabit the future that current technological enterprises might produce.

Kass illustrates the wisdom of repugnance with the example of cloning. Cloning is techne par excellence. We are very close to being able to make, or manufacture, copies of human beings. Ought we to put a stop to this particular technology?

...I could find no participant who did not feel changed by the readings and discussions. Everyone seemed to encounter the limitations of their own disciplines that had to be complemented by disciplines, as it were, "on the other side of the gap". All participants seemed to feel the need to revise higher education curricula in such a way that student inquiry

encountered the world as a whole. Although the director's stated goal of the project was actual curricular infusion, the evaluator began to think that the consciousness-raising of the immediate participants might be an equally significant result. Curriculum changes can remain superficial unless the zeitgeist is prepared to accept and perpetuate what underwrites the changes. It may be that the individual convictions and illuminations reported by participants constitute actual changes in the spirit of the times. Thus, even before any formal assessment of actual curriculum revisions, the evaluator believes the project to have been a splendid achievement.