$Collaborative\ Curriculum\ Revision\ Project\ (CCRP)$

Documentarian's Report

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Introduction

The third series of Collaborative Curriculum Revision Project workshops, initiated by the DOE/CUNY Library Collaborative, took place in spring 2015; it comprised five professional development workshop sessions held in March at CUNY Central Office. Faculty and librarians from the New York City College of Technology (referred to as "City Tech" from here on) and Sunset Park High School gathered, developed a shared collection of teaching strategies for preparing students for the college experience, and revised a high school earth science curricular unit. To inform revisions to the high school curricular unit, participants engaged in conversations on common teaching goals and challenges, skills that constitute "college-readiness," and best teaching practices. In engaging in these conversations, participants developed a community of practice that can extend beyond the workshop series itself.

The development of this series was largely informed by reflections and recommendations of Collaborative members who developed the first two workshop series. Members of the Collaborative distributed copies of their white paper, *DOE/CUNY Library Collaborative: Bridging the Gap Between High School and College*, from which participants learned about successes and lessons of the 2012 and 2013 workshop series. The newly-hired facilitator and documentarian of this series also underwent training and were given access to documentation of previous series, from which they gained further insight into the process of shaping the series around collaborative work and dialogues.

This report describes the collaborative revisions to the high school earth science curriculum unit, explicates the process of revision and community-building, and details successes and recommendations to inform upcoming workshop series.

High School Curricular Unit

The high school earth science unit presented for revision was on astronomy and comprised four lessons on the Big Bang Theory, the solar system, orbital eccentricity, and stars. The unit was developed for a 10th grade earth science course and will be taught over five weeks in April and May of 2015. Overall, the astronomy unit makes up roughly 20% of the course's content; prior to it, students in the course will have previously completed other units on geology and meteorology. The astronomy unit is highly anticipated by this year's cohort of students, due in part to the field trip to the American Museum of Natural History that opens the unit.

Design of the astronomy curricular unit was not constrained by prescribed materials other than general recommendations of coverage for Regents examination preparation. The unit includes interactive media activities in each lesson, which will be completed through use of the

high school's shared laptops. The presenting high school faculty member requested that workshop participants focus revision efforts on the Big Bang Theory and Stars lessons.

Lesson-by-Lesson Breakdown

Lesson 1: Big Bang Theory

- Goal: Cover the major theory about the universe's current expansion and evidence that scientists use to support the theory
- Lesson opens with a trip to the American Museum of Natural History to view the film *Dark Universe*. The field trip simultaneously closes the preceding meteorology unit.
- Two readings are assigned to introduce the theory of expansion and major evidence; one is done in-class and the other independently.
- One class period will be devoted to a PowerPoint presentation and an episode of the television show *Cosmos*.

Lesson 2: Solar System

- Goal: Students should demonstrate understanding of data tabulation and be able to pull specific information from a table on the masses, diameters, and densities of our solar system's bodies.
- Students will consider the concept of a "cosmic address," viewing a second episode of *Cosmos*.
- Through interacting with NASA's *Eyes On* programs, students will consider where individual solar system bodies are.
- Students will create "travel guides" for specific solar system bodies in class.
- If time allows, exoplanets will also be covered in this lesson.

Lesson 3: Eccentricity

- Goals: Students should demonstrate understanding of non-circular orbits, and be able to calculate an orbit's eccentricity and identify its foci. Students should also demonstrate understanding of the moon's phases.
- Students will complete interactive activities in class to learn about elliptical orbits, using thumbtacks to identify foci.
- Students will observe the moon from their homes on a nightly basis during the month beforehand, documenting their observations.

Lesson 4: Stars

- Goal: Students should demonstrate understanding of the relationships between star mass, temperature, and luminosity, and be able to read a Hertsprung-Russell diagram that shows these relationships.
- Students will learn about the evolution of different types of stars.

• To reinforce lectures, students will use the web app *Star in a Box* to view simulations of the evolution of stars of any given mass.

Revision

Revision to the astronomy unit proceeded in four major stages: 1) discussion on common teaching goals, challenges, and strategies; 2) identification of skill sets constituting "college-readiness" and best practices for teaching toward development of those skills; 3) identification of revision opportunities within the presented unit for addressing identified goals and challenges, and selection of opportunities for workshop development; 4) development of framework, activities, and materials for selected revision opportunities.

Teaching Goals, Challenges, and Best Practices

During the first two workshop sessions prior to the presentation of the high school curriculum unit, participants discussed common teaching goals, challenges and realities faced in teaching, and concrete strategies used to address goals and challenges. Many of the goals and strategies brought up during these opening conversations became underpinnings for the revisions to the high school earth science unit. Among the many goals elucidated during this discussion, the following became key to the revision process:

- Embedding peer-based and student-driven learning;
- Fostering autonomy and habits of independent study and inquiry;
- Building research skills and valuation of information literacy, including source evaluation:
- Building meta-cognitive skills such as analytical reading and writing.

Challenges to meeting these goals included:

- Students' fragmentary engagement with dense texts;
- Lack of in-class student engagement;
- Disconnect between library instruction and course or discipline instruction.

Among the many practices and strategies brought up from the diverse teaching experience of the group, several were applied to the revision process, including:

- Active reading and annotation activities to promote inquiry and engagement with dense texts
- Scaffolding reading and writing activities toward major projects
- One-on-one collaboration between librarians and faculty
- Embedding research and information literacy into student grades
- Student group presentation of lesson components

Revision Opportunities

Of at least eight proposed revision opportunities, participants selected three on which to focus their collaborative work during the workshops:

- Developing active reading activities to promote engagement with readings and media, and to scaffold development of analytical reading and writing skills;
- Adding a debate to the end of the Big Bang Theory lesson as an opportunity to embed library research and information literacy;
- Embedding peer-to-peer collaboration opportunities.

These opportunities were selected based on how well previously-identified best teaching practices could be applied or incorporated, and on the presenting high school faculty member's request for focus on the Big Bang Theory and Stars lessons. Eventually, all revisions were applied to the lesson on the Big Bang Theory, with the idea that they are scalable for other lessons as well.

Developed Activities and Materials¹

To promote engagement with the *Dark Universe* film, participants applied an activity presented by the college science faculty member called an "anticipation guide." The activity has a "pre-test/post-test" functionality, giving students the opportunity to answer fundamental questions about a new topic before and after readings or lectures.

Participants also developed a two-column reading log for engaging with the two reading assignments of the Big Bang Theory lesson. The high school English language arts faculty member suggested the two-column model based on activities that he uses to promote engagement with literary texts. Additions to the model were suggested by other participants based on goals related to the debate component of the lesson.

The bulk of the revision process lay in creating a framework for a debate component in the Big Bang Theory lesson. The debate was conceived as a culminating "project" or "assignment" to close the Big Bang Theory lesson, and much of the revision work lay in developing ways to make each lesson component an opportunity to gather evidence to present in the debate. The debate topic will be the scientific supportability of the Big Bang Theory; the students will present "pro" arguments supporting the Big Bang Theory, and the science faculty member will present "con" arguments against the Big Bang Theory. A library research session has been added to the lesson to incorporate independent research and information literacy. Students will be required to find two pieces of evidence not presented in class; they will research

¹ See Appendix C

in one group and discuss presentation of evidence in a different group. Each discussion group will be assigned to focus on one major argument supporting the Big Bang Theory and select a spokesperson to present the evidence for it. The science faculty member will debate each group spokesperson in turn, and students will grade their peer groups through polling software during the debate. Peer grading will be based on a rubric, for which criteria were developed during the workshops. A checklist will be handed out to provide students an "assignment" framework to complete the necessary work prior to the debate. They will individually synthesize all evidence that they have gathered from readings, the *Dark Universe* film watched during their field trip, class lectures, and library research in a four-column Debate Evidence Log. The completed Debate Evidence Logs will allow student groups to find and select evidence to present on the debate day with relatively easily, with minimal synthesis activity to be done in-class.

In sum, the deliverable materials developed during the workshop included an anticipation guide, a reading log for individual texts, an assignment framework for the Big Bang Theory debate comprising a checklist and a working rubric, and a synthesis log for compiling evidence for the debate.

Successes, Challenges, and Recommendations

As aforementioned, all participants learned about the overall goals for the Collaborative Curriculum Revision Project through *The New York City DOE/CUNY Library Collaborative: Bridging the Gap Between High School and College*, the white paper on previous iterations of the workshop series. They engaged in the 2015 workshops with the understanding that they would contribute to the overarching project goals set forth there, and that the Collaborative might further refine the project goals based on observations of their contributions and priorities.

The facilitator and documentarian were provided with resources and training to implement recommendations set forth in the Documentarian's Report of CCRP's 2013 iteration, all of which contributed to 2015 workshop successes. These successes included:

- Agreement from all participants that the workshops had helped them to understand that
 the teaching challenges that they face are very similar to the challenges that their
 counterparts face;
- Desire and intention voiced by high school and college faculty from English and science departments to collaborate with their counterparts on their existing work in developing remedial reading and college-to-high-school student mentoring programs;
- Report from the high school science faculty member of greater awareness of the high school librarian's work, and both voiced an intention to collaborate in future;
- Satisfaction from all participations regarding the variety of learning modes embedded into the revisions to the high school earth science unit, which encompass peer-to-peer

collaboration, presentation and public speaking, independent research, and analytical reading and writing.

Challenges in progressing toward the workshop goals were largely identified during collaborative development of workshop agendas by the facilitator and documentarian. These included:

- Transitioning from abstract conversations on educational ideals and challenges, to practical conversations on developing specific curriculum;
- A lack of predetermined practice for document sharing or development of a shared digital collaboration space;
- Determining a common consensus on which aspects of the unit to prioritize for revision.

The following recommendations are set forth for consideration in streamlining the workshop experience further for all participants:

• Create a method for sharing and disseminating documents and a digital space for ongoing collaboration prior to the first workshop session.

The facilitator and documentarian created a shared Google Drive folder (https://drive.google.com/open?id=0B9ikadv3Im0TNjFobkRsSUE2RDQ&authuser=0)² for sharing and disseminating documents during the 2015 workshops. However, the shared folder was not deployed until the third workshop, and pressing need for digital document sharing overcame the consensus-building process for deciding what tools to use. Some issues with viewing and editing privileges occurred when the shared Drive folder was first deployed. It was also unclear as to whether the Google Drive folder could be used for ongoing collaboration after the workshop series was over.

• Stipulate that materials for the high school curriculum unit to be revised should be shared with the facilitator before the start of the workshop series.

The high school earth science unit materials were made available to the facilitator prior to the start of the 2015 workshop series, and this was highly helpful in planning ahead for key conversations to facilitate in the third and fourth workshop sessions. Recommendations from past workshops have included allowing participants to practice the activities that they are developing; to effectively implement this recommendation, the

facilitator needs time to consider opportunities in the workshop sessions to embed activity practice. In general, stipulating soft deadlines for sharing materials was helpful

² In this folder are presented high school curricular materials, presented college curricular materials, workshop session agendas, workshop session notes and recordings, and handout deliverables developed in the 2015 workshops.

for the facilitator's planning and for the participants' preparation for each session.

• Consider recruiting high school and college faculty with somewhat aligned subject expertise.

Following presentation of the high school earth science unit, multiple participants voiced some trepidation regarding the lack of college-level earth science expertise in the group. However, to qualify this recommendation, participants agreed that the lack of expertise alignment between the life science college faculty member and the earth science high school faculty member in fact provided an opportunity to discuss literacy as a cross-disciplinary skill, and did not impede the revision process.

Consider recruiting high school faculty members who have taught the curriculum unit to be revised before.

To qualify this recommendation, the high school faculty member who presented in the 2015 iteration stated that the workshops were a helpful to him, in that they provided an unusual opportunity to devote time and collaborative effort to developing a single curriculum unit without competing deadlines. Out of consideration of CCRP's overall goals, he stated that better qualitative data on the workshops' success might be gathered from a high school faculty member who had taught the presented curriculum unit before; he himself did not feel able to evaluate how well the curriculum revisions improved his practice, since he had never taught the unit as presented.

• Create session agendas collaboratively prior to each workshop.

In this iteration of the workshop series, the facilitator and documentarian set up time each week to meet or call and speak about the upcoming session's agenda. Generally speaking, each meeting included discussion on progress achieved toward the workshop series goals, major conversation topics to "stage" the collaborative revision work, and timing for each major topic on the final agenda. The meetings helped the facilitator to develop concrete notes for directing the session discussions, and the facilitator's notes often provided a helpful organizational framework for the documentarian's session notes.

• Communicate with the curriculum-presenting high school faculty on his or her needs and goals for unit revisions.

This helped to narrow down the opportunities for revision identified after the presentation of the unit, and to prioritize revision work.

• Consider development of a framework for ongoing collaboration following the end of the formal workshop series.

One of the stated goals of CCRP is to create functional communities of practice that support high school and college teachers and librarians. Continuing collaboration is often referred to in documentation of the previous iterations of CCRP as a benchmark for gauging the success of the workshops. In light of this, it may be helpful future workshop iterations have time built into them to formally consider how this can happen and what resources community members may need.

Appendix A: Participants

CCRP Advisory Committee

- Sharae Brown, Senior Project Manager, GradNYC!
- Robert Farrell, Coordinator of Information Literacy & Assessment, Lehman College
- Alison Lehner Quam, Librarian, Lehman College
- Nate Mickelson, English Instructor, Guttman Community College
- Leanne Ellis, Bronx Library Coordinator and Destiny District Manager, NYC DOE
- Diane DiMartino, Special Projects Librarian, CUNY Office of Library Services
- Meghann Suzanne Walk, Librarian, Bard High School

Workshop Participants

- Adalena Kavanagh, Librarian, Sunset Park High School
- Jason Green, ELA Teacher, Sunset Park High School
- Edward Yany, Earth Science Teacher, Sunset Park High School
- Anne Leonard, Librarian, City Tech
- Caroline Hellman, Professor of English, City Tech
- Davida Smyth, Professor of Biology, City Tech

Facilitator and Documentarian

- Nora Almeida, Facilitator
- Anastasia Chiu, Documentarian

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Appendix B: Session Agendas

Workshop 1 Agenda March 2, 2015, 4pm-6pm

Session Goals

- To establish our individual & shared intentions for this series of workshops.
- To share and discuss our educational values (habits of mind, learning objectives, and goals that we strive to cultivate in our teaching practices).
- To discuss the issues, realities, and challenges we face related to teaching and learning in high school and college.
- To begin to think about ways to address challenges through informed pedagogical approaches.
- 1. **Participant Survey** (10 minutes)
- 2. Introductions, Welcome, Overview of Project & Session Goals (15 minutes)
- **3. Communities of Practice Quotation Exercise** (15 minutes)
- 4. **Discussion of Educational Values & Learning Objectives** (30 minutes) What are some of the things you value about educational practices? What kind of environment do you hope to create in your classroom? What habits of mind to you hope to cultivate? What goals do you have for your students? What goals to you have for yourself as a teacher or librarian? What specific learning objectives do you hope your students will meet?
- 5. **Discussion of Issues, Realities, and Challenges** (30-40 minutes) What are some of the social and cultural realities (in our schools and communities) that present obstacles to learning? What issues impact your capacity to foster an ideal educational space? What challenges stand in the way of student achievement? What learning obstacles do you see as particular to your discipline?
- 6. Conclusion and Looking Ahead (10 minutes)

Workshop 2 Agenda March 9, 2015, 4pm-6pm

Session Goals

- Discuss best practices for teaching and implementable strategies to foster student success and address challenges.
- Present and offer initial responses to curricular unit.
- 7. Welcome / Session 1 Recap (10 minutes)
- 8. **Discussion of Best Practices for Teaching** (30 minutes)
 - What activities do you employ in your classroom to help students meet learning objectives?
 - O How do (can) these activities set students up to succeed in college? What are some of the specific challenges to student success or engagement that you identified?
 - How can you acknowledge and address challenges students face while encouraging them to move forward and facilitating independence and autonomy?
 - What teaching techniques can be used to accelerate the acquisition of critical skills that students are missing?
 - Do the teaching techniques and classroom activities we've identified align across institutions?
 - What are strategies to help students develop analytical reading, systems thinking, research, problem solving?
 - How might the library or partnerships with librarians impact student achievement?
 - o How can we facilitate student transition from assignments with built in scaffolding to independent work characteristic of college?
 - Where do we find new sources of material to incorporate into our classrooms?
 - o How do literary non-fiction texts like Bryson's "How to Build a Universe" help students make sense of abstract / complex concepts?
 - What are ways to ensure that students understand specific vocabulary that they will need to complete lab assignments?
 - o How can we promote active inquiry processes?
 - o How do we prepare students to conduct research or evaluate sources?
- 9. Presentation of Unit / Creating "Parking Lot" for Reflections (30 minutes)
- 10. **Initial Discussion of the Unit through the Parking Log** (30 minutes)
- 11. Prep for Session 3 College / High School Assignment Comparative Analysis (10 minutes)

12. Meta Conversation: Strategies for Approaching Revision; Moving from Theory to Practice; Logistics of Remote Collaboration (10 minutes)

Workshop 3 Agenda March 16, 2015, 4pm-6pm

Session Goals

- Discuss our responses to the Earth Science unit and begin to analyze sections of the unit we will focus on in our revision.
- Consider College Level Assignment / materials in relation to high school unit.
- Collectively develop a working plan for revision.

13. **Meta Conversation: Defining Revision** (20 minutes)

14. Recap / Review Revision Ideas Introduced in Session 2 (10 minutes)

- Introduce more opportunities for urban field work to promote student engagement and illustrate application of scientific principles.
- Incorporate reading and writing skills into the unit, promote active reading of informational texts.
- Collaborate with an English Language Arts teacher to make connections between mythology / culture and science in this unit.
- Embed library research and autonomous information-seeking in the unit.
- Promote open-minded evidence-based thinking, perhaps driven by encouragement of controversial discussion. A strategy could be to challenge students to disprove central theories in the unit and consider what evidence they might gather to do so.

15. Analysis of 'Big Bang' & 'Stars' Sections of Unit (40 minutes)

- Where are there opportunities for urban field work?
- What kind of research could students conduct? Could research be incorporated into an existing assignment?
- Where do we see possible tie-ins to mythology / culture?
- How could we edit the unit to promote active reading?
- How could we modify the unit to include more writing activities?
- Would our suggestions constitute edits or additions to unit? Both?
- If we are adding onto the unit, what materials would need to be created?

4. Consideration of College Activities and Assignments (20 minutes)

- What skills will help entering college students succeed in this science course?
- What high school activities or instructional strategies will better prepare students for college level work?
- What parallels do we see between the college and high school curricula?
- How do the college activities and assignments impact the way that we think about and approach the revision process?

5. **Meta Conversation: Revision Process** (20 minutes)

Where do we go from here? What do we need to bring, edit, create, bring? What concerns do we have going into the next 2 sessions? What ideas do we have about how to approach the revision process after our conversation today?

Workshop 4 Agenda March 23, 2015, 4pm-6pm

Session Goals

- Hold college readiness discussion in consideration of college level assignment / materials.
- Introduce, categorize, and refine ideas for curricular revisions and addition.
- Begin producing materials to support active reading.

16. Recap / expand upon discussion of college readiness (20-30 minutes)

How do the college activities and assignments impact the way that we think about and approach the revision process?

17. Recap and expand list of ideas for curricular revisions and addition (30 minutes)

- Big Bang debate with independent student research
- Integrate "key questions" identified in the lesson plan throughout the lessons
- Add a social media engagement component to night sky observation activities
- Structured active reading activities (anticipation guides / organizers)

18. Categorize / refine curricular revision list and discuss strategies for material creation (30-40 minutes)

What things should we actually focus on creating and revising for the remainder of the time we have together? What suggestions are things that Edward can use to independently make minor modifications to materials or to his teaching strategy? What curricular revision suggestions might involve further collaboration with ELA Department / Library? What do we need to bring, edit, create, bring to the final session?

6. Create drafts of active reading assignment material (20-30 minutes)

Workshop 5 Agenda March 30, 2015, 4pm-6pm

Session Goals

- Define expectations for the Big Bang unit through the debate assignment.
- Consider the framework of the unit and outline scope of deliverables including: anticipation guide / reading log / library research and peer activity / culmination of evidence gathering / writing prep for debate / debate structure.
- Work on achievable deliverables including reading log, anticipation guide, research and peer activity assignment.
- Establish framework for completion of remaining deliverables and facilitation of continued collaboration.
- 19. Overview of Unit Structure (10 minutes)
- **20. Establish framework for debate assignment and outline deliverables** (20-30 minutes) How and when is the debate introduced to students? What are expectations for research and evidence gathering? What are the scope of deliverables that will be incorporated into this unit?
- 21. Discuss evidence gathering, library research, and peer activity assignment (30 minutes)

How will Edward articulate evidence and research gathering expectations to students? If Edward plans a library class visit, what would student go into library with? What resource would Adalena introduce? What would the peer activity look like?

- 7. **Compare and revise reading log template(s)** (30-40 minutes) What organizational strategies did we individually and collectively deploy? What accounts for differences in our organizational approaches? How do our strategies address college readiness skills?
- 5. **Discuss anticipation guide and determine if revisions are needed** (10-15 minutes) Is the assignment effective? Adaptable? Does this deliverable align with college readiness strategies we outlined in the previous session?
- 6. Wrap up (10 minutes)
- 7. **CCRP DOE-CUNY Library focus group** (60 minutes)

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Appendix C: Draft Handout Materials

Anticipation Guide³

Instructions

1. Respond to each statement twice: Once before exploring the Rose Center for Earth & Space, and viewing Dark Universe, and again after.

Response Before	Question	Response After
	The universe is expanding, contracting, or not	
	changing?	
	Is there a center of the universe?	
	When you see a star in the sky, you are seeing	
	it in the past, present, or future?	
	Compared to other stars, the Sun is very large,	
	very small, or average size?	
	Do stars burn forever, or do they die?	
	You weigh more or less on the Sun than you	
	do here on Earth?	
	You weigh more or less on the Moon than you	
	do here on Earth?	

2. The Big Bang Theory is the leading explanation about how the universe began. At its simplest, it explains that the universe began as an infinitely small, infinitely dense point. Then, in an instant, the universe exploded into existence, inflating over the next 13.8 billion years to the cosmos that we know today.

After visiting the Big Bang Theatre and viewing Dark Universe provide at least one piece of evidence that supports the Big Bang Theory.

³ This anticipation guide is part of a final handout created by Edward Yany, informed by a model developed in the CCRP workshops; all other materials in this Appendix are working drafts.

Reading Log for Individual Texts

Title:				
Author:				
Source:				
Kind of reading:				
Topic:				
Thesis:				
Evidence:	Claim 1:			
Evidence:	Claim 2:			
Evidence:	Claim 3:			
Key Terms:				
Questions:				

Big Bang Debate Assignment

At the end of the Big Bang unit, you will work in groups to construct an argument based on evidence you've compiled and present your best argument scientific supporting the theory of the Big Bang.

All students are responsible for finding 4 pieces of evidence, 2 pieces of which can be from class readings, slides, and films and 2 pieces of which must be found independently. Use the Evidence Log below to document your discoveries in class and during our class trip to the library. You should formulate evidence based claims that you can incorporate in the debate, all of which must be backed up by cited research and use scientific terminology.

Debate Preparation Checklist:

- Define and incorporate new vocabulary and terms found during class and research
- Find at least 2 pieces of evidence not presented in class
- Summarize the arguments & evidence that you found in your own words
- Identify the source of each piece of evidence found
- Share the evidence and sources that you found with your team members on debate day
- Work with your team to compile all members' evidence and sources in an organized fashion, with all team members participating to support the presenting spokesperson.
- Grade your peers on other teams during the debate, according to the rubric.

Debate Grading Rubric:

- Presentation skills (including speaking clarity, eye contact)
- Quality of argument
- Quality of evidence
- Identification of sources
- Terminology use
- Preparation and organizational strategy

Debate Evidence Log

Evidence	Supporting Claim	Source	Debate Strategy / Notes