A Living Laboratory: Revitalizing General Education for a 21st Century College of Technology

FINAL REPORT, THIRD YEAR FELLOWS

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GENERAL EDUCATION THROUGH THE LENS OF LIVING LAB: FROM ESOTERIC TO ESSENTIAL

THE GOALS OF GENERAL EDUCATION:

It has been estimated that about ninety-five percent of the four-year colleges and universities in the United States offer General Education programs.[3] Schneider and Schoenberg describe the goals of General Education as "acquiring intellectual capacities and understanding multiple modes of inquiry, civic knowledge and values."[4] More specifically, General Education should emphasize skills that will contribute to students' success in college and in their careers. Skills such as verbal and written communication, information gathering, decision making, critical thinking, and problem solving are the foundations for in-depth studies within specific disciplines. General Education should also include social, political, economic, and cultural issues so that

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[3] Aloi S.L., Gardner W.S., Lusher, A.L. "A Framework for Assessing General Education Outcomes within the Majors." *Journal of General Education* 52 (2003), 237-52.

[4] Schneider, C.G. and Schoenberg, R. "The Academy in Transition: Contemporary Understandings of Liberal Education." *Washington DC: Association of American Colleges and Universities* (1998)

students are better able to view diverse cultures, lifestyles, and backgrounds from objective and informed perspectives.[5]

REFORMING GENERAL EDUCATION:

The reform of General Education is one of the most complex challenges facing colleges and universities. A mistake that faculty and administrators sometimes make when addressing the reform of General Education is to believe that they are simply engaged in the task of curricular reform.[6] They fail to realize that it is also a cultural change. Most General Education reforms focus on what is best for students while not recognizing why faculty hold the beliefs they do about what is best. The Living Lab experiment at City Tech focuses on the latter as we reimagine and revitalize General Education and strive to achieve student learning outcomes to meet General Education goals at City Tech.

MODELS FOR GENERAL EDUCATION:

According to Newton, there are three dominant models General Education in the United States; the *great books model*, *the scholarly discipline model*, and *the effective citizen model*.[7] The great book model emphasizes familiarity with classic works where students are challenged with fundamental questions of human existence. Criticism of this model includes its narrow focus on knowledge within a single framework with a lack of diverse voices. The scholarly discipline model focuses on the importance of specialization. Major critiques of this model include the absence of effective communication of the relevance of the disciplines to students and society. The effective citizen model, according to Newton, includes important ideas and discoveries of the disciplines and their relationship to and implications for society. This model is becoming more prevalent because of its focus on student learning. More recent changes in General Education curricula emphasize learning the competencies that are needed for societal change. This focus on the "real world" supports the integration of multiculturalism and diversity into the curriculum. The more recent evolving model of General Education focuses on the relationship between student and instructor and the connection between general and specialized/ professional education.

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[5] Glynn, S.M., Aultman, L.P., Owens, A.M. "Motivation to Learn in General Education Programs." *Journal of General Education* 54.2 (2005), 150-70.

[6] Awbrey, S.M. "General Education as Organizational Change: Integrating Cultural and Structural Change." *Journal of General Education* 54.1 (2005), 1-21.

[7] Newton, R.R. "Tensions and Models in General Education Planning." *Journal of General Education* 49.3 (2000), 165-81.

THE LIVING LAB AND GENERAL EDUCATION:

The Living Lab Project at City Tech is an experiment in exploring various models of General Education and expanding the dialogue between faculty across disciplines as to how best we can implement these General Education learning outcomes in the curricula. Before developing curricula, however, the project focused on educational theory and teaching methodology.

Brooklyn Navy Yard and Environs

EFFECTIVE TEACHING: CHANGING THE MINDSET

WIPING THE SLATE CLEAN:

There is a common assumption in society that faculty at institutions of higher learning are experts in their fields as well as effective teachers. Most faculty are hired primarily as a result of their expertise in their fields, and while many have prior teaching experience, many have little or no formal training in education theory and teaching methodology. This point is noted in a recent *New York Times* article on education. In the article, Dr. Catherine Uvarov of University of California, Davis points out "higher education has this assumption that if you know your subject, you can teach it, and it's not true. I see so much that I was missing before, and that was missing in my own education."[8]

When new faculty lack formal training in education and teaching, it is natural to draw from personal educational experiences and apply the same practices and techniques in the classroom that have been standard for many generations: lectures, readings, papers, quizzes, and examinations. These vehicles for education delivery and assessment are found in the vast majority of classrooms regardless of the context, the field, or the nature of the students.

There is certainly a great tradition and culture behind the lecture, for example, as a vehicle for instruction and education. Most faculty today can probably recall a highly inspirational lecturer in their own education, someone who sparked their passion and dedication to their field. This lecturer was often passionate, funny, challenging, insightful, entertaining all at the same time. These qualities combined to make the course content exciting, engaging, penetrating, and memorable. Faded from our memories are all the average lecturers who barely register as having had an impact on us as students. These highly inspiring lecturers, however, are likely the exceptions rather than the rule in most higher learning institutions. In the context of 21st century students, the lecture is likely seen by the students as a sanctioning of a passive approach to education.

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[8] Pérez-Peña, Richard. "Colleges Reinvent Classes to Keep More Students in Science." *The New York Times*. 26 Dec. 2014. Web. 5 Jan. 2015.

The Boyle Commission On Educating Undergraduates in the Research University points out that:

> traditional lecturing and note-taking, certified by periodic examinations, was created for a time when books were scarce and costly; lecturing to large audiences of students was an efficient means of creating several compendia of learning where only one existed before. The delivery system persisted into the present largely because it was familiar, easy, and required no imagination. But education by inquiry demands collaborative effort; traditional lecturing should not be the dominant mode of instruction in a research university.[9]

The exploration for more effective teaching methods is an important albeit slowly growing project across the country.[10] While there is strong data supporting change,[11] there is natural resistance to the project by established faculty who believe they are already effective as teachers. To carry out our mission of educating new generations as a foundation for a better society, our institutions cannot rely only on the rare personality traits that make a great lecturer. We need to research and better understand education and teaching methodology as well the students sitting in our classroom if we are to uncover the keys to effective teaching. Although it targets research universities, the Boyle Commission report has wide applicability to higher education. The report likens the university to an ecosystem in which "the ecology of the university depends on a deep and abiding understanding that inquiry, investigation, and discovery are the heart of the enterprise, whether in funded research projects or in undergraduate classrooms or graduate apprenticeships. Everyone at a university should be a discoverer, a learner."[12]

This has been, in our eyes, the core value and aim of the Living Laboratory General Education Seminar. Through this project, we fellows became acutely aware that we could not rely on past experiences in teaching as an assured model of effective teaching. Our first lesson was to reframe our attitude towards teaching such that we became open to judging and reflecting on everything we assumed was standard or best practice. We had to wipe the slate clean and start building a new foundation for teaching that is not based merely on traditional tools, but on informed techniques and methods that are backed by significant research and are appropriate and well suited to our student body.

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[9] The Boyle Commission On Educating Undergraduates in the Research University. *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. Rep. no. ED424840. Carnegie Foundation for the Advancement of Teaching, Princeton, NJ., 1998. Web. 6 Jan. 2015.

[10] Pérez-Peña, Richard. "Colleges Reinvent Classes to Keep More Students in Science." *The New York Times*. 26 Dec. 2014. Web. 5 Jan. 2015.

[11] National Survey of Student Engagement. (2014). *Bringing the Institution into Focus—Annual Results 2014.* Bloomington, IN: Indiana University Center for Postsecondary Research.

[12] The Boyle Commission On Educating Undergraduates in the Research University. *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. Rep. no. ED424840. Carnegie Foundation for the Advancement of Teaching, Princeton, NJ., 1998. Web. 6 Jan. 2015.

OPEN TO EXPLORING TEACHING AND LEARNING:

Very important to this process was the series of readings assigned for the seminar. These readings brought to light the latest research and findings on effective teaching, but also shared stories from classrooms and educators with whom we could easily identify. The readings challenged us to look inward, to examine our approach to our courses. They inspired us to focus on assessing how engaged our students were and if we could do better. Most importantly, we grew to understand that we needed to shift our attention to the specific nature of our students and their learning processes.

CONTEXTUALIZING OUR STUDENTS:

As part of our Living Lab seminar, Dr. Sandra McGuire from Louisiana State University came to City Tech to present her findings from her experiences with struggling students at the University's Learning Center.[13] The first and most significant takeaway from Dr. McGuire's presentation was that faculty must eliminate assumptions regarding the students preparation and acquired skills, making us more attuned to the particular needs of the students in our classrooms. This helps deepen our awareness of who our students are and helps place them in a context of place, of past experiences, of demands and pressures inside and outside the classroom.

Contextualizing the students is particularly important when developing new curricula or adjusting existing assignments in the attempt to increase the effectiveness of courses in terms of the outcomes for the students. While assessment helps faculty measure the achievement of learning outcomes, contextualizing provides a basis for the strategies employed in conceiving new approaches to teaching.

Our examination of teaching and learning at City Tech through our Living Lab fellowship activities helped reveal some issues that affect our students. Two in particular stand out: efficiency as a priority and the lack of challenge in previous educational experiences.

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[13] McGuire, Sandra Y. What's Your Plan? Strategies for Student Success. New York City College of Technology, Brooklyn. 12 Apr. 2013. Lecture.

THE EFFECTS OF EFFICIENCY AND LACK OF CHALLENGING EDUCATIONAL EXPERIENCES ON OUR STUDENTS:

Many of our students have an innate sense of efficiency that grows from their busy lives balancing school, work, family, and social life. Efficiency in the context of education is a force that focuses on completing the task at hand without question or more general inquiry. Students emphasizing efficiency learn to discern the base requirements of the professor and execute them without putting the course in context of their overall studies, without drawing connections between course materials. This "silo"[14] effect hampers their achievement of learning at a higher level, leaving the students functioning at the lower tiers of Bloom's taxonomy.

Efficiency in education can lead to critical deficiencies in study skills, such as taking shortcuts in students' process and work. A likely shortcut is skipping over reading assignments, as these are among the most time consuming tasks in coursework. An internet search can quickly reveal an answer or information while discovering the same information through careful reading of a textbook or a literary work can take much more effort. Research is also a likely task where shortcuts are applied frequently.

In addition, many students in our classrooms came from high school programs where they may not have been adequately challenged. Here we can define "unchallenged" as referring to situations where students can pass a course with little effort and/or where the students can easily apply already acquired skills and knowledge to pass a course. Challenging educational experiences are those that demand *effort* AND require *acquisition* of new skills and knowledge. In unchallenging educational situations, students not only can pass the course with little gained, but they also hardly need to focus on their development of fundamental study skills or learning strategies. Students coming from such situations therefore likely lack the tools necessary to become successful learners.

Dr. McGuire reinforced this lack of study skills and learning strategies in her presentation. In particular she recounted a finding regarding student struggles with reading.[15] She discovered that many students who perform poorly on exams based on reading material lacked a strategy to effectively study and analyze a text whereby meaningful comprehension is possible. These students need guidance and training on study techniques and strategies to build the skills for success in the classroom.

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[14] Eger, John M. "Eliminating the Silos in Education." *The Huffington Post*. N.p., 30 Jan. 2013. Web. 5 Jan. 2015.

[15] McGuire, Sandra Y. What's Your Plan? Strategies for Student Success. New York City College of Technology, Brooklyn. 12 Apr. 2013. Lecture.

The combination of the effects of efficiency and lack of challenge in their previous educational experiences can leave our students poorly equipped for higher learning in college. City Tech's own investigations into General Education skills reveal that many students lack core skills of reading, communication, and writing. The root cause of the lack of skills is unclear, but it is reasonable to consider the effects of efficiency and lack of challenge as having played some role.

ROTE LEARNING VERSUS MEANINGFUL LEARNING:

The efficiency the students seek can have a limiting effect on their engagement with the course subject matter. The students certainly want to pass the course, but they can become content with the goal of earning their degree with the least necessary effort. In the study of student learning How Learning Works , the authors categorize this approach of the students as the pursuit of a "performance goal" or "work avoidance goal" as opposed to a learning goal. They cite research that concludes that students who hold performance goals rather than learning goals are less likely to "use study strategies that result in deeper understanding,…"[16] When this occurs, a culture of rote learning can become pervasive.

Richard Mayer, Prof. of Psychology at University of California, Santa Barbara, places learning into two broad categories of retention and transfer. As he points out, students must be able to retain the information presented in the demonstration and lecture, but also process it and be able to apply that information to new situations. He contrasts rote learning and constructivist (meaningful) learning in a useful way; rote learning is simply information acquisition, while constructivist learning is where "students engage in active cognitive processing, such as paying attention to relevant incoming information, mentally organizing incoming information into a coherent representation, and mentally integrating the incoming information with existing knowledge."[17]

In today's educational environment, rote learning, especially where access to information is ubiquitous, is virtual and passive: a student barely needs to commit information to memory as it is only a click away on a mobile device. Meaningful learning demands active engagement. Rote learning by definition is a mechanical process. Meaningful learning requires a cognitive, human relationship to the subject matter where the students are in the act of "constructing meaning" for themselves.[18] Rote learning is most efficient when context is striped away, but context is crucial for meaningful learning.

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[16] Ambrose, Susan A. *How Learning Works: Seven Research-Based Principles for Smart Teaching.* San Francisco, CA: Jossey-Bass, 2010. Print.

[17] Mayer, Richard E. "Rote Versus Meaningful Learning." *Theory Into Practice* 41.4 (2002): 226-32. Aug. 2013. Web. 28 Apr. 2014.

[18] Mayer, Richard E. "Rote Versus Meaningful Learning." *Theory Into Practice* 41.4 (2002): 226-32. Aug. 2013. Web. 28 Apr. 2014.

PAYING ATTENTION AND CAREFUL OBSERVATION:

The goal of the Living Lab project is to explore General Education and its application to City Tech. At the core of the emphasis on General Education is a determination to foster life-long learning, which means learning must be meaningful. The first step in Mayer's view towards meaningful learning is paying attention[19], which is therefore a fundamental General Educational discipline. Another way to think of the discipline of paying attention is the habit of careful observation, which is critical to many fields including the natural and social sciences, the arts, and architecture, to name a few. As a critical skill of General Education the application of careful observation can be applied much more broadly becoming a gateway leading to meaningful learning.

Careful observation requires a tangible subject that can be contemplated. In many fields the classroom or laboratory can provide a setting for things that can be studied with great care. Outside the classrooms and laboratories of City Tech, however, there is a rich and diverse setting for careful observation: the City.

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[19] Mayer, Richard E. "Rote Versus Meaningful Learning." *Theory Into Practice* 41.4 (2002): 226-32. Aug. 2013. Web. 28 Apr. 2014.

CRITICAL TEACHING STRATEGIES: ENGAGING OUR STUDENTS

CITY AS LABORATORY:

New York City is a laboratory in its own right that can be leveraged for practically any subject matter. This is one of the principal findings of our fellowship work. The most frequent context of teaching exploration during the Living Lab seminar was the city itself. On the streets the fellows explored the value and potential of using the city as a place, context, and subject for teaching. Each on-site activity challenged the fellows to develop ideas for assignments and curriculum development that could make use of the city as a laboratory for learning. We found that the city offered advantages that significantly enhanced learning and could be used in lieu of or in conjunction with classroom learning.

CITY AS PRIMARY SOURCE:

The streets and places of the city demand a discipline of paying attention and careful observation that has a great potential to kindle meaningful learning, thereby fostering life-long learning. The city has this potential largely because it can function as a primary source of information, because it requires the students to collect data and/or make direct observations and discern the information they require. This mode of inquiry requires interpretation and a search for patterns and meanings. In their study of educational research, Johnson and Christensen define primary sources as "those in which the creator was a direct witness or was in some other way directly involved in or related to the event."[20] The people of the city, its buildings, its streets, open spaces, artworks, flora and fauna, atmosphere, air quality, sounds, government, laws and regulations are all possible subjects for investigation. These primary sources are more direct, accessible, and observable. Rather than search for the meaning of someone else's explanation, one can develop one's own observations and interpretations. It is a form of research that is particularly suited to undergraduate students.

PLACE-BASED LEARNING: PLANTING THE SEEDS FOR ACADEMIC SERVICE LEARNING

Learning to pay attention is a potential central asset of place-based education. Place-based learning offers a unique opportunity for field investigation and site-specific research that can play a powerful role in developing careful observation in students. Prof. Gregory Smith of Lewis & Clark College explores the important benefits of place-based learning. He notes that a "critical characteristic of place-based education is its emphasis on learning experiences that allow

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[20] Johnson, Burke. "Part IV: Selecting a Research Method." *Educational Research. Quantitative, Qualitative, and Mixed Approaches.* Thousand Oaks, CA: Sage Publications, 2014. 482. Print.

students to become the creators of knowledge rather than the consumers of knowledge created by others."[21] Place-based learning is a platform for inquiry and discovery by both the faculty and the students. Its application to the college curricula can be broad because the city itself offers a great diversity of subject matter for investigation. The Boyle Commission recommends "undergraduates need to become an active part of the audience for research. In a setting in which inquiry is prized, every course in an undergraduate curriculum should provide an opportunity for a student to succeed through discovery-based methods."[22]

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[21] Smith, Gregory A. "Place-Based Education: Learning to Be Where We Are." *The Phi Delta Kappan* 83.8 (2002): 584-94. *JSTOR*. Web. 13 June 2014.

[22] The Boyle Commission On Educating Undergraduates in the Research University. *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. Rep. no. ED424840. Carnegie Foundation for the Advancement of Teaching, Princeton, NJ., 1998. Web. 6 Jan. 2015. <http://reinventioncenter.colostate.edu/the-boyer-report/>.

HIGH-IMPACT EDUCATIONAL PRACTICES:

Following from the exploration of the clear need to reform teaching based on the findings of how students learn and become engaged[23] and the significant potential of place-based learning using the city as a laboratory, the major focus of the Living Lab project is the application in particular of High-Impact Educational Practices. Faculty fellows in the General Education Seminar explore innovative pedagogical approaches and incorporate what they learn into their courses with the goals of changing student experience in the classroom, changes that will support creative and critical thinking through the use of High-Impact Educational Practices (HIEP). George Kuh includes the following teaching and learning practices that have been widely tested and have been shown to be beneficial for college students from diverse backgrounds as HIEPs: first year seminars and experiences, common intellectual experiences, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity and global learning, service learning and community-based

learning, internships, and capstone courses and projects.[24] Educational research suggests that use of these HIEPs on many campuses increased rates of student retention and student engagement. Kuh's research supports the emphasis on place-based learning as it has natural links to a number of the HIEPs, especially service/community-based learning and undergraduate research. The college is currently emphasizing many of these practices, and can further develop their application more broadly. For example, undergraduate research as a strategy ties neatly with place-based learning where the use of primary sources is the focus. The city as a laboratory allows the students to use careful observation, inquiry, and discovery to become creators of knowledge. For this project, the Third Year Fellows focused on applying academic service learning in particular to our curricula to test its viability and application within our college.

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[23] Ambrose, Susan A. How Learning Works: Seven Research-Based Principles for Smart Teaching. San Francisco, CA: Jossey-Bass, 2010. Print.

[24] Kuh, George. *High-Impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter.* Washington DC: LEAP, 2008. *Association of American Colleges & Universities.* 30 Sept. 2008. Web. 5 Mar. 2013.

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