Lyman Briggs College

Memo

To: Dr. Doug Estry

From: Kelly Millenbah

CC: Elizabeth Simmons, Philip Strong

Date: 10/4/2012

Re: Pilot Model for Integrative Studies – Follow Up

On June 5, 2012 you asked LBC to provide additional information to our request (initial memo included below) regarding changes to the Integrative Studies requirements for LBC students. Because LBC faculty are appointed on 9 month appointments, I was delayed in responding to your request until Fall 2012 when I could consult with the faculty on your request.

In your request, you asked for the following pieces of information:

1) How the design of the HPS courses meets the following statement of purpose:

> "The purpose for an Integrative, Global Learning Model at Michigan State University is to provide a sequence of developmental, student-centered course options that complement the majors and further students' liberal learning by providing students with the opportunity to explore exciting, innovative, and compelling global ideas and themes from diverse perspectives with a faculty facilitator with a goal of improving their ability to analyze, evaluate, critique, synthesize, reflect upon, and apply different theories and sources of information."

2) How each course you propose as a substitution has the characteristics that are illustrated in the attached model (Global Competencies)?

Below we offer our responses to your request.

Question 1: HPS Course LB331-335 Global Competencies - The HPS unit of Lyman Briggs College is dedicated to bridging the gulf between science and the humanities (what C.P. Snow famously called "the two cultures"). This humanistic study of science inherently supports the development of global competencies in our students.

We study scientific theory and practice across different sociocultural and national contexts and diverse historical periods. We stress that to understand the sciences one must learn, for example, how their development has been influenced by sociocultural factors including religion, national interests, funding mechanisms, and the inclusion/exclusion of women and minority ethnic groups. Our students undertake comparative analyses that involve their critiquing of local, mainstream, modern definitions of and attitudes towards science by taking into account the definitions and attitudes prevailing in other places, cultures, and times. We believe that developing these global competencies will make them far better practicing scientists.

We teach our students to analyze scientific thought through the lenses of historical, sociological, and philosophical approaches, and to reflect upon the different methodologies and sources of evidence that each employs. At the same time, we engage them in exploring how these diverse disciplinary approaches work in synergy with scientific or technological contributions in addressing fundamental challenges facing modern society, such as providing clean water, safe food, reliable energy, and accessible healthcare across the globe. Reflecting upon these compelling challenges brings an immediacy to the class which students find engaging; drawing in multiple disciplinary perspectives broadens their outlook tremendously, as they often note in course evaluations.

All HPS courses are small (35 or fewer students), discussion-focused, and student-centered. Course sessions typically include team-based analysis of primary sources, small-group work on research projects, student-led presentations, peer critiques, reading-fueled debates, and visits to local sites where science and society intersect. Throughout these courses, students work closely with faculty and peers to develop their analytic and communication skills. To ensure that our courses focus on student learning, we now evaluate them via the Student Assessment of Their Learning Gains (SALG), which provides feedback to faculty about the degree to which various aspects of the course helped students develop new skills, attitudes, and knowledge.

Question 2 – Specific HPS Courses Requested as Substitutes

LB 331: Literature and Science – This course explores science fiction texts that provide a window into major political and cultural institutions from diverse national and historical perspectives. For example, one instantiation of this course focuses on empire, imperialism, and colonialism. Starting with the British Empire in H.G. Wells' *The War of the Worlds*, the students analyze the complex position of a British subject critiquing British imperialism at the turn of the century. In Isaac Asimov's *Foundation* and Ursula K. Le Guin's *The Word for World is Forest*, they transition to American-inspired imperialism, the first text condoning and the later condemning. Finally, they end with an anthology of indigenous science fiction written from a postcolonial perspective. In other words, the course offers a broad overview of various historical and theoretical manifestations of empire and colonialism. Within this context, students are encouraged to evaluate their personal views of imperialism and colonialism, as well as the role of science/technology in supporting these manifestations. Furthermore, students look to a postcolonial future when new forms of government and more egalitarian relationships might flourish among diverse groups of people.

LB 332: Technology and Culture – This course explores how different groups of people understand and use technologies across a range of contexts and cultures. Students examine how past peoples understood familiar technologies that we use every day -- for example, how the cultural idea of the car has changed over the past century - as well as how different populations understood and used technologies differently - for example, the fact that hot-air ballooning was pursued as a valuable technological achievement in 18th-century France, but was ignored in England. These diverse national, historical, and cultural perspectives allow students to connect their local and familiar experiences with the lived experiences of people in different places and times, encouraging our students to understand and appreciate the perspectives and beliefs of people different from themselves.

LBC 333: Topics in the History of Science – This course focuses on a "hot topic" in HPS and frequently relates to one of the professor's primary research areas. As with all the HPS classes, topics are explored through scholarly readings, primary sources from paper and/or digital archives, film and novels as

appropriate. In addition to learning via the readings and class discussions, students create their own knowledge through self-directed research projects and presentations. For example, in one instantiation, "People and Other Primates", the course focuses on how primates have been studied to shed light on human behavior. This includes a unit on how primatology takes place in Africa, and specifically on how the relationships between American primatologists and indigenous researchers have changed and evolved over time. It also looks at the ecological, economic, and social justice implications of human-wildlife conflict in the African National Parks.

LB334: Science, Technology and Public Policy – This course explores the dynamics between scientific developments, the emergence of new technologies, and the legal/policy responses to them. The class takes a global comparative approach throughout. For example, in the unit on human experimentation, the class contrasts regulatory systems used across the world, and focuses on the issue of internationalization of experimentation (e.g., testing drugs destined for US consumers on human subjects in Eastern Europe). The comparative international approach is highlighted most strongly in the unit on health insurance, which discusses diverse implicit notions of justice and healthcare rights, manifested through policy, across the globe. The class emphasizes the context-dependence of science, technology and policy, which means that the course material demands global perspective to adequately address the material.

LBC 336: Gender, Sexuality, Science and Technology – This course uses historical and contemporary case studies to demonstrate how science can be directed by culturally constructed assumptions about gender and sexuality. In turn, the apparently scientific findings created by such projects are used to bolster the restrictive understandings of biological sex, gender, and sexual identity upon which they were founded. Drawing on scholarship from gender studies and HPS, this course examines the experiences of women scientists from a range of countries, the contributions of women and minorities operating outside the boundaries of the scientific community, as traditionally defined, the responses of women to scientific works which claimed to prove their “inferiority” to men, and the responses of homosexuals declared to be “unnatural” by some scientists. Topics include looking at the intersection of gender, race and evolutionary discourse in Victorian explorations of the "missing link"—the search for a link between the English gentleman and his beastly cousin, the non-human primate. Museum exhibits, "freak shows," and newspaper articles all discussed the "missing link" and were saturated with racist discourse and, in the case of "freak shows" and museum exhibits, often involved the exploitation of non-Western peoples who were displayed as "spectacles." These and other topics are explored through scholarly readings, primary sources from paper and/or digital archives, film and novels as appropriate. Students create their own knowledge through self-directed research projects and presentations. It is common for students entering the class to see no connection between feminism and science and to leave with a scholarly understanding of the various forms feminism takes and how such ideological views promote good science by demanding individuals and groups in authority reflect on how prejudice impacts the questions pursued, methods applied, and claims made by scientists. It is also common for students to gain new insights into the experiences of individuals whose gender and/or minority status is different from their own. One former male student, for example, commented about how the class will help him be more aware of women’s health issues and the experiences of his future female patients. Such personal, political, and ideological transformation is a common outcome of this student-centered class experience.

Please let me know if there is other information you request. We look forward to receiving your decision on this important matter.

Lyman Briggs College

Memo

To: Dr. Doug Estry

From: Dr. Kelly Millenbah

CC:

Date: 5/22/2012

Re: Pilot Model for Integrative Studies

For the last year, LBC has been in discussion with your office regarding our proposed pilot project for Integrative Studies (Appendix1). You and I recently met (May 16, 2012) to discuss moving this proposal forward pending some additional information regarding how LBC would assess the outcomes of the model.

In addition to the assessment strategy outlined in Appendix 1, LBC will also adopt and implement the survey instrument developed by Jardeleza and Librakin (see Appendix 2) for all students participating in the proposed model; this survey instrument would primarily be used to collect data from student who are participating in LBC courses that are substituting for the 3XX ISS and IAH courses we are seeking to replace. As per an email exchange with Jardeleza, the survey instrument in Appendix 2 was designed to be modified to fit other disciplines across campus and we would modify it to match the courses in question. We would coordinate with Jardeleza to ensure that all of the data generated from the Center for Integrative Studies and LBC can be analyzed together in a broader analysis of student learning across MSU.

Data collected for analysis of whether our pilot project met its goals would be data generated over the next 5 years, beginning in Fall 2012. The table below indicates the student pool that would be included in this pilot study. The same color across years coincides with a particular cohort of students. In this way, we will be able to follow 2 full cohorts from their freshman to senior year (yellow and green), one cohort from their freshman to junior year (purple), one cohort from their sophomore to senior year (red), and one cohort form their junior to senior year (blue). If this pilot is implemented in Fall 2012 we may also be able to collect data on a small number of seniors who may be affected as well (gray).

Year	Freshman	Sophomore	Junior	Senior
Fall 2012				
Fall 2013				
Fall 2014				
Fall 2015				
Fall 2016				

LBC would commit to providing annual reports with a final report on the outcomes of the pilot project at year 5.

I look forward to hearing from you on this request. Please let me know if there is further information I can provide.

APPENDIX 1: **Lyman Briggs College**
Pilot Model for Integrative Studies
24 May 2011

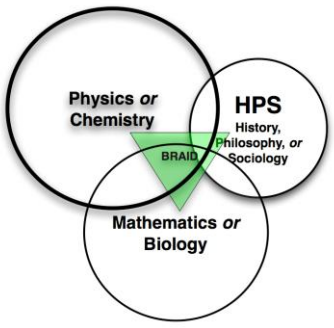
What is Lyman Briggs College?
The Lyman Briggs College (LBC) is a residential college that bridges the sciences and humanities through interdisciplinary teaching and research. It provides students with a fundamental science education in mathematics, chemistry, biology, and physics. Additionally, the core program integrates historical, philosophical, and societal concerns and consequences of modern science, technology, the environment, and medicine. LBC was founded in 1967 with the mission of bridging the divide between C.P. Snow's ``two cultures" of the sciences and the humanities; it is the longest-running program of its kind on a research-extensive campus in the United States. It is also a college where experimentation in novel instructional methods is encouraged and valued. The faculty in LBC are leaders on the MSU campus in securing external support (i.e., NSF) to test a variety of innovative teaching practices aimed at bettering the learning environment for students.

Who are the faculty at Lyman Briggs College?
The LBC faculty are grouped into two categories: history, philosophy, and sociology of science (HPS) or science, technology, engineering and mathematics (STEM). Almost every faculty member in LBC has a 25% joint appointment with another disciplinary unit on campus to facilitate scholarship and allow them to teach upper division undergraduate and graduate courses in their area of expertise. Within the HPS group, the faculty have joint appointments in the Departments of History, Philosophy, and Sociology along with connections to the Asian Studies Center, Center for Latin America and Caribbean Studies, African Studies Center, Center for Ethics and Humanities in the Life Sciences, Environmental Science and Policy Program, and the Women's Studies program.

What is the Curriculum in Lyman Briggs College?
All students in LBC must complete a common core curriculum regardless of major (LBC has over 30 majors and coordinate majors across four colleges (LBC, CANR, CNS, EGR)). In addition to the University and major requirements, the core curriculum consists of the following:

- One writing-intensive freshman HPS course (Introduction to HPS)
- Two math courses (calculus 1, and either calculus 2 or statistics)
- Two physics courses (mechanics and electromagnetism, including labs)
- Two biology courses (organismal and molecular, including labs)
- Two chemistry courses (general chemistry, including labs)
- Two 300+-level LB HPS courses
- One senior seminar capstone course

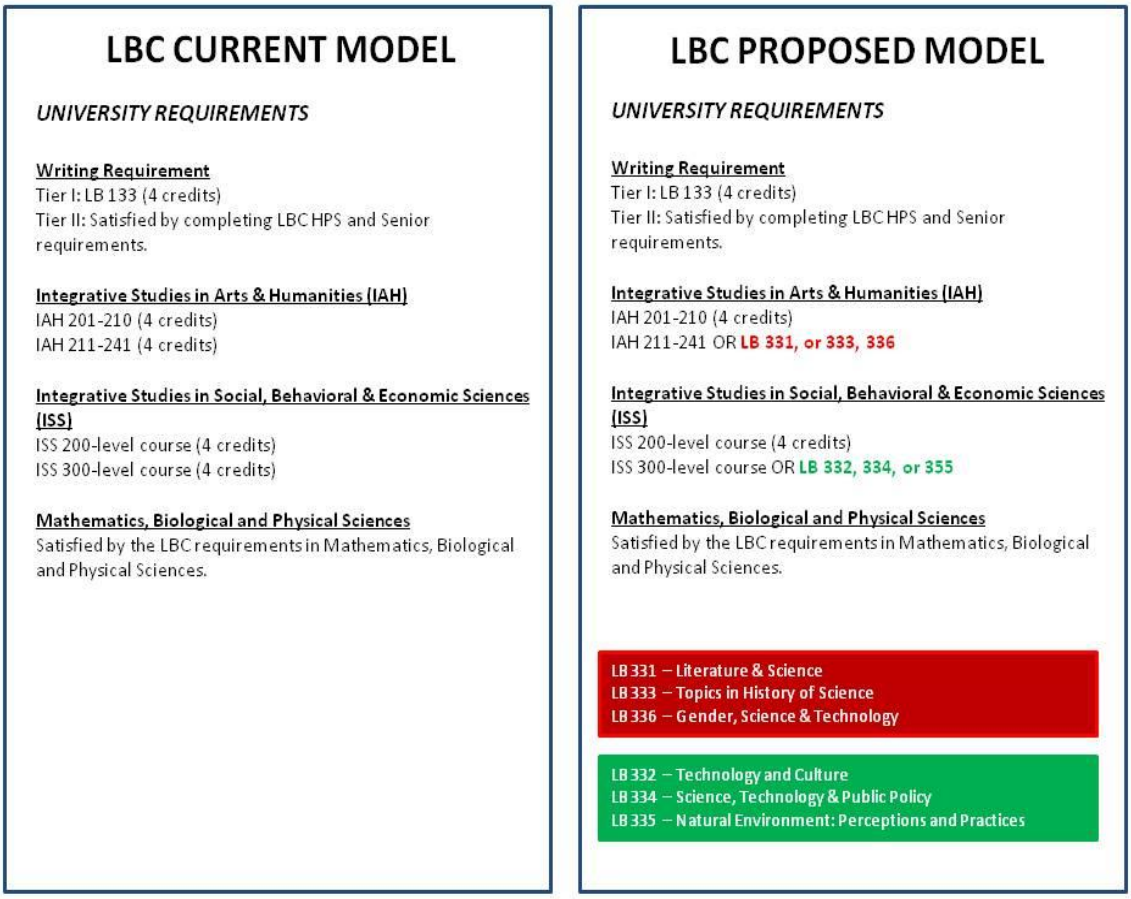
Integrating Disciplines in Lyman Briggs College



LBC has a long-standing (45 years) commitment to integrating the sciences with the humanities and social sciences. Faculty members in LBC are regularly seeking innovative ways to link the STEM and HPS disciplines and to encourage students to build their own knowledge through practice by finding connections between prior understanding and new concepts. Senior seminar courses that are co-taught by faculty from STEM and HPS fields, interdisciplinary study-abroad courses, faculty collaboration on cross-disciplinary course modules or labs, and team-taught freshman seminars linking the core chemistry, biology, and HPS classes are a few examples of these innovative methods. The faculty also have recently been awarded two National Science Foundation grants (BRAID and BRAID 2.0) that support faculty research on how best to prepare students to think and work in the interdisciplinary scientific environment they will encounter in their future studies and careers. Participation in the BRAID project and the cross-disciplinary LBC curriculum prepare the faculty to address the academic goals of integrative studies at MSU in a unique and thoughtful way.

Pilot Proposal

As discussed above, LBC is strongly committed to multiple ways of knowing and values efforts to enhance students' ways of thinking. Given the faculty composition and the commitment to an integrative approach to multi- and inter-disciplinary general education within LBC, we propose a pilot project to determine if the LBC model of addressing MSU's integrative studies mission can be met using a modified approach to the current campus paradigm. The model below highlights the changes we seek to implement in this study. Simply, we propose that LBC students who are completing certain 300+-level HPS courses as part of their LBC graduation requirement be allowed to apply those courses as their second IAH or ISS requirements. Taking one of three specific HPS courses (LB 331, 333, or 336) would fulfill the second IAH requirement; taking one of three other specific HPS courses (LB 332, 334, or 335) would fulfill the second ISS requirement. These LBC courses are taught by our HPS faculty whose doctoral degrees and scholarly expertise are in History, Philosophy, or Sociology of Science and who consistently honor the goals of integrative studies in their courses.



Why the Proposal?

LBC is requesting to implement this pilot project for several reasons. First, LBC supports the intent of integrative studies at MSU, and acknowledges that the experience offered by the first-level IAH and ISS courses is not replicated anywhere else in the LBC curriculum. However, we believe that our two required 300+- level HPS courses fulfill the essence of the second IAH and second ISS course currently required by the University. The second IAH and ISS courses in the University level requirement are meant to help students to learn the perspectives, literature, and analytical methods of another discipline that approaches knowledge differently than one's primary field of study. This is precisely the goal that our upper division HPS courses accomplish; students majoring in science learn how to approach topics at the science-and-society boundary using the methods of

historians, philosophers, and sociologists. Since the faculty teaching our HPS courses have doctoral degrees, teaching experience, and scholarly publications in the social science and humanities, their expertise helps to meet the spirit of IAH and ISS (i.e., their own academic work is at the intersection of history, philosophy, sociology, and the sciences). Second, this proposal addresses a major issue recently highlighted by Provost Wilcox: he is interested in units' thinking more strategically about the number of requirements students must meet in completing their degrees. Our proposal engages students in deeply integrative academic studies while also opening up several additional credits that would allow them to further supplement their degree via specializations, minors, undergraduate research experiences, languages, and study abroad opportunities. Third, we are concerned that LBC currently loses some students specifically because they are not able to accommodate the 300+-level HPS courses and their second IAH and/or ISS requirements in their curriculum. Many of these students shift to majors in science colleges offering fewer course opportunities in the social sciences and arts and humanities, and few or no interdisciplinary or integrative courses in their curricular plans.

Expected Outcomes

We anticipate that our proposal will result in three major outcomes. First, there will be improved instantiation of integrative studies and liberal learning in the LB curriculum. Second, allowing students to count the 300+-level HPS courses toward their second IAH and ISS requirements will allow students to pursue other courses that further complement their intended degree. Our discussions with LBC students show that most students would use the open credits to pursue foreign language courses, additional specializations/minors, study abroad or away, undergraduate research, and second majors that normally would not fit in their curriculum. Third, we expect that the number of students starting in LBC and graduating with a degree in LBC will increase; students will leave with a well-rounded understanding of the societal role of science.

Timeline

We propose to implement these changes for a period of 5 years beginning in Fall 2011.

Assessment

Each year we will track students who pursued the proposed model to determine how they used their open credits including additional course selection, pursuit of minors and specializations, language courses, study abroad / away opportunities and undergraduate research experiences. We will also use a qualitative assessment (i.e., survey, supplemented by interviews) of graduating seniors pursuing the pilot model to determine their experiences with integrative studies. The qualitative assessment will study their learning gains in interdisciplinary awareness and critical thinking skills and will ask about the benefits and challenges they encountered under the academic path they pursued. To compliment this data, we will also collect similar data for students not choosing the proposed model. Because the data set will be large, we may randomly select a subset of students for the assessment process depending on how the first year of analysis works. Depending on other models that may be piloted by other units on campus, we would be interested in working on developing assessment plans with the other units that would allow us to compare results across the different integrative studies models.

Appendix 2: Survey Instrument from Jardeleza

General Education Efficacy Survey in Science (GEESS)

Part 1 (University and Center-aligned Goals): Items aligned from the wording of the original goals are as follows: University goals (MU), Analytical thinking (AT); Cultural understanding (CU), Effective citizenship (ECi), Effective communication (ECo), Integrated reasoning (IR), Center of general science goals (C), Scientific knowledge (SK), Scientific development (SD), Scientific practice (SP), and Scientific appreciation (SA).

Early-course Likert scales were prefaced with the question set text "Indicate the extent to which you believe your [MSU general education science] course(s) will help train you to:", whereas post-course Likert scales were prefaced with the question set text "Indicate the extent to which you believe your [MSU general education science] course(s) helped train you to:" Both had the following response options: A GREAT DEAL, SOME, A LITTLE, NOT AT ALL.

Goal and Item	**Dealing with Information**	**Using and Understanding Science**	**Cultural Understanding and Effective Citizenship**	**Effective Inquiry and Communication**	**Communality**
MU-AT: Find information from multiple sources	.860				.741
MU-AT: Analyze information from multiple sources	.928				.859
MU-AT: Evaluate information from multiple sources	.924				.846
MU-AT: Synthesize information from multiple sources	.881				.765
MU-AT: Consider the credibility of science		.693			.515
MU-AT: Recognize the appropriate use of science		.726			.553
MU-CU: Demonstrate sensitivity about diversity			.839		.723
MU-CU: Demonstrate self-knowledge about diversity			.858		.763
MU-CU: Recognize the mechanisms that produce diversity			.846		.742
MU-ECi: Understand the structures of local, national, and global governance systems			.810		.631

CONTINUE TO NEXT PAGE

Goal and Item	Dealing with Information	Using and Understanding Science	Cultural Understanding and Effective Citizenship	Effective Inquiry and Communication	Communality
MU-ECi: Act effectively within governance structures			.812		.650
MU-ECi: Solve societal problems ethically			.751		.560
MU-ECo: Effectively communicate in writing				.730	.557
MU-ECo: Effectively communicate orally				.750	.634
MU-ECo: Effectively communicate visually				.744	.584
MU-IR: Solve problems through independent inquiry				.826	.702
MU-IR: Answer questions through independent inquiry				.829	.724
MU-IR: Generate new understanding through independent inquiry				.793	.668
C-SK: Describe major concepts in science		.780			.629
C-SK: Use science to explain important natural phenomena		.813			.694
C-SD: Explain how major concepts in science were developed		.810			.683
C-SD: Recognize the implications of major concepts in science		.841			.722
C-SP: Discriminate between ideas that are and are not proper subjects for science		.648			.430
C-SP: Give examples of how science constantly evolves		.814			.659
C-SP: Use scientific approaches to solve problems in the natural world		.802			.642
C-SA: Value the efforts of scientists		.671			.441

Part 2 (Student Expectations/Perceptions of General Education Science Courses): Items were based on student responses to an open-ended question about the benefits of general education science courses.

Likert scales were prefaced with the question set text "Indicate what degree you agree with each of the following statements:" and had the following response options: Strongly agree, Agree, Disagree, Strongly disagree. These are the early-course items, whereas the post-course items were adjusted to be in the past tense when applicable.

Item	**Student Expectations/ Perceptions of GES Courses**	**Communality**
Taking a general science course will improve my attitude about science.	.762	.580
General science courses will help me learn about the world.	.754	.568
Taking a general science course will increase my awareness of the natural world.	.767	.588
I have a positive attitude about general science courses.	.729	.532
Taking a general science course will help me to understand the process of science.	.758	.574
Taking a general science course will increase my observation of the natural world.	.787	.620
Taking a general science course will increase my respect for science.	.781	.610
General science courses will help me learn the effects humans have on the world.	.733	.537
I will learn facts in my general science course that are relevant to my life.	.725	.525
General science courses will help me to change my behavior towards the environment.	.725	.525
I will learn skills in my general science course that are relevant to my life.	.758	.575