Comparative Analysis of a MOOC and a Residential Community Using Introductory College Physics: Documenting How Learning Environments Are Created, Lessons Learned in the Process, and Measurable Outcomes

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Comparative Analysis of a MOOC and a Residential Community Using Introductory College Physics: Documenting How Learning Environments Are Created, Lessons Learned in the Process, and Measurable Outcomes

by

Jack Ryan Olsen

Bachelor of Science in Engineering Physics from University of Colorado, 2014

A thesis submitted to the Faculty of the Graduate School of the University of Colorado in partial fulfillment of the requirement for the degree of Master of Science Department of Physics 2014
This thesis entitled:
Comparative Analysis of a MOOC and a Residential Community Using Introductory College Physics:
Documenting How Learning Environments Are Created, Lessons Learned in the Process, and Measurable
Outcomes
written by Jack Ryan Olsen
has been approved for the Department of Physics

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(Committee Member: Diane Sieber)

Date______________

The final copy of this thesis has been examined by the signatories, and we
Find that both the content and the form meet acceptable presentation standards
Of scholarly work in the above mentioned discipline.
I. ABSTRACT

Olsen, Jack Ryan (M.S., Physics)

An Analysis of How Learning Environments Are Created, the Lessons Learned in the Process, and the Measurable Outcomes for a MOOC and for a Residential Community

Thesis directed by Professor Noah Finkelstein

Higher education institutions, such as the University of Colorado Boulder (CU-Boulder), have as a core mission to advance their students' academic performance. On the frontier of education technologies that hold the promise to address our educational mission are Massively Open Online Courses (MOOCs) which are new enough to not be fully understood or well-researched. MOOCs, in theory, have vast potential for being cost-effective and for reaching diverse audiences across the world. This thesis examines the implementation of one MOOC, Physics 1 for Physical Science Majors, implemented in the augural round of institutionally sanctioned MOOCs in Fall 2013. While comparatively inexpensive to a brick-and-mortar course and while it initially enrolled audience of nearly 16,000 students, this MOOC was found to be time-consuming to implement, and only roughly 1.5% of those who enrolled completed the course -- approximately 1/4 of those who completed the standard brick and mortar course that the MOOC was designed around. An established education technology, residential communities, contrast the MOOCs by being high-touch and highly humanized, but by being expensive and locally-based. The Andrews Hall Residential College (AHRC) on the CU campus fosters academic success and retention by engaging and networking students outside of the standard brick and mortar courses and enculturating students into an environment with vertical integration through the different classes: freshman, sophomore, junior, etc. The physics MOOC and the AHRC were studied to determine how the
environments were made and what lessons were learned in the process. Also, student performance was compared for the physics MOOC, a subset of the AHRC students enrolled in a special physics course, and the standard CU Physics 1 brick and mortar course. All yielded similar learning gains for physics 1 performance, for those who completed the courses. These environments are presented together to compare and contrast their strengths and weaknesses so that the best pieces can be synthesized for future innovation to better encourage academic success in higher education.
II. **DEDICATION**

My motivations for this thesis stem from my personal experience as a student of CU Boulder. I have lived in the Andrews Hall community for my whole university career and have been fortunate enough to learn physics from the faculty of the Physics Department. For me, these two communities are distinctly separate, but have both been crucial in my personal, academic, and professional development throughout my time at University.

My interest in teaching and pushing the boundaries of what we know about student learning and performance inspired me to get involved in the physics education research (PER) happening at CU. The new concept of these Massively Open Online Courses is the most recent line of research for the PER group at CU. But, as I think towards the future with this research, I cannot help but look backwards at my own experience. The community that I found in the Andrews Residential College felt unique, inspiring and, honestly, life-changing. I do not believe that my own success academically could have been possible without the mentorship and peer group that I found in this learning community.

And so, I dedicate this thesis in part to my friends and peers in Andrews and to Scot Douglass for his guidance and mentorship throughout my higher education experience. I also wish to dedicate this thesis to the incredible education researchers and reformers who helped design and implement the world-class physics education that I received at CU. These are the communities that have most significantly shaped who I am as an academic and so these are the communities for which I dedicate my work.
ACKNOWLEDGEMENTS

I could not have possibly managed this thesis without the help of my advisor, Professor Noah Finkelstein. He has been available to answer my questions and to offer guidance and feedback on my work through every step of this long process. His incredible knowledge of PER topics and thoughtful insight on the workings of communities and learning systems would always come to bear in our conversations and leave me inspired. Thank you, Noah, for all of your support and encouragement.

Too, I would like to thank the PER group at CU and the physics MOOC team for providing me with data and analyses and for allowing me to be a part of the team. This work has been very interesting and I look forward to continuing it beyond this thesis.

Along those lines, I also want to thank all of the folks involved in both environments who participated in my interviews and shared their perspectives.
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1 INTRODUCTION

1.1 MOTIVATION
As the world advances with new technologies, there arise new opportunities for the pedagogical community to improve educational practice. The potential of the internet has started to transform the world of higher education with online learning and Massively Open Online Courses (MOOCs). The relatively new implementation of MOOCs in university settings has sparked a line for study and research. This thesis will seek to add to the growing knowledge of MOOCs in order to help assess whether and how the pedagogical community should take up the idea.

A stark contrast to the concept of the MOOC is the idea of a live-in learning community, such as an on-campus Residential Academic Program (RAP) in university housing. Compared with the MOOCs’ recent arrival, there exists a relatively long history of residence halls and associated live-in academic communities. Despite this lengthy history, however, the study of success and implementation of RAPs is still a growing field, just like the MOOCs. This thesis will strive to add to the understanding of residential communities as well.

The presentation of these two learning communities together is tailored to emphasize the range of pedagogical approaches now available to modern academic institutions. These two settings are seemingly on opposite ends of the spectrum from each other for students: MOOCs are free to join while live-in residential programs carry a large price tag; MOOCs are, by name, massive while residential programs are limited in size by the physical space available. The differences between these environments make a comparative analysis difficult. However, these learning environments – and many others not explored by this thesis – compete for the time, money, and other resources of higher education institutions when policy and practices are being decided.
In order to compare and contrast a MOOC and the residential community, this thesis will bring in a third learning environment: the traditional “brick and mortar” classroom. In comparing the two environments with the standard educational model, this thesis will provide a form of assessment on the two learning communities.

1.2 BACKGROUND
In order to begin a study of these environments, it is important to first define the different terminology and then to understand the current state of the literature.

A broad definition for learning communities is provided in K. Patricia Cross’s paper Why Learning Communities? Why Now? as: “groups of people engaged in intellectual interaction for the purpose of learning” (Cross, 1998 p.4). This definition is useful because it includes standard “brick and mortar” courses, residential communities, and MOOCs. Cross's definition will be used as a broad framework from which this thesis can bring together different environments that endeavor to encourage learning and intellectual interaction.

1.2.1 Historical Context of the MOOC
One of the environments studied in this thesis is the Physics 1 for Physical Science Majors MOOC (physics MOOC) at CU Boulder. The physics MOOC is one of CU Boulder’s first MOOC implementation efforts. The following section will describe MOOCs and the various studies that have delved into the details of what types of students engage in MOOCs and how these students engage in and learn the content offered.

1.2.1.1 What is a MOOC?
MOOCs are among the newest wave of technological revolutions in education. Instead of having a centralized classroom where students meet periodically, the MOOC is based on the world wide web and can reach students, who have reliable internet access, the world over. The MOOC platforms – the three
most prominent being Udacity, edX and Coursera – launched within the last few years and have already reached students numbering in the millions (Pappano, 2012). As an example of the scale of these platforms, Coursera has had over 22 million enrollments in their 571 courses by students from 190 countries (Coursera Inc., 2014). Another of these platforms, edX, has granted over 100,000 certificates for completing one of their 150+ courses (edX, 2014).

The accessibility of the MOOCs via the internet is enhanced by the fact that most MOOCs are free to experience. In order to become a student, one need only have internet, e-mail and a few minutes to sign-up and browse the courses for something of interest (Coursera, 2014). The courses offered include a broad spectrum of topics and a range of sophistication. For example, a sampling of what Coursera, edX, and Udacity offer, along with the courses’ recommended background:
Table 1-1: Sample of the MOOCs offered by various MOOC platforms/providers and the recommended prior knowledge required to take the MOOC. (Coursera Inc., 2014; edX, 2014; Udacity Inc., 2014)

<table>
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<tr>
<th>Course Name</th>
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<tr>
<td><strong>Coursera</strong></td>
<td></td>
</tr>
<tr>
<td>Introduction to Public Speaking</td>
<td>No Prerequisites</td>
</tr>
<tr>
<td>Climate Change in Four Dimensions</td>
<td>Previous college experience</td>
</tr>
<tr>
<td>Bioelectricity: A Quantitative Approach</td>
<td>E&amp;M physics at early grad-level</td>
</tr>
<tr>
<td>The Music of the Beatles</td>
<td>No Prerequisites</td>
</tr>
<tr>
<td>Probabilistic Graphical Models</td>
<td>Experience coding/programming</td>
</tr>
<tr>
<td><strong>edX</strong></td>
<td></td>
</tr>
<tr>
<td>Introduction to Biomedical Imaging</td>
<td>High school science/math</td>
</tr>
<tr>
<td>Principles of Economics with Calculus</td>
<td>Basic Calculus Fluency</td>
</tr>
<tr>
<td>The Art of Poetry</td>
<td>No Prerequisites</td>
</tr>
<tr>
<td>Hypersonics – from Shock Waves to Scramjets</td>
<td>Calculus, Fluid Mechanics, Thermodynamics</td>
</tr>
<tr>
<td><strong>Udacity</strong></td>
<td></td>
</tr>
<tr>
<td>Applied Cryptography</td>
<td>Experience Programming, Understand probability/theory of computations/algorithms</td>
</tr>
<tr>
<td>How to Build a Startup</td>
<td>No Prerequisites</td>
</tr>
<tr>
<td>Intro to Psychology</td>
<td>No Prerequisites</td>
</tr>
<tr>
<td>Machine Learning 1 – Supervised Learning</td>
<td>Probability Theory, Linear Algebra and Statistics</td>
</tr>
</tbody>
</table>

While this sampling is by no means comprehensive, these emulate the diverse range of course types and course levels offered by MOOCs (Coursera Inc., 2014; edX, 2014; Udacity Inc., 2014). Many of these courses are offered by prestigious universities through partnerships with the MOOC platforms. This study will focus on the platform Coursera as it has recently partnered with the University of Colorado, among others, to offer four more MOOCs including the Physics 1 for the Physical Science Majors (Conroy, 2013).
1.2.1.2 **Online Learning**

Though MOOCs are relatively new, the idea of online learning is not. Many universities have moved to implement some form of online learning as, “Greater – and smarter – use of technology in teaching is widely seen as a promising way of controlling costs while also reducing achievement gaps and improving access” (Bowen, 2012 p.7). There is a draw to these online options because of the smaller price tag, promise of revenue, and the potential for increased access. However, with this push for newer, cheaper online learning techniques comes the question of cost versus quality.

In order to test the viability of any online course, there needs to be a rigorous study done on the course’s methods and implementation. And, though, “There have been literally thousands of studies of ‘online-learning’...Very few look directly at the teaching of large introductory courses in basic fields at major public universities” but one study, published by W. Bowen, M. Chingos, K. Lack and T. Nygren in 2012, endeavored to do just that (Bowen, 2012 p.9). The course the authors looked into was an introductory course in statistics developed into an online course by Carnegie Mellon University. The study was done across six different campuses either from the State University of New York, the University of Maryland or the City University of New York with roughly 600 volunteer students participating. The students were separated randomly into either a traditional in-person version of the statistics course or an online version, hybridized with a one-hour-per-week in-person session. Note from the description that this study by Bowen et. al. is not of a MOOC. However, the study presents a method for comparing a large introductory-level brick and mortar classroom with its hybridized online version.

The study used a few tools to compare the traditional students with the online students. Firstly, the national standardized test in statistics, the Comprehensive Assessment of Outcomes in Statistics (CAOS), was administered as a both a pre-test and as a post-test (Bowen, 2012). Secondly, all of the students
had the same set of final exam questions and were assigned grades for their course-work. What the authors found was that there were no statistically significant differences in the measured learning outcomes between the two groups of students (Bowen, 2012). The authors also report quite small standard errors on their results and so are quite confident in their findings.

While these performance findings are useful in themselves, the authors also looked into the students’ perceptions of the course as well as the amount of time students spent on the course using end-of-semester surveys (Bowen, 2012). In these categories, there are significant differences between the two groups. Overall, the students in the hybrid version of the class rated: that the course was more difficult, that they learned less, and that the course overall was worse (Bowen, 2012). Despite all of this, the two course versions had similar effects on students’ reported interest in statistics (Bowen, 2012). Lastly, the study on how much time students spent on the course showed that students in the hybridized online version spent roughly 25% less time on the course than did the students in the traditional version.

This study, though done on an introductory statistics course, sets a tone for what might be found in the studies on the CU physics MOOC. The authors saw no significant difference in student performance when implementing this statistics course online, and yet the online students spent less time on the course overall. This implies that the online version was somehow more efficient in teaching the material to the students. The authors found this out using a national standardized test as well as course information and used a control group traditional classroom. These are pieces of the methodology that can be replicated for MOOCs. However, there will be no offline hybridization, no weekly in-person session because MOOCs deal with fundamentally different audiences. Though MOOCs are online, there may be differences between what this study found and what a study on a MOOC might find.
1.2.1.3 From Online Learning to Massively Open Online Learning

In a study presented in the proceedings of the 2013 conference of MIT’s Learning International Networks Consortium, researchers begin to answer the question about whether or not an online course, like the one described above, is different from a MOOC. The authors compare a progressive, flipped online course with what eventually became the MOOC that parallels it (Fredericks, 2013).

The course, in its flipped version, was originally designed “To help students learn strategic knowledge” to better understand and apply basic physics mechanics knowledge (Fredericks, 2013 p.1). The first students enrolled in this flipped course were those who had failed the material in the previous semester of introductory mechanics. As the course evolved to meet students’ needs and developed to meet its own needs, materials and content were created in an open online setting. This eventually evolved into a MOOC that is now run on MIT’s edX platform (Fredericks, 2013). While the original intent of the course was not to become a MOOC, but rather to act as a review supplement for the students most struggling with the material, eventually the online nature of the course lent well to the MOOC model.

The authors ran a few studies on this MOOC during two sequential offerings, one in the spring and one in the summer. There were notable differences in the demographic breakdown and retention, which the authors speculate was due to an advertising campaign they ran to “…intentionally market the summer course toward physics teachers…to increase numbers…to help teachers and to efficiently spread MAPS [Modelling Applied to Problem Solving] pedagogy” (Fredericks, 2013 p.6). The authors saw success with this as one measure of retention found a 74% retention rate in the summer course versus a 44% rate in the spring course. Nearly half of the summer course participants who responded to the survey reported themselves as physics teachers. Approximately 90% of the certificates from the summer course were awarded to these physics teachers. One significant motivation that teachers had with finishing the summer course was that the American Association of Physics Teachers offered
Continuing Education Unit credits for completing the course (Fredericks, 2013). The teachers who enrolled seemed to find the course useful and even requested copies of some of the material. In the end, the authors speculate that MOOCs “...will ultimately be adapted and targeted to specialized audiences...” just like this one was during its summer offering (Fredericks, 2013 p.9).

The other measures of the course include the time students spent on the course and the students’ perceptions of the course. There were complaints about the interface and navigation of the course, but also positive feedback on the usefulness of the discussion boards. The spring course survey found that students desired more time and so the summer course itself was more flexible with deadlines. Finally, the authors found little correlation between students’ time input on the course and their overall performance. For example, with two similarly performing students: one spent less than ten hours and the other spent more than one hundred hours on the course (Fredericks, 2013).

1.2.1.4 Students’ Engagement with MOOC Content

The number of studies that detail different MOOC outcomes is small, but growing. One line of MOOC research is the demographic breakdown of participating students. MOOCs have high initial enrollment and then high attrition rates, which leads to questions about who stays, who leaves and why. One such study breaks down the MOOC users into several categories in an attempt to grapple with these phenomena.

The study, still in pre-print, analyzed an electronics course offered on edX with, “…approximately 100 GB of time-stamped log data...” to determine how students interact with the course content (Seaton, 2014 p.2). The data of this study are essentially every click of every enrolled student while on the course site. The authors organized all of the click data into separate files for each participant and performed statistical analyses to determine what students spent their time on. These results can be used to better understand what resources students are generally engaged in.
The study found that while over 150,000 people enrolled in the course, nearly a third of those never even logged on to the course (Seaton, 2014). Of those that did participate to some degree, the authors created a series of categories to assess the different levels of engagement in the homework assignments. The first, and least engaged, category is labeled as Browsers and is for those students who attempted less than 5% of the homework. The rest of the categories step up the amount of homework attempted: 5-15%, 15-25%, and >25%, and then include participation in exams with students who attempted >25% of homework as well as >25% of exams (Seaton, 2014). The final category that the authors created is simply named for student success as Certificate Earners. There are a few outliers in these categories, namely, there are high performing Certificate Earners who spent very little time on the course and there are low performing students who took the exams and did the homework, but did not do well enough to earn a certificate. These outliers are to be expected because they can be found in any classroom.

The first category, the Browsers, comprises about three-quarters of the total number of engaged students. The average amount of time that a Browser spent on this course was only an hour and, despite the large percentage of Browsers, the total time spent by all of the Browsers in the course only accounted for 8% of the total time spent on the course by students (Seaton, 2014).

After the Browsers, there are the intermediary groups who attempted some pieces of the content, but did not make it too far into the course. Each of these groups spent increasing amounts of time on the course, but the bulk of the time spent on the course was done by the Certificate Earners. The Certificate Earners, which only made up 6% of the total population, accounted for 60% of the total time spent on the course (Seaton, 2014)! So the authors found that the majority of the time spent on the course by students was actually spent by student who successfully completed the course.
This breakdown of students demonstrates the huge attrition rates common to MOOCs, but gives a more detailed look at how little time the Browsers spent on the course versus how much time the Certificate Earners spent. While it is impossible to know why every single Browser left after so little time, it is generally assumed that the novelty of MOOCs inspires curiosity, but not commitment to any enrolled courses. On the other hand, the bulk of the timing data collected is actually for the smaller population of Certificate Earners, so the authors can analyze how the Certificate Earners used their time with the course resources (Seaton, 2014).

The more detailed analyses on the Certificate Earners showed which resources these students used among the lecture videos, homework, online book, discussion boards, course wiki page, etc. This breakdown showed some interesting behavior. One thing the authors note is that the lecture video questions, which are not for credit, got progressively less of the Certificate Earners’ time over the semester (Seaton, 2014). While, as a counter-point, the homework got progressively more of the students’ time. While this might indicate that students avoid content which is not for credit, the participation in the discussion boards says otherwise; students spent more of their time in the discussion boards as the course progressed (Seaton, 2014). The other components of the course saw relatively constant use: lecture videos were the most time-consuming for the students, then were the homework and discussion boards, followed by the lecture video questions and the lab, and the least engaged components were the online book and the tutorial with the course wiki barely ever being used.

The figure provided in the paper will be included in Section 3.3.4, along with a similar analysis for the Certificate Earners from the physics MOOC studied in this thesis.

The authors of this study demonstrate how MOOCs can be used as a tool for studying student behavior and engagement in course materials. The detailed data of every click and action taken by every involved student can be harnessed to that end. One potential for MOOC research is to link patterns found in
MOOC student engagement in course content to other, non-MOOC, online courses’ or in-person courses’ student engagement.

1.2.1.5 Describing the Students in a MOOC

Another MOOC, an introductory physics course modelled after an on-campus version from Georgia Tech, has also been studied to determine what types of students are participating. The study was not focused so much on what students did, but rather on who the students were. The authors analyzed a demographic survey, a pre-test FMCE and the first few weeks of homework and lecture participation numbers. While the study was not over the entirety of the course, the authors were able to get a sense of who the students were that enrolled and were participating. (Aiken, 2013)

What the demographic survey showed for this MOOC included data on gender, age, geographic, educational, etc. (Aiken, 2013). In terms of the gender demographic, the students were 66% male. For the age, 70% of the students were younger than 35. Geographically, the bulk of the population, 44%, live in North America, though a significant number also live in either Europe or Asia, 31%, which means roughly 75% of the MOOC’s population came from continents with mostly developed countries. For the educational breakdown, the authors found that most of the students had at least a high school level education and the majority had at least a college education. The majority of the college-level educations were in STEM related fields (Aiken, 2013).

In terms of the students’ physics educational background, most of the students had a high school physics class and nearly half had seen physics in the college setting. The authors also administered the FMCE as a pre-test to determine the students’ physics background knowledge (Aiken, 2013). The results of this test showed that the MOOC students had an average score of roughly 30%, but that there was a non-normal distribution. The abnormal component of the distribution was that over 20% of the
students scored higher than 50% on the test, which is atypical of the George Tech introductory physics course.

The authors looked into these high scoring individuals, using the demographic survey. The top scorers, those students in the top quintile on the pre-FMCE test, scored an average of roughly 64%. These top scorers, which produced the atypical peak in the overall distribution, are themselves not typical for an introductory physics course (Aiken, 2013). Nearly all of the students took physics in high school and almost three-quarters held a college degree.

In terms of retention and participation in the course overall, the authors found that fewer than half of the registered students even watched the first video. The authors saw the same steep drops in participation, the same high attrition rates, that other MOOC studies have found. By the fifth week, less than 5% of the enrolled students were watching the lectures (Aiken, 2013).

An interesting twist to this study is that the course is laboratory-based, which, though light in terms of the materials required, still requires some computing materials for video capture and motion-tracking software (Aiken, 2013). The authors saw very little participation in the first lab, 2%, with only half of those participating in the second lab. One speculation about such little participation in the labs comes from the fact that labs can be time-consuming and that students did not quite expect to spend so much time on the MOOC. The authors looked at those students who completed both labs and found that the only distinguishing feature about them was how much time they expected to give to the course at the outset, but even that number was less than the amount of time suggested to put into the course.

1.2.1.6 Closing remarks

These studies all looked into different MOOCs offered on different popular MOOC platforms. One common thread in all of them is the large attrition rates, which may be inherent in such an open
environment. The students have no real penalty for signing up for a MOOC and then abandoning it. But, despite the high attrition rates, there are still large numbers of students completing these MOOCs or, at least, participating enough to provide information on how they engage the content. The MOOCs provide a wealth of information on how students use their time and use the materials of a course, as was demonstrated by the paper from Seaton et al.

These studies demonstrate what types of people are enrolling in and participating in MOOCs, and show that a lot of the people engaged are those who have access to education. The demographic surveys administered also provide a wealth of other information about participating students.

1.2.2 Historical Context of Residential Communities

The other environment that this thesis will explore is the Andrews Hall Residential College (AHRC) at CU Boulder. This residential college is part of the RAP programming at CU Boulder, and is also the first residential college for the university. The following section will describe other current residential programs offered by institutions of higher education and will look at a specific study detailing how faculty and students might interact in a residential environment.

1.2.2.1 What are Residential Communities?

The current breadth of residential academic programming is explored in an overview of several universities’ websites. The full overview is included in Appendix A. RAPs have a long, 800 year, history which began with the residential colleges of Oxford and Cambridge. The residential college model creates an environment where students and faculty live together and engage one another in both an intellectual and social manner.

When the residential college model was adopted by US institutions, the key component of situating students and faculty remained, but many of the other components changed. This can be seen more
prominently in the lack of any consistent naming convention, but extends through whether or not there are live-in faculty, scheduled meals/events, required courses, etc. The lack of convention means that residential communities have to be broadly defined as places where students live together on-campus while attending university.

1.2.2.2 Faculty-Student Interactions in a Residential College

A major aspect of all the different RAPs is that there is some form of mentorship from faculty and other students. Most RAPs advertise faculty-sponsored events and seminars or small seminar courses. A study done on a live-in learning community at a large public research university and published in 2007 by Cox and Orehovec provides a more detailed look at how faculty and students interact with one another within a RAP-like environment. The authors never refer to the university by name, but rather refer to the program as “the College” (Cox, 2007). Their questions focus on determining which types of faculty-student interaction exist outside the classroom and what encourages or discourages these types of interactions.

As the community of the “the College” was modeled on the Oxford and Cambridge residential colleges, there were a number of official events designed to facilitate faculty-student interaction: Teas and Dinners (Cox, 2007). Every Monday-Thursday evening, the students were required to have dinner in dining halls reserved for “the College.” The faculty were encouraged to attend these dinners, but not required. The Teas were held in the live-in faculty’s apartment and were typically attended by about 100 students and several faculty (Cox, 2007). On top of these official events, were unofficial ones sponsored by faculty. As one example, the authors describe an ethnic food dinner where six faculty and eight students met up to share a meal. There were a total of 40 faculty involved in “the College” and the students ranged from freshman through graduate students from various fields of study.
To study “the College,” the authors first recognize that there is a complexity to relationships and personal interactions. Because of this complexity the authors decided to try more qualitative measurement tools instead of attempting to use the more common quantitative measurement tools, like surveys. The authors were themselves part of the community and spent upwards of 30 hours per week in the building, working with the faculty and students involved in the study (Cox, 2007). This familiarity allowed the authors themselves to attend events without attracting attention to themselves and allowed them to observe the community without affecting it via their presence. On top of these observations, the authors conducted a series of focus groups with the more engaged students and interviews of the faculty who were deemed most engaged by the focus groups.

In the literature review done by these authors, there were two key factors which seemed could inhibit the interactivity between the faculty and students (Cox, 2007). The first is simply whether or not it happens. The second factor is the quality of the interactions between the students and faculty.

As to the first factor, the National Survey of Student Engagement finds relatively low levels of interactivity between students and faculty, with the lowest occurring at larger research-focused universities like the one of the study (Cox, 2007). These low levels are reflected in the findings of this study where, unfortunately, the most common type of interaction found between the faculty and the students was disengagement. Of the 40 faculty involved, only eight made enough of an impact on the students to be memorable and worth mentioning in the focus groups (Cox, 2007). The behavior of disengagement is demonstrated vividly in an anecdote from one of the observations during a Dinner:

Two faculty members were sitting in the second to last seats, across the table from each other, at one end of a double-long rectangular table. The rest of the table had four students sitting together with one space between them and the professors. The faculty members were engaged in their own conversation, while the students were engaged separately in their own. Moreover,
the students closest to the faculty members turned in their chairs a little, and were leaning forward, almost turning their backs to the professors. The faculty members showed no visible sign of being bothered or offended. In fact, the faculty members and students seemed oblivious to each other. (Cox, 2007 p.351)

This disengagement was acknowledged by both the students and the faculty from “the College.” The researchers note that this disengagement is most remarkable because the entire point of the learning community was to engage students and faculty with each other. That there would be faculty and students sitting at the same table at the same time is by design. However, to have those conditions and all the while the two groups ignore one another goes against the very purpose of the program (Cox, 2007).

The authors developed a typology of the interactions observed. The lowest tier for this typology is disengagement. The other levels of engagement in are represented by the authors in the following figure:

![Typology of Faculty-Student Interactions](figure1-1.png)

*Figure 1-1: Typology of Faculty-Student Interactions presented by Cox and Orehovec in a case study of a residential community. (Cox, 2007 p.351)*
The typology presented has a pyramid-like structure with regards to the numbers of interactions observed. The most observed tier was disengagement. As the tiers go higher – through incidental contact, functional interaction, and personal interaction – the amount of observed interaction diminishes. Until, finally, at the top of the pyramid, there is only one relationship which fits the definition for being a mentoring relationship (Cox, 2007).

The interaction Incidental Contact is largely superficial and, as the name implies, incidental. Most often, this type of interaction is seen as polite greetings during chance encounters when students and faculty go about their daily activities (Cox, 2007). The authors use Functional Interaction to categorize the institutionally related encounters: when students have academic questions or when students and faculty are working together on a project, for instance. These interactions can be one-on-one and might be tangentially related to academia, but generally involve the faculty as a source of intellectual knowledge. Personal Interaction categorizes moments when students and faculty are purposefully meeting due to the personal interests of either the student, faculty, or both. These interactions are not generally about the students’ courses or academic concerns. Rather, these are the times when the professor is viewed as a friend or a peer and the student views the professor on a more personal level, instead of as a part of the institution (Cox, 2007). The forms Personal Interaction are the most humanizing because the students perceive the professors as people instead of as resources for intellectual growth. The final tier in the authors’ typology is mentoring. The authors look to a paper published by Maryann Jacobi in 1991 in the Review of Education Research on behalf of the American Educational Research Association to loosely define mentoring as the highest quality of interaction, using three mentoring functions – professional development, emotional and psychosocial support, and role modeling – to define any of the interactions as a mentoring relationship (Cox, 2007).
There is not an argument given for any of the relationships being necessarily better than the others. The authors mention how oftentimes the Incidental Contact would result in a Personal Interaction later. So, it might be that the lesser involved levels are important for facilitating the more involved functions.

There was no study done on the specific impacts of each tier of interaction. The authors argue that any level of engagement is beneficial. While the higher tiers made students feel more valued, some students reported that even the incidental encounters, superficial as they were, served to reassure the students of the faculty presence in “the College” (Cox, 2007).

There are limits to this study. The authors point out the largest issue with their methodology is the selection process for their focus groups and interviews. The focus groups are sampled from the more engaged students and the interviews are of the more engaged faculty. So, the results of this study, the relative participation levels in each interaction level, are likely skewed to be more interactive than what the whole population of “the College” experiences. As the study sample is difficult to generalize to the whole of “the College,” the results are even more difficult to generalize to other universities and other residential learning communities. The role of the highest tier of the typology, mentoring, was minimal because only one student could be identified as having that type of a relationship.

1.2.2.3 Mentoring

The idea of mentoring: what is it, how does it work, and what types of relationships can be considered mentoring relationships remains largely undefined in academia. To get a better sense for this, a more in depth discussion of two surveys of the field of mentoring are included in Appendix A. A vague definition, the same one used by Cox and Orehovec, is provided by Maryann Jacobi, that mentoring involves functions that fall into three broad categories: emotional and psychological support, professional development, and role modeling (Jacobi, 1991).
1.2.2.4 Communities of Students

Stepping back from the residential component, there are learning communities which strive to foster student achievement using similar ideas but without students living together. These communities are created using several methods that revolve around curricular planning: linking courses together, clustering courses together, or adding supplementary seminars (Tinto, 2003). The studies into these non-residential communities are important to consider because they utilize the general idea of engaging students by unifying them.

In one study on these non-residential communities, the author argues that a community fosters three important forms of student involvement. The first is that students share a common knowledge, generally the theme of the community (Tinto, 2003). The second is that students are together and, in particular, that students take the same courses together. This means that the students are in contact with one another on a regular basis (Tinto, 2003). The third form of involvement is a sense of responsibility for the success of fellow community members via group work and conditions wherein the group’s learning is dependent and each member’s learning (Tinto, 2003).

The faculty involvement in these non-residential communities is crucial and often key in that several faculty might link their courses together and coordinate curriculum and syllabi in order to create a learning community (Tinto, 2003). In this way, the individual courses’ contents are made interdisciplinary and part of a larger construct. A residential community can take advantage of the results from these non-residential communities by having a shared curricula that unifies the students both in and out of the classroom.

1.2.2.5 Closing remarks

Though residential communities have a long history, there is no unifying definition or design for how they are implemented. Students live together and learn together, and that is what creates the living-
learning community. Faculty are involved to encourage student involvement and success, but the presence of faculty in a community does not necessarily mean that students and faculty engage one another. Further, any faculty-student relationship that goes beyond the classroom and into the realm of mentorship is ill-defined and difficult to measure. Residential communities are present at many universities, and yet there are still questions regarding how to effectively implement a residential community and how to measure its outcomes and impacts on the students involved.

1.2.3 Historical Context of the “Brick and Mortar” Classrooms

As a reference point from which to compare the MOOC and the residential community, a “brick and mortar” classroom can offer a well-researched middle ground. This reference classroom will be the introductory physics mechanics course offered by the CU Boulder Physics Department: PHYS 1110, Physics 1 for Physical Science Majors, which is further detailed below in Section 1.2.3.1. The architects of the MOOC have deliberately sculpted the MOOC to be as similar to this “brick and mortar” course as possible. The comparison is not as direct for the residential community. There is a subgroup within the Andrews community which has to take a separate “brick and mortar” introductory physics course. This course is GEEN 1010: Engineering Explorations through Physics and is further detailed below in Section 1.2.3.2.

1.2.3.1 Physics 1 for Physical Science Majors of CU Boulder

The PHYS 1110 course is the first calculus-based mechanics course offered by the CU Physics Department in the physics sequence as part of “a 2-semester survey of introductory physics” where a CU semester runs for 15 weeks (Dubson, 2013). The course has a prerequisite of algebra and trigonometry knowledge – recommending a score of 50% or better on the Assessment and Learning in Knowledge Spaces (ALEKS) Math Assessment exam administered to all first-year CU freshman – but does
not assume that students have any prior knowledge about physics. Because PHYS 1110 is calculus-based, there is a corequisite Calculus 1 course (or equivalent).

There is a large enrollment in the course, upwards of 700 students, because the calculus-based physics sequence is required for many of the degree paths offered at CU. The in-class portions of PHYS 1110 are held on the CU campus in the Duane Physics building. There are 150 minutes of lecture time per week augmented by 50 minutes per week of small group work in tutorial-based recitation sections (Pollock, 2008). The lectures are given in a large room which can seat hundreds of students. The lectures implement Peer Instruction by utilizing concept test questions and the iClicker system (Finkelstein, 2005). For the fall 2013 running of PHYS 1110, there were three back-to-back lecture sections, 50 minutes each, held three times per week (Dubson, October 9, 2013). The recitation sections are led by teaching assistants, typically graduate physics students, with the help of learning assistants, typically undergraduate students, and are held in a small area where students sit in clusters of up to four.

The course has weekly homework assignments which are administered online using the Computer Assisted Personalized Approach (CAPA) system from MSU (Dubson, 2013). To help the large number of students with their CAPA homework and to answer general questions about the course content, all of the teaching staff for the course hold office hours in the physics help room, a large space dedicated to such purposes for all of the physics courses.

This introductory physics course has evolved pedagogically from a traditional course to incorporate the Peer Instruction in the lectures and then to incorporate the University of Washington (UW) Tutorials in the recitation sections. The UW tutorials, more formally known as *Tutorials in Introductory Physics*, are well-documented as successful in the UW classrooms (McDermott, 2002). The goals of the tutorials differ from the traditional classroom by emphasizing scientific reasoning skills and conceptual fluency. This is accomplished in a variety of ways, but most prominently in the actual tutorial section of the
course where students discuss physics in small groups. During the tutorial sections, the instructor’s role changes from the traditional lecturer to that of a discussion manager, intervening in student discussions only as a Socratic conversation guide. While these tutorials do not fully replace the lecture component of the course, they adjust the focus of the course culture towards the desired goals of the tutorials (Finkelstein, 2005).

The Physics Education Research (PER) group at CU Boulder studied the effects of implementing the tutorials at CU and reported their findings in the paper *Replicating and understanding successful innovations: Implementing tutorials in introductory physics*. These tutorials were first tested at CU in the fall semester of 2003.

The first tutorial-based recitation sections were held in a space created specifically for them with tables that could sit up to four students. The teacher:student ratio for these first tutorials was 1:14, just shy of the 1:10 recommendation. To get this teacher:student ratio, the study hired undergraduate students as learning assistants who were trained to assist the teaching assistants (Finkelstein, 2005). All of the teaching staff engaged in training each week to prepare for the tutorial-based recitations and to review the ideals of the new pedagogy (Finkelstein, 2005).

To assess the effectiveness of the reformed classroom, the authors N. Finkelstein and S. Pollock used various measurement tools: pre-/post-FCI, pre-/post-FMCE scores, pre-/post-CLASS scores, exam performance and specific exam questions (Finkelstein, 2005). The authors implemented weekly pre-tests for the tutorial students and used in-lecture concept test questions to gauge how students’ preconceptions were changed and how their conceptualization evolved over time. The FCI (Force Concept Inventory) was the nationally standardized test administered for the fall 2003 implementation and the FMCE (Force-Motion Concept Evaluation) was the nationally standardized test used for the
The pre-/post-test analyses for each semester showed high normalized learning gains, $G$, defined by:

$$G = \frac{Post - Pre}{100 - Pre}$$

For the fall 2003 semester, the study reports an average pre-test score of 53% and an average post-test score of 81% leading to a normalized gain on the averages of 0.6. The study also reports that, for individually matched pre-/post-FCI scores, the average normalized gain was 0.67. The tutorials stayed for the spring 2004 semester and the FMCE results showed even better performance with an average pre-test score of 23% and an average post-test score of 74% leading to a normalized gain on the averages of 0.63. The authors also reported the individually matched exams’ average normalized gain which was 0.77 (Finkelstein, 2005).

The other analyses showed similar success stories. For the pre-tests administered to gauge students’ preconceptions compared against later in-class concept test questions, students showed significant conceptual improvement. The only intervening factor between these pre-tests and the in-class questions was the tutorials. These concepts were then tested again on the exams, up to months after the tutorial, and the responses demonstrated even better performance.

The students’ attitudes and beliefs about science were tested using the Colorado Learning Attitudes about Science Survey (CLASS). In semesters prior to implementing the tutorials, the CLASS analyses showed a tendency for students’ beliefs to move negatively. With the tutorials, however, the CLASS showed no statistically significant change on the students’ attitudes about science (Finkelstein, 2005).

Overall, the implementation of the tutorials at CU was reported as successful as the UW implementation (Finkelstein, 2005). As such, the tutorials have stayed as a permanent piece of the introductory physics
sequence at CU. The next step taken by the PER group at CU Boulder was to measure the sustainability of the newly reformed classroom through the years as different faculty were rotated in to instruct the course.

In their study, *Sustaining educational reforms in introductory physics*, S. Pollock and N. Finkelstein compare the performance of different faculty implementing the UW tutorials. Each new faculty had to be trained to develop the class to accept and utilize the tutorials.

The study found that performance varied based on the instructor’s involvement in Physics Education Research with delineations between PER teachers, teachers informed by PER and strictly traditional teachers. Overall, the study showed some difficulty in bridging the PER faculty successes over to the other faculty in the department, but an overall success for sustaining the tutorials in the introductory physics sequence (Pollock, 2008).

The use of research based pedagogy in PHYS 1110 has led to a very successful record for the course. The typical student performance on the FMCE, as provided by the CU PER group, is seen in the figure below:
The above figure shows the pre-FMCE and post-FMCE distribution for the fall 2012 semester of PHYS 1110. This semester’s average pre-FMCE score was 41% and the average post-FMCE score was 75% leading to a normalized gain on the averages of 0.58. Using matched pre-/post-FMCE exams, the average normalized gain was 0.59. These results are indicative of a typical PHYS 1110 semester.

The typical demographic breakdown for the PHYS 1110 is noted in the studies of the course. The study reports that, for the fall 2003 course, the typical student population: “…is roughly 50% engineers and 20% natural science majors (20% are undeclared, and the remaining 10% are a broad mix of social science, arts, architecture, business, etc)...75% male, and over half are freshman” (Finkelstein, 2005).

The fall 2012 data, provided by Prof. Pollock, shows a similar distribution with roughly 40% engineers, 30% natural science majors, 20% undeclared, and the remaining 10% in the broad mix of majors. For the fall 2012 course, 78% were male and over half were freshman (with over 80% either freshman or...
sophomore). Lastly, the students enrolled in PHYS 1110 are in the typical college-going age-range of 18-24. (Finkelstein, 2005)

1.2.3.2 Engineering Explorations through Physics - AHRC Subgroup

To compare the Andrews community’s influence on academic success to these physics courses, a physics-specific subgroup within Andrews will be selected. The subgroup chosen for this study is actually the first-year students of one of the programs housed in the AHRC, the GoldShirt Program which is described in Section 4.1.1.4 along with the other AHRC subgroups. This subgroup is used because these students all take a GoldShirt-specific introductory physics course: GEEN 1010 Engineering Explorations through Physics, which administers both a pre-test and a post-test FMCE.

The GEEN 1010 course is offered by the College of Engineering and Applied Science (CEAS) and is taught in the Integrated Teaching and Learning Laboratory (ITLL). The GoldShirt Program’s: “First-year coursework focuses on enhancing student preparation for success in their chosen engineering major” (University of Colorado Boulder, 2012b). GEEN 1010 was first offered in the fall 2013 semester as part of that first-year coursework to prepare students for the physics sequence, which includes PHYS 1110.

The GEEN 1010 curriculum focuses on the fundamentals of introductory mechanics concepts and reinforces these concepts with hands-on laboratory experiments. The experiments are taken from the RealTime Physics Active Learning Laboratories Module 1 Mechanics text by Sokoloff and Thornton (Stites, 2013). The students spend two hours per week in the laboratory plaza of the ITLL, working in groups of 4-5, on each lab.

The course assigns the lectures as homework using the Thinkwell website; using lectures that were recorded by Professor Steve Pollock of the CU Physics Department’s PER group (Stites, 2013). The three
50 minute in-class lecture sections are then reserved for answering student questions, brief lectures to reiterate concepts or expand on the video lectures, and guided group work on problem sets.

The student enrollment is very small, with only 32 students, which are 100% engineering majors, of the typical college-going age-range of 18-24 and 57% male. All of the GEEN 1010 students live together in the AHRC. The course has a teaching assistant who also lives in the AHRC. The teaching assistant utilizes the spaces of the AHRC for exam review sessions and individualized tutoring sessions with the students.

This course does not parallel nor substitute the Physics Department’s course, but it has similar content and goals for physics learning. The course is aimed at preparing the students to take the Physics Department’s PHYS 1110 course. Using data provided from the GEEN 1010 course and the data provided by Prof. Pollock and presented in Section 1.2.3.1, the difference in physics preparation between the PHYS 1110 students and the GEEN 1010 students can be compared using the average pre-FMCE scores: for the GEEN 1010 students the average pre-FMCE score is 15% while for fall 2012 PHYS 1110 students the average pre-FMCE score is 41%. The FMCE results of the GEEN 1010 students can be further used to compare this course, which is strongly connected to the AHRC community, to other physics-learning environments: the MOOC and PHYS 1110.
2 RESEARCH OVERVIEW

2.1 RESEARCH QUESTIONS

2.1.1 What does it take to make a learning community?
This study will delve into the history and origins of two distinctly different types of learning communities: one focused in a residence hall and the other on a MOOC. How are these communities realized? What were the initial motivations that brought about their formation? What does it take to create these environments?

2.1.2 What lessons were learned by the leaders of these communities while the community was being created?
Another focus of the thesis will be on the successes, mistakes and lessons learned during the formation of these environments. How successful, step by step, do the leaders believe their plans were? What would the leaders do differently if they were to try to build the same community again elsewhere? In other words, what advice is there to offer other leaders aspiring to create their own learning community? The responses to these questions will be recorded, reported and analyzed for any readers interested in making their own similar learning communities.

2.1.3 How might the successes of these learning communities be measured?
What does it mean for each of these learning communities to be successful? What are some forms of measurement we might pursue? How do these communities benefit their members and in what ways can these benefits lead to academic success? How can we measure those benefits or proxies for those benefits? Finally, how do the measurable outcomes relate to the perceived or desired outcomes introduced in the interviews?
2.2 DATA SOURCES
This thesis is written in cooperation with and with involvement from of the Physics Education Research (PER) group of the University of Colorado’s Department of Physics. As such, this thesis is part of the PER group’s initial analyses of the CU physics MOOC. This thesis is also written in cooperation with and with involvement from the Andrews Hall Residential College and the Engineering Honors Program therein. The data are acquired as a participant observer in these environments, using mixed methods and active research approaches that include interviews, survey data, external analyses, informal observations from experience in the environment. The following is an overview and description of the different data and data sources, listed alphabetically.

2.2.1 Colorado Learning Attitudes about Science Survey
The Colorado Learning Attitudes about Science Survey (CLASS) is a tool developed by the CU PER group published in 2006. The CLASS asks 42 Likert scale questions which probe students’ beliefs about science and doing science. The test is scored based on whether students’ answers reflect a more novice-like mindset or a more expert-like mindset (Adams, 2006).

An analytic tool for assessing CLASS data was developed by Wendy Adams and Kathy Perkins and provided by the CU Physics Education Research group for use in this thesis. This tool allows for a set of matched pre-/post-CLASS results to be analyzed against experts’ opinions on the same questions. The questions of the CLASS are broken up into various categories: personal interest, real world connection, problem solving general, problem solving confidence, problem solving sophistication, sense making and effort, conceptual understanding, and applied conceptual understanding (Adams, 2006). The CLASS and further discussion about the analysis tool are included in Appendix B.
2.2.2 Demographics Survey (MOOC only)

The demographics survey used in this thesis is generously provided by the CU physics MOOC team. The survey, titled “Tell us about you Survey” for the MOOC students, was opened for participation credit if completed by students before the end of the first week of the MOOC (before September 22, 2013). However, students could still submit the survey after the reported hard deadline.

The survey itself consisted of 26 different questions. The topics covered included the standard demographic information about age, gender, income, education, country, etc. Along with this information, the survey asked about the students’ relationship to the MOOC content (ie: whether it pertains to their field or not), the students’ relationship to online learning, the students’ reasons for taking the course, and the students’ commitment to engaging in the course content. The questions of the survey are included in Appendix B.

This survey was for participation credit in the course, but still voluntary for the students to take. Because of this, the sample of students who filled out the demographics survey is a subset of the whole MOOC population: 13% of the total enrollees, 29% of those who engaged in the first lecture, and 60% of those who participated in the first homework. There are several options for validating the generalizability of the demographics survey takers to the whole MOOC population, but that full verification will not be a part of this thesis.

To analyze the data collected in this survey, an Excel workbook was developed in concert with data from the Coursera site. Lists of anonymized user numbers for each course activity are used to filter the anonymized user numbers attached each of the demographic data. This allows for a breakdown by lecture, survey, forum, homework, and exam participation. The demographic survey can be used to select subsets from any of the question responses like the question on students’ physics background.
Using the Excel workbook, these cross sections can be easily obtained and analyzed in terms of the students’ demographic breakdown.

### 2.2.3 Force-Motion Concept Evaluation

The Force-Motion Concept Evaluation (FMCE) is a nationally normed standardized test used for quantitatively assessing students’ conceptual fluency with introductory physics material (Finkelstein 2005). This test was developed in 1998 by Ron Thornton and David Sokoloff and consists of 47 questions which probe students’ conceptual fluency on basic mechanics principles (Thornton, 1998). To further improve the FMCE as an evaluative tool, an alternative scoring was developed which seeks to balance the relative weightings of the tested concepts. This alternative scoring, which is out of 33, will be used for all of the presented FMCE results. Both how to find the FMCE and the alternative scoring method are included in Appendix B.

The FMCE was administered in slightly different conditions for each of the three environments of this study. For the PHYS 1110 course, the pre-test version of the FMCE was administered during the first recitation of the first week of the CU fall 2013 semester and the post-test version was administered during last recitation at the end of the semester. As a side note, the FMCE has been administered the same way for the previous semesters and years that the PHYS 1110 course has been offered. For the GEEN 1010 course, the pre-test was administered during a summer bridge program before the CU fall 2013 semester. The GEEN 1010 course’s post-test was administered at the end of the semester during lecture-time. For the MOOC, both the pre- and post-tests were administered online. Several attempts were available to the MOOC students for both the pre- and post-tests to account for potential technical errors, but which allowed MOOC students to submit multiple attempts. In each environment, students were allotted 50 minutes to complete the FMCE and credit was given for participation, not for the actual score.
When processing the FMCE results, there are several potential complicating factors. Some students who were considered to have taken the FMCE, really did not. This could happen if a student did half of it and stopped or if a MOOC student clicked on the item and then left it blank. In order to filter out the students who did not fully commit to an attempt, a strict tolerance was applied and any FMCE with 2 or more blanks was removed from the analysis, so only responses with zero or one blanks are included. This is the main concern for the brick and mortar courses because the FMCE is administered in-class and so nearly all of the students take both the pre- and post-tests. For the MOOC, only a small percentage of the students who take the pre-test ended up taking the post-test. For this reason, there are two important pre-test distributions: the entire set of pre-tests and the set of pre-tests which correspond to a post-test. This matching is simple to do and also necessary for each environment for the analysis of improvements made by each individual.

The FMCE results will be analyzed both in aggregate and on an individualized basis. For the larger picture look, the average pre- and post-test scores are calculated. The learning gains made by the students can be estimated by comparing those averages. For a more individualized look, each matched pair of pre- and post-tests can be compared. The normalized learning gain function used to compare the pre- and post-tests is:

$$G = \frac{Post - Pre}{100 - Pre}$$

where G represents the normalized learning gain, -∞ to +1, relative to what could have been learned. This number ranges from negative values (where the post-test is worse than the pre-test) through zero (where the pre- and post-tests are the same) to 1 (where the post-test is a perfect 100%). There will be two normalized gains presented for any pre-/post-FMCE analysis. The first is the gain of the averages,
using the average pre-score and the average post-score as the inputs into the gain function. The second is the average of the gains, using each pre-/post-matched individual’s pre-score and post-score as the inputs to the gain function for each individual and then taking the average of those gains. Because this gain function assumes that students’ pre-tests are not perfect scores, there is a slight complication for the latter statistic when students do have perfect scores. This cannot be avoided when presenting the average of the gains, so the number of perfect pre-tests will be noted, if any exist.

2.2.4 Homework and Exam Performance (MOOC and PHYS 1110)
By design, the same exams and homework assignments were administered to the students in the MOOC and in PHYS 1110 (Dubson, October 9, 2013). The students’ performance on the homework assignments and exams is provided by the CU physics MOOC team. Specifically, the numbers, figures, and other results presented in this thesis were provided by Professor David Lieberman. The data from Coursera were collected and processed to present the first attempts made by the MOOC students in order to better match the PHYS 1110 students. Because there are large attrition rates in the MOOC, the group of students who submitted the first homework assignment is significantly different from the group who submitted the last homework assignment, and similarly with the exams. To account for this, the only MOOC students included in the homework and exam analysis are those who participated in at least one of the exams. While this method does not solve all of the potential issues that arise when using this data source, it will be sufficient for the purposes of this thesis where the overall analysis will not rely heavily on the students’ homework and exam performance.

2.2.5 Interviews
A series of interviews were conducted to collect perspectives of the leading members of each environment. The interviewees were all people involved with one of the communities either by being involved in the administrative and decision-making side of implementation, influential in the design and
creation, or those involved in the simpler day-to-day workings. There are those who are involved in similar environments who can provide a slightly different perspective on the same type of community.

The questions for each interview were the same and focused primarily on the first two research questions of this thesis. The primary interview questions were:

- How did you decide to create this community?
- What have you done, in time order and to the best of your ability to remember, to make this community possible?
- What did you learn during the process?
- What would you do differently, if you were to do it again?
- What are the strengths and weaknesses of this type of community?
- What do you expect students to learn from this community?

For each of these questions, the use of the word community was used interchangeably with either MOOC or AHRC, depending upon the interviewee. There were also a few follow-up questions specific to each interview based on the content of the responses to this set of questions.

Each interview was recorded with the consent of the interviewee and with the recording device in plain view. The audio for each interview was transcribed and is included in Appendix C. An analysis of each interview was used for addressing the research questions of this thesis.

The following is a list, alphabetically, of the interviewees detailing their experience with the pertinent learning community and any relevant qualifications for their part in this study.
2.2.5.1  Scot Douglass, PhD

Prof. Douglass was interviewed for his role with the CU residential communities. He is the Faculty-in-Residence for AHRC, the Director of the Engineering Honors Program, which is housed in AHRC. He is also an Associate Professor for the University of Colorado’s College of Engineering and Applied Sciences’ Herbst Program of Humanities.

2.2.5.2  Michael Dubson, PhD

Prof. Dubson was interviewed for his role with the CU MOOCs. He was the instructor for the fall 2013 PHYS 1110 course that then ran in conjunction with the Physics 1 for Physical Science Majors MOOC of this study. He is also a Senior Instructor, Associate Chair for Undergraduate Studies, and member of the Physics Education Research group of the University of Colorado’s Department of Physics.

2.2.5.3  Noah Finkelstein, PhD

Prof. Finkelstein was interviewed for his role with the CU MOOCs. He helped to produce the Physics 1 for Physical Science Majors MOOC. He was on the CU President’s Task Force on technology and education and on the CU Boulder Campus Task Force of the same kind. He is also a Professor and member of the Physics Education Research group of the University of Colorado’s Department of Physics.

2.2.5.4  Edmond Johnsen

Ed Johnsen was interviewed for his role with the CU MOOCs. He was involved with the technical aspects – a self-named ‘code monkey’ – for the Physics 1 for Physical Science Majors MOOC. He has been involved with the Physics Education Research group of the University of Colorado’s Department of Physics since June 2013.
2.2.5.5 William Kuskin, PhD

Prof. Kuskin was interviewed for his role with the CU MOOCs. He was the instructor for the Comic Books and Graphic Novels MOOC. He was the Chair of the CU Boulder Campus Task Force on education and technology. He is also a Professor and Chair of the University of Colorado’s English Department.

2.2.5.6 Michael Lightner, PhD

Prof. Lightner was interviewed for his role with the CU MOOCs. He was the Chair of the CU President’s Task Force on technology and education and the faculty point-of-contact for the CU MOOCs with Coursera. He is also a Professor and Chair of the University of Colorado’s Department of Electrical and Computer Engineering.

2.2.5.7 Diane Sieber, PhD

Prof. Sieber was interviewed for her roles both with the CU MOOCs and with the CU residential communities. She is the Faculty-in-Residence and Director of the Global Engineering Residential Academic Program. She was on the CU President’s Task Force on technology and education and on the CU Boulder Campus Task Force of the same kind. She is also the Associate Dean for Education in the University of Colorado’s College of Engineering and Applied Sciences as well as an Associate Professor for the University of Colorado’s College of Engineering and Applied Sciences’ Herbst Program of Humanities.

2.2.6 Observations

There were observations made to document the experience of working within each environment. While some observations come in the form of detailed field notes, others are limited by the timeline of this thesis project.
One set of observations comes from engaging with the Coursera website. By visiting the Coursera website and clicking through the available pages, the content can be assessed and described. A sample of screenshots are included in the Appendix D to demonstrate the types of information available on their site.

Another set of observations deals with the AHRC. Living in the AHRC as a student and as a member of the community prior to the writing of this thesis has provided a set of opinions and viewpoints only attainable from such an experience. Because the observations of the AHRC are less formal, they are given less weight as a source of data. However, that does not discount the potential validity of the experiences or any externalizations expressed in this thesis. As such, descriptions of major AHRC events, like the open mic nights, and even smaller informal events, like student luncheons, are derivative of almost six years of experience as a part of the community.

The brick and mortar course forms the final environment captured through observations. Being a TA for the GS introductory physics course GEEN 1010 provides a similar set of experiences as did living in the AHRC. Having been a student of the physics department and having experienced the physics course, albeit several years ago, lends a type of familiarity with the student-perspective of the research-based PHYS 1110 course. These experiences are not well documented with field notes, but are rather the product of familiarity and are not treated as such. Descriptions of the GEEN 1010 course, for instance, are based on these observations.

2.2.7 Program Review (AHRC)

The Residential Academic Programs of the University of Colorado, Boulder were required to complete a program review for the 2013-2014 school year (Douglass, 2014). The program review of the AHRC is provided for use in this thesis from the AHRC. Along with this program review, the AHRC provided access to the data used to compile the program review.
2.3 SUMMARY OF WHAT IS TO COME NEXT
This study will be focused on answering the above research questions for first the MOOC, Section 3, and then for the residential learning community, Section 4. Within the section for each environment, there will be a subsection detailing the data collected for each of the research questions. A comparative analysis will be provided, Section 5, which details the strengths and weaknesses for each community and stipulates the recommendations that follow from the study.

This report has been structured in this way in order to clearly separate the two distinct studies. For those reading this who simply desire to create a MOOC, it is easy to find the MOOC-related study without having to skim through anything regarding the residential learning community. The same is true for those reading this who simply desire to create a residential learning community and have no interest in the MOOC. These are two very different types of learning environments and there are strengths and weaknesses that can be found in either. For those reading this who desire to create a MOOC, I would recommend reading Sections 3.1 and 3.2 for specific examples of how the MOOCs of this study were created and the lessons learned in those processes. Similarly, for those reading this who desire to create a residential learning community, I would recommend reading Sections 4.1 and 4.2 for specific examples of how the residential communities of this study were created and the lessons learned in those processes.
3 MOOCs of CU Boulder

This part of the thesis will focus primarily on CU Boulder’s Physics 1 for Physical Science Majors MOOC. However, the first and second research questions are designed to be more general for presenting a basis for understanding MOOCs in general. As such, a second CU Boulder MOOC will be used in addition to the physics MOOC to begin to generalize the data from the physics MOOC. This second MOOC is the Comic Books and Graphic Novels MOOC.

3.1 Research Question 1: What does it take to make a MOOC?
The MOOCs of this study were created from already existing courses. The important components required for mounting a MOOC from a pre-existing course are:

- A partnership with a MOOC Platform/Provider
- An instructor
- Lecture recording and editing equipment
- A support staff to engage with the MOOC technology

Each of these components can be found in Sections 3.1.2 and 3.1.3, which detail the specifics for mounting each of the MOOCs of this study. Section 3.1.1 will detail the process required before these MOOCs could be mounted, namely, the process by which the CU Boulder campus signed on with the Coursera MOOC platform.

3.1.1 Partnering with a MOOC Platform
A MOOC needs to have a platform to be run from, and there are a number out there to choose from, as described in Section 1.2.1.1. Coursera is one of a handful of big-name MOOC platforms and, while some MOOC platforms mount courses made by individuals, Coursera only mounts courses which are created and endorsed by external academic institutions who are partnered with Coursera (Coursera Inc., 2014;
Lightner, October 8, 2013). This was the first step in the making of the Physics 1 for Physical Science Majors MOOC; the University of Colorado had to partner with Coursera.

The process for a university to partner with a platform like Coursera consists of a series of discussions, decisions and legal contracts. These discussions began informally with a group of faculty, including Professor Lightner, and some of the campus leadership. The last of these informal meetings was in May 2012 and the consensus was “...there was no rush to want to get into this [MOOCs]” (Lightner, October 8, 2013 T.0:00:57). Later in the summer of 2012, the CU President put together a task-force to look into the different educational technology options and MOOCs were brought up. The CU Boulder provost then set up a committee on the Boulder campus to gauge the interest from a campus-level and send that back to the system-wide task-force (Lightner, October 8, 2013).

As these discussions evolved, the different MOOC platforms were contacted. Coursera came to the forefront and one of the Coursera cofounders, Daphne Koller, actually visited Denver and met with the CU President and the campus leadership (Lightner, October 8, 2013). The Boulder campus was specifically chosen, because at that time Coursera was only partnering with universities from the Association of American Universities. The Boulder campus agreed to represent CU with the first MOOCs (Lightner, October 8, 2013).

A few more details had to be sorted through before the announcement of the partnership. Firstly, Coursera requires, “a technical point of contact and then maybe an overall point of contact” which were chosen for the CU Boulder campus (Lightner, October 8, 2013 T.0:10:46). Secondly, Coursera required an actual commitment of courses to become MOOCs and there were none specified yet.

When the campus learned of the latter requirement, a quick series of requests went out to various departments and faculty of interest (Lightner, October 8, 2013). Prof. Lightner contacted the faculty in
his department and created the Introduction to Power Electronics MOOC with the promise of a TA and a
course relief. Prof. Lightner then reached out to the Chair of the Computer Science Department and the
Linear and Integer Programming MOOC was created with funding decided internally by that
department. In all, “the University as a campus provided nothing for those two courses” but, for the
other two MOOCs, the University did have to find funding (Lightner, October 8, 2013 T.0:13:50). The
Physics Department stood out because of the Physics Education Research group and Prof. Lightner
thought this group could, “turn it into more of an experiment in their work than an experience”
(Lightner, October 8, 2013 T.0:14:20). To get the Physics 1 for Physical Science Majors MOOC, the
University provided the funding for a postdoc position. Finally, the Vice Chancellor suggested William
Kuskin because of his online course on comic books. The University paid a summer month’s salary and
“5K was devoted to copyright issues” for taking the course to the MOOC platform (Lightner, October 8,
2013 T.0:16:00). In all, Prof. Lightner estimates that the initial resources required for these four MOOCs
was somewhere between $25K and $50K and that, “it’s really being put together on a shoestring”
(Lightner, October 8, 2013 T.0:17:56). Dean Sieber agrees on the extent to which the campus funded
these MOOC efforts:

    ...we don’t have a facility. We don’t have a recording studio. We don’t have an expert in MOOCs. We
don’t have a support infrastructure. These courses are costing between 50 and 150 thousand
dollars for institutions that are really taking it seriously.... (Sieber, October 24, 2013 T.0:07:04)

Even with such little funding, however, these four MOOCs were set in motion. In May 2013, Coursera
announced in a press release the newest wave of University partnerships, including CU Boulder (Conroy,
2013).
3.1.2 Physics 1 for Physical Science Majors MOOC

On February 12, 2013, Professor Finkelstein was contacted by Prof. Lightner and the Vice Chancellor to create and run a MOOC in introductory physics. Prof. Finkelstein instead agreed to, “produce one and immediately said the person to run the MOOC, teach the MOOC, is the US [physics] professor of the year from 2006...Mike Dubson” (Finkelstein, October 23, 2013 T.0:05:20). Professor Dubson agreed to use his on-campus fall 2013 Physics 1 for Physical Science Majors course as the basis for the MOOC’s lecture videos and course content (Dubson, October 9, 2013). After the full-time Graduate Research Assistant position was promised by the University and some course buyout was provided from the department, Prof. Finkelstein began to assemble the team to run the MOOC (Finkelstein, October 23, 2013).

In June 2013, the technical support – and self-named ‘code monkey’ – Ed Johnsen was hired onto the team (Johnsen, October 7, 2013). He spent his first week getting acquainted with Coursera and then began uploading the course content which Prof. Dubson had already set: the homework, exam and concept-test content. To coordinate this, Prof. Dubson, “put together a spread sheet that had, you know, each week, each day, each lecture, each concept tests he wanted in that lecture” and sent that to Johnsen to then upload all of the content (Johnsen, October 7, 2013 T.0:25:18).

There are a few other members of the MOOC team. An external faculty member was hired to help monitor the discussion boards and make sure the physics content was appropriate. An undergraduate student was hired to do the video editing. There were a handful of volunteers, students interested in education, who also scanned the MOOC for typos and small errors (Dubson, October 9, 2013; Johnsen, October 7, 2013; Finkelstein, October 23, 2013).

In August 2013, the month leading up to the start of the fall semester, Prof. Dubson got the logistics ready for running the MOOC, namely, “making sure that the recording hardware, and the recording and
editing procedures were worked out” because once the semester started, there would be no time available to fix anything (Dubson, October 9, 2013 T.0:03:13). The biggest issue in this process was setting up the video camera in the lecture hall. The mounting was in the wrong place. It took weeks and interactions with six different people from CU’s Office of Information and Technology (OIT) in order to remount the device. With the recording device in order, Prof. Dubson tested it and tested the video editing software (Dubson, October 9, 2013).

On September 17, Prof. Dubson posted on the MOOC website that the course had begun. Because of all the preparation, the MOOC ran with few hiccups or impediments. There were some worries about needing to heavily monitor the discussion forums, but, “...they don’t require much monitoring at all.” (Dubson, October 9, 2013 T.0:09:19).

For the lectures, there are three on-campus sections of the course offered each day of lecture, which, “...gives us three opportunities to get a good recording of a lecture.” (Dubson, October 9, 2013 T.0:12:11). The third lecture is not always needed, but it is useful when there are issues with the first two lecture recordings. Prof. Dubson chooses one of the lectures and lets the hired undergraduate edit out all of the dead-time. This first edit takes approximately two hours and brings the recording down to roughly 35 minutes (Dubson, October 9, 2013). Prof. Dubson does the final editing, producing a 30 minute video and uploads it to the MOOC website. The final piece of editing is done by Johnsen who makes sure the concept tests are inserted at the correct places throughout the lecture (Dubson, October 9, 2013). Overall, Prof. Dubson estimates that takes 4 hours to fully edit and mount a recorded lecture.

The MOOC went for 12 weeks and included a total of: 36 lecture, 12 homework assignments, 3 exams, and 6 surveys, nearly all of which already existed for Prof. Dubson’s on-campus course. Essentially, the MOOC team, “simply adapted, edited the brick and mortar course slightly, and put it online.” (Dubson, October 9, 2013 T.0:18:53).
In addition to this whole creation process, the MOOC team spent time and energy planning how to study the MOOC: what questions could be asked and what data could be collected (Finkelstein, October 23, 2013). Part of this time and energy was spent creating the demographics survey and an exit survey as additional sources of data. There were a few other people from the Physics Education Research group involved in that process and several meetings.

### 3.1.3 Comic Book and Graphic Novels MOOC

A second, comparative, interview study of another CU Boulder MOOC instructor, Professor Kuskin, was performed to gauge which parts of this experience are true for other MOOC implementations. Prof. Kuskin, on sabbatical at CU, is the instructor for the Comic Books and Graphic Novels MOOC (Kuskin, October 8, 2013). In contrast to the physics MOOC, this comic book course was run almost solely by the Prof. Kuskin.

The Comic Books and Graphic Novels MOOC was made from an already existing and well established course. Prof. Kuskin had been teaching an on-campus version of the course for seven years and, three years prior to this MOOC, had converted it to be an online course (Kuskin, October 8, 2013). In April 2013, Prof. Lightner asked Prof. Kuskin to make the course into a MOOC and they arranged for the funding, described earlier in Section 3.1.1, for a summer month’s work and copyright issues. The copyright issues at play were because of the use of comic book material (Lightner, October 8, 2013). These issues were resolved on the grounds that the comics were in sections and being transformed for use as an educational tool (Kuskin, October 8, 2013).

In an effort to make the MOOC into, “a hot-rodded version of the online course,” Prof. Kuskin spent his time writing an original comic book about MOOCs, Higher Education, the Humanities, and himself (Kuskin, October 8, 2013 T.0:03:20). After finishing writing and drawing, Prof. Kuskin sent it off to a professional artist to have it illustrated.
The next step in preparation for the MOOC was to become familiar with the Coursera platform. This took Prof. Kuskin a significant amount of time because, as he says:

...just figuring out how to post a PDF takes time. Figuring out how to construct the surveys and the exams takes time. Their-their grading peer-to-peer essay grading thing is completely opaque. Their explanation is just not there. (Kuskin, October 8, 2013 T.0:14:41)

And so, the taping of the videos did not begin until mid-August. Recording the 20-30 minute lecture videos, in the beginning, took upwards of 15 hours, even with help from OIT (Kuskin, October 8, 2013). To decrease this time, Prof. Kuskin began writing scripts for each video, which brought the time down to 6 hours of production time per 15 minutes of recorded and edited video.

There are other content that needed to be updated, including the PowerPoint lectures from the previous versions of the course. Multiple-choice exams had to be created, which were never a part of the non-MOOC version of the course (Kuskin, October 8, 2013). To help proof-read the content and monitor the discussion boards, two TAs were hired and work 5 hours per week between the two of them (Kuskin, October 8, 2013).

In late September, the MOOC went began. Every week a new piece of the comic book that Prof. Kuskin created was released along with a couple of lecture videos. In total, there were 2 essays, a comic project, two tests, and about 30 videos (Kuskin, 2013).

3.1.4 Coursera Recommendations for MOOCs, in Brief

The Coursera site has some recommendations for creating a MOOC. There are several screenshots of the relevant part of their website included in Appendix D, but the gist, for courses that are already established, is (Coursera, Inc., 2014):

- Lecture Material
2 hours lecture video per week

Keep video length between 5-15 minutes

Warns that 2 or more hours of editing is required for each hour of video

- Upload Content
  - All videos, in-video quizzes, homework assignments, exams, surveys, and other resources
  - 1 month in advance of launch
- Send out a welcome e-mail and a this-class-will-start-soon e-mail
- Launch and monitor the course

The general idea of these recommendations were followed by these CU MOOCs. However, the two CU MOOCs did not adhere strictly to this list. One of the largest deviations would be the length of the physics MOOC’s lectures, which were 30+ minutes in contrast to the Coursera recommendation of having a 15 minute maximum.

3.2 RESEARCH QUESTION 2: WHAT LESSONS WERE LEARNED?

3.2.1 Coordination in the Administration

The funding and commitment concerns brought up by Dean Sieber about the CU Boulder partnership with Coursera are realized in a lack of coordination between the various administrative groups of the University. Essentially, Dean Sieber describes multiple groups attempting to move forward without the rest and that:

...OIT...[was] trying to come up with its own strategy and in competition with the-President’s Committee. And, the campus was in competition with the President’s Committee and saying that the President’s Office shouldn’t interfere.... (Sieber, October 24, 2013 T.0:08:29)
Her work largely consisted of bringing these groups together, to continue the planning with a reunified administration. And, while these issues do not, from the data collected in this study, affect the individual MOOCs, they might affect the campus’s ability to move forward with its MOOC strategy.

### 3.2.2 Quality Control and Production Standards

One of the concerns that Prof. Dubson notes about MOOCs is the potential for low-quality products because there is, as of yet, no mechanism for quality control for the MOOCs. However, Prof. Dubson reflected on his own MOOC-making experience and notes:

> ...there’s no need to worry. The production standards of Coursera courses are uniformly high. And, now that I’m doing it, I-I think the reason is obvious. One of the primary goals of putting up a MOOC course is advertising for your institution. You want to show that your institution creates a, produces a first-rate educational product. ...you’re going to try...that it actually be a first-rate educational product and it compares well with the other MOOCs that are on Coursera. (Dubson, October 9, 2013 T.0:34:05)

The same mentality is expressed by Prof. Kuskin who deals with his, “own perfectionism when faced with a recording device” and let some of the video production time take up to 15 hours: writing, recording, rerecording, and editing (Kuskin, October 8, 2013 T.0:07:35). MOOCs created by similarly minded professors are not in need of any imposed quality control or production standards because those constraints are naturally self-imposed.

### 3.2.3 Depersonalization

An unfortunate, but common experience of the instructors for both the physics and comic book MOOCs was a general dissatisfaction. As Kuskin puts it: “the MOOC is the least pleasant, indeed most unpleasant course I’ve ever taught in my life” (Kuskin, October 8, 2013 T.0:02:42). And, as Dubson puts
it: “I am fatigued...I’m distressed that I don’t have a lot of direct contact with the students” (Dubson, October 9, 2013 T:0:35:10). At the heart of this dissatisfaction is the lack of humanity, of individualized humanity, in teaching their MOOCs. Another way that Kuskin describes his interactions with the discussion boards is that it is like dealing with a mob – there is no distinct personalities to get to know, there is simply the demand from a huge pool of people. In an on-campus course, even in Kuskin’s online but non-MOOC version, the instructors have the chance to see students’ faces and hear students’ voices. For Kuskin’s online course, students lived in the area which could sometimes lead to chance encounters. For Dubson’s brick and mortar course, every student is expected to attend three lectures per week and participate in live, facilitated discussion. There is, unfortunately, no modality for this within the MOOCs.

These constraints, while surprising to these instructors, were predicted by Finkelstein in his slides at the AAPT National Meeting in early 2013 (Finkelstein, 2013). He talked briefly about the various affordances and constraints of online education versus face-to-face education. Several of the constraints listed for online education involve the “lack of intentionality” and, also, the “lack of...the water cooler conversation” meaning the happenstance encounters which lead people to know one another (Finkelstein, 2013 Slide:81). Granted, there is a clear discrepancy in that Kuskin’s online non-MOOC course allowed for those types of engagement. What can solve this problem is the issue of size and locale. While Kuskin’s course was online, it was small at around twenty students, and all of the students were local to the campus. MOOCs, on the other hand, are by name massive and by design spread across the world. It is with MOOCs that these issues come into play. MOOCs are, almost necessarily, depersonalized. Even from the students viewpoint, the instructor is less personable because there can never be a one-on-one office hour visit, even virtually. There is simply not enough time for an instructor to meet with upwards of 100,000 students individually.
This isolation does not leave the instructors with a very encouraging perspective about the whole MOOC-creation process. To reiterate this sentiment, here is another quote from Prof. Dubson:

...if someone asked me if they should run a MOOC, I’ll go: “Only if you are dying to.” Because, you know, it’s an enormous amount of work and, you know, the payback is nebulous at best.

(Dubson, October 9, 2013 T.0:36:09)

And another quote from Prof. Kuskin:

...what the MOOC has taught me is that, as I imagine my little daughter going off to school...If she took a good online course, I wouldn’t begrudge it. I would pay. But, I would say: “Honey, don’t take a MOOC. If they’re offering it for credit, don’t. Because it is not, it is too removed from the professor. It’s not that the information might not be there. It’s not that you can’t write him or ask him a question or write the discussion forum. But, the human element is too buffered.” That’s where I am right now and that’s why I’m finding it unpleasant. (Kuskin, October 8, 2013 T.0:19:49)

3.2.4 Technology of the MOOC Platform

The majority of the technical issues for the physics MOOC were handled by Ed Johnsen and there were a number of issues that he ran into (Johnsen, October 7, 2013). One of the biggest issues, because it effected the students’ engagement with the MOOC, was with the Coursera homework system, which, “...was argued to be worse than our [CU physics’] 1980s-based UNIX CAPA system.” (Finkelstein, October 23, 2013 T.0:11:13). The issue was that the algorithm recognition software was ill-equipped to recognize equivalent algebraic or unit-based expressions. This became a problem for the students: “...for the first couple of days of the release of this question, those who charged ahead and submitted
anyway...were, in fact, misgraded.” (Johnsen, October 7, 2013 T.0:15:25). Johnsen had to then remove all other similar questions from the rest of the future homework assignments.

Another issue with the limitations of the Coursera technology is described by Prof. Finkelstein:

I was really hoping to enact the Peer Instruction, model which is, you answer individually and then the computer, based on what you said, would come back with an intelligent response...having students type something, and vote again, and then come back. Coursera has not allowed us to do that. (Finkelstein, October 23, 2013 T.0:10:05)

The concept-test questions were integrated into the lecture videos, but only the first part of this process is allowed because there is not system in place for providing responses to the student. Even then, the Coursera system would communicate to the student the correct answer to the question, which was not desired. Johnsen spent time writing a JavaScript work-around to fix this issue (Johnsen, October 7, 2013). Students can avoid a concept-test question entirely by simply clicking on the video’s progress bar past the question, and there is no readily available solution for that.

One major issue faced by Prof. Kuskin is the peer-to-peer grading system and the differences between running science-based and humanities-based MOOCs. This comes across in Prof Kuskin’s impressions of the platform: “I don’t think it’s [Coursera] spent a comparable amount of time in its sense of grading essays...” (Kuskin, October 8, 2013 T.0:10:28). This sentiment is further expressed when Prof. Kuskin mentions the multiple-choice exam he had to create and assign for the MOOC. According to Kuskin, multiple-choice exams are simply not worth the effort, but the MOOC needed to have one (Kuskin, October 8, 2013).

Essentially, the MOOC users have found that the technology of the platform is more limited than what they were expecting. As Prof. Finkelstein notes:
...the people producing this MOOC on the Coursera side, know a lot about technology and don’t have a very deep sense on the theory of education or are uninformed about the more progressive approaches to education. As a result of that,...[they provide] the most limited forms and they’re the early stages of what has been done in educational technology. (Finkelstein, October 23, 2013 T.0:22:28)

While the technology could eventually catch up at some point, it is right now behind other technologies. The expectations of these MOOC creators were off from the actual abilities of the platform, which limited the potential of these MOOCs. These limitations can be solved by somebody with the know-how, such as Johnsen, who can write Java Scripts and work with the other coding languages present.

3.2.5 What Students Expect to Get from the MOOC

One question in particular from the administered demographics survey provided an option for students to use their own words. This freedom led to an interesting set of responses. The question was: “What do you expect to get out of this course?” and it had a series of pre-prepared answers which allowed students to check all that applied. This distribution of these responses is shown in the following figure.
Figure 3-1: Distribution of MOOC students’ responses for what they expect to get from the MOOC.

The most common answer is to learn physics and the next most common answer reaffirms that with a motivation for the next physics introductory course. However, the interesting part of these answers is actually found in the “other” category because the students were provided with a space to elaborate what “other” meant for them. The 369 responses vary wildly from just learning physics. Each response was coded into several categories as can be seen in the following figure:
To demonstrate what these categories mean, the following are several example responses and their coded breakdown. The first example:

As a deployed member of the military who will be transitioning back out into the civilian world soon, I hope to use successful completion of this class as evidence that I can handle challenging college-level coursework. I did not apply myself in high school, and need to demonstrate my real potential in my college applications now, 8 years later.

This response was binned as “Credit/Professional Development” because the student is looking to prove their ability to handle a college course. The second example:
I'm learning English and the teacher has excellent diction and pronunciation. Also the classes are very enjoyable. And I love reviewing physics I studied engineering. Thank you very much!

This response was coded into multiple bins: “General Refresher” and “Learn English/Physics Jargon” because the student mentions that they are using the course to pick up on English skills and because they mention that they have already taken this type of course before. A third example:

I have several reasons, I have been looking for lectures as a general review for the physics GRE since many of the problems are Physics I, II and modern physics I graduated from CU with a physics degree, however, I took the honors physics intro mechanics class and I feel like I missed out on interesting class demonstrations. I also intend to watch these and other lectures while at work, since I have a lot of spare moments when I am not busy.

This CU alumnus is looking to take the physics GRE and is using this course as preparation. The mention of the course demonstrations categorizes this into the “High Quality” bin and the mention as being a physics student meant that the “Physics Student Refresher” bin was also appropriate. As a fourth example:

professional development/curiosity - hoping to pick up some tricks for my own equivalent course

This response was coded into the “Credit/Professional Development” and “Teaching Skills/Pedagogy” bins because the person seems to be implying they have an equivalent course and they are curious how it is taught elsewhere. This last example demonstrates the difficulty in coding these responses because the inferred meaning might not be the originally implied meaning. So, while the former categorization is blatant, the latter is more speculative. In other responses the teaching aspect is more blatant:

To learn how to teach physics.
Or the learning English aspect is more obvious:

maybe it sounds a little bit ridiculous, I'm trying to improve my English

And so on for dozens of other examples.

What is interesting about these “other” responses is that students are approaching the MOOC for reasons different than what one might expect from a physics course. There is an assumption that all of the students participating in this introductory physics MOOC have a desire to learn introductory physics. That, however, might not be the case for all of the students. Instead, there are students who feel they have a good grasp on physics and are using that as a bridge to help them learn English better. There are about 80 students who are actually teachers or tutors looking for a lesson in how to teach physics.

In addition to this added insight on what students’ goals are, there is also an added element of humanity. The first example listed was a very succinct version of that student’s life, their story. In Section 3.2.1, the issue of depersonalization was discussed. This type of feedback might be a way for students to share their background and give instructors a sense of who is participating in their course.

3.3 Research Question 3: What are the outcomes/successes of the MOOC? In order to assess the successes of the MOOC, it is important to first understand the goals of the MOOC.

In the interviews with the creators, it was clear that one major goal of this MOOC was to compare it side-by-side with the brick and mortar version of the course. This side-by-side comparison will be done in multiple areas including the FMCE, CLASS, and performance on homework assignments and exams in Section 5.1. In this section, the MOOC’s performance alone on those measures, and several others, will be presented.
3.3.1 Demographics of Early MOOC Students

The tool used for analyzing the population that was attracted to and enrolled in the MOOC is the demographic survey. This survey is described in greater detail in Section 2.2.2 and provides a broad spectrum of information on the MOOC students who filled it out. There were 2,149 students who filled out the demographic survey, accounting for only 13% of the total enrolled population of the MOOC. However, 6,346 students watched the first lecture and 1,831 (29%) of those filled out the demographics survey. Similarly, 2,259 students participated in the first homework assignment and 1,376 (61%) of those filled out the demographics survey. More details on retention will be presented in Section 3.3.2. But, while this survey only represents 13% of the total enrollees, it represents 29% of the population that engaged in the first video lecture and it represents 60% of the population that engaged in the first homework assignment. The following analysis will provide a description of the students who participated in the survey, and will focus on these students as an incomplete, but best available, representation of the whole MOOC population.

3.3.1.1 Geographic Distribution

Firstly, the MOOC is available to anybody with internet access, which means the MOOC can have a global reach. This MOOC’s students are spread across the countries, but a significant portion are from the United States. The following figure shows the top ten represented countries, along with a column for the combined total of all the remaining countries:
Figure 3-3: Distribution of MOOC students’ geographic presence by specific country. The United States has the largest fraction of students. The remaining countries represented in the top 10 have significantly smaller fractions of students.

It is clear from the above figure that the United States is the highest represented country; the US consists of just shy of 38% of the population. The second highest represented country is India, at just less than 10%. Of the top five represented countries, four of them have English as the native language. The countries not shown in the top ten (i.e. those in the “All the Rest” column) consist of just over 34% of the MOOC population. Just over 6% of the students left the question blank.

While this sorting by country helps to visualize which specific countries are best represented, it fails to demonstrate how that large portion chunked as “All the Rest” is distributed. In order to get a better sense for the geographic distribution of students, it might be better to sort students by continent. Using an online atlas to assign countries to continents, the following figure is made (Graphic Maps, 2013):
Figure 3-4: Distribution of the MOOC Students’ geographic presence by continent. (Graphic Maps, 2013)

North America is the most represented continent, with 44% of the population. The next most represented continent is Asia, 24%, followed closely by Europe, 20%. The remaining 12% are split across Africa, Oceania, and South America. This physics MOOC has a broad geographic reach.

3.3.1.2 Geo-Economic and Income Distributions

Another way of sorting the country distributions is by geo-economics. The UN posted a statistical annex of the countries in 2012 and classified the countries into four categories by per capita GNI: high income, upper-middle income, lower-middle income, and low income (United Nations, 2012 p.137). The following shows the distribution of students by their countries’ assigned category:
The majority of MOOC students come from countries with high income while barely any of the MOOC students come from countries with low income.

While this geo-economic breakdown provides some insight into the level of the countries’ economy, it does not give direct information about the specific wealth of the students. For that, one of the survey questions asked for students’ annual household income in US dollars. This is a figure of the results:
Figure 3-6: Distribution of annual household income of the MOOC students.

The largest fraction of students, 38%, preferred not to answer this question. The rest of the responses are spread evenly across the choices. This spread indicates an even distribution of students within $20k-$100k range. However, this figure shows a greater number of students with <$20k than any other $20k bin. About 10% with an annual household income in the range of $20k-$40k. There are 27% with <$20k of annual household income. Then, the higher brackets have larger ranges of household income with the same number of students in them.

The story told by the figure of annual household income is a significantly different than that told by the geo-economic distribution. While there are more students from countries with higher GNI, there are more students from households with low annual income. A potential oversight of this analysis of wealth is the large number of students preferring not to answer the question on household income or that the traditional student has a low income. The former can be addressed by choosing the subset of students
who preferred not to answer the household income question and running the breakdown by country economy. This analysis is presented in the following figure.

Figure 3-7: Distribution of the countries of the MOOC students who preferred not to provide their annual household income by GNI, as classified by the 2012 UN Statistics (United Nations, 2012). This breakdown is nearly the same as that of the students who did provide that information.

The geo-economic distribution of students who preferred not to answer is nearly the same as the total population. The analysis continues with a specific breakdown for the low annual household income (<$20k), medium annual household income ($20k-$60k), and high annual household income (>=$60k) subsets in Appendix E. The geo-economic distribution for these subsets is not the same as the whole population. For the students with higher annual household incomes, 90% come from countries with higher per capita GNI.
3.3.1.3 Age and Gender Distributions

Another question the demographics survey asked students was about their age. The age distribution of the MOOC students is:

![Age Distribution Graph](image)

*Figure 3-8: Distribution of ages of the MOOC students.*

The most prominent age group is 25-34 while the second most prominent is 18-24. The latter is a typical age range for college-going students. However, the MOOC is used by people of all ages. There are students older than 65 taking the MOOC. There are even children taking the MOOC – with seven younger than 12 and 200 with ages between 12 and 17.

Another of the demographic survey questions asks about gender. The results show that this MOOC’s population is biased towards male students:
These different demographic options can be analyzed further by combining the different measurements.

For instance, what is the gender distribution for each age range? Well:

Figure 3-9: Gender breakdown of the MOOC students.

Figure 3-10: Distribution of ages of the MOOC students with the gendered breakdown included for each age.
This figure shows the same age distribution columns presented earlier, however no with the gender breakdown within each age range. The more prominent ages have slightly more even male-to-female ratio than the whole: both age ranges 18-24 and 25-34 are 33% female. While this is hard to see visually on the figure, we can tell that the older populations are less evenly represented. Indeed, of the 49 students older than 65, only 7 are female. And, while it would be possible to perform a breakdown of gender by country, income, etc., these figures will not be included.

### 3.3.1.4 Educational Backgrounds

Instead, the analysis will continue on with the educational background of the MOOC students. There are several questions related to this on the demographic survey. The first is simply an inquiry into the highest achieved level of education:

![Highest Attained Level of Education](image)

*Figure 3-11: Distribution of education level of the MOOC students.*

This figure shows that many highly educated people were not only interested in the MOOC, but also enrolled and participated to some level. A third of the students hold at least a Bachelor’s degree, a fifth
hold at least a Master’s degree, and nearly 5% have earned their PhD or equivalent degree. In total, 67% of the students have some sort of degree (Associate’s through PhD). What these degrees are for is the subject of the next figure:

![Distribution of types of higher education degrees held by MOOC students](image)

*Figure 3-12: Distribution of types of higher education degrees held by the MOOC students.*

While many, nearly 49%, of the degrees are in the sciences and engineering, there are a number from a diverse range of fields. Unfortunately, there are 29% marked as “Other”, presumably due to the limited list of options presented. In another section of this demographics survey, a student complains: “I have a BA in math from Cornell. Math was not one of your choices?!?!?” which helps name one of those in the “Other” category, but certainly not all of them. Students were able to select multiple degrees, if they had them, and there are more degrees marked than students who took the survey. This means that likely many of these degree holding individuals have degrees in multiple subjects. All of this to say that there is a diverse range of general educational preparedness for the students of this MOOC.
This range of general education leads to a range of physics preparation. The next figure demonstrates the levels of preparation in physics by showing the highest physics course previously taken by the students:

![Graph: Highest Attained Level of Education in Physics](image)

*Figure 3-13: Distribution of previous physics experience of the MOOC students.*

Also, to further parse this information, the next figure is the physics background layered onto the general education levels:
Figure 3-14: Distribution of the educational level of the MOOC students with a breakdown of previous physics experience shown. Demonstrating that the MOOC students with higher education degrees do not necessarily have prior experience with physics.

On the above figure, going from bottom to top, are the lower level of physics background through the higher levels. Most of the students have had some form of previous experience with a physics-based course. The majority of this physics background is introductory, either high school- or college-based. On top of that, nearly a fifth have had physics beyond the introductory-level. This range of physics background is seen for all levels of general education in the latter figure.

3.3.2 Retention

Many MOOCs have experienced high attrition rates and this one is no exception. Over the course of the semester, the participation across multiple areas of content dwindled. The total number of students enrolled in the CU physics MOOC was 15,996, but total number of students who viewed the first lecture is only 6,346 (39.7%). The retention of MOOC students watching – either downloading or viewing on the
Coursera site – lectures is displayed in the figure below along with the lecture-retention for the MOOC students who filled out the demographics survey.

![MOOC Retention on Lecture Videos](image)

**Figure 3-15:** The number of students who participated in each of the lecture videos, either by viewing the lecture on the Coursera site or by downloading it to watch later. Both the total number of engaged students and the number of engaged students who also filled out the demographic survey are included.

The initial large number of lecture viewers falls off very quickly over the first four lectures, dropping 51% to 3,105. The attrition rate lowered as the course continued with 27% of the original number watching the first exam review and 20% watching the second exam review. The last lecture video, the final exam review, saw a rather large spike in activity, nearly doubling the number of students who watched the second to last lecture video. However, taking this sharp peak on the exam review to be an outlier and examining the overall trends by looking at just the number of students watching the penultimate lecture, the final lecture retention was 17%, with only 1,051 students engaged.
The above figure also shows the retention for students who filled out and submitted the demographics survey. This is included to demonstrate the relative sample size of this subset of students. Of the 6,346 students who watched the first lecture, only 1,831 (29%) also filled out the demographics survey. However, the students who did fill out the survey had a significantly lower attrition rate than the MOOC as a whole. So, of the 1,734 who watched the first exam review, 609 (35%) had filled out the survey. For the penultimate lecture video, 333 (32%) of the students watching had filled out the survey at the beginning of the course. This indicates that the students who took the time to fill out one of the introductory surveys were more invested in the course overall. This conclusion is better supported by the retention curves for the participation in the homework assignments.

**MOOC Retention on Homework Assignments**

![Graph showing retention over homework assignments](image)

*Figure 3-16: The number of students who participated in each of the homework assignments. Both the total number of engaged students and the number of engaged students who also filled out the demographic survey are included.*

69
A total of 2,259 students made an attempt at the first homework assignment. This number is significantly smaller than the number of students that watched the first lecture, which is likely indicative of the increased level of involvement required. The attrition rates for the engagement in the homework assignments are higher than those for the lectures. Only 429 (19% of those who tried the first assignment) tried the fifth homework assignment, which was administered alongside the first exam and the first exam review. The ninth homework, which temporally aligns with the second exam, had only 13% participation. By the final homework, just under 11% of the original number made an effort.

The demographic survey subset of students becomes more and more relevant to the whole population of students doing the homework. The subset of students who filled out the demographic survey is 68% and as the course progressed, this number converged quickly to 90%. The demographic cross-sections presented in Section 3.3.1 are more accurate for the students more heavily engaged in the course (ie: doing the homework assignments).

The retention for the exams tells a similar story as that for the lectures and homework assignments. Namely, 543 students took exam 1; 347 students took exam 2; and 283 students took the third, and final, exam. The number of students who actually earned a certificate for successfully completing the course was 225, just 1.4% of the total who enrolled.

The question arises: what, if any, types of students stay through the end and what types leave? To begin to answer this question, the FMCE pre-test can be used and filtered based on the students who continue through the course. The pre-test scores are filtered by the pre-test, each exam, the FMCE post-test, and the certificate earners. The average pre-FMCE score for each of these subgroups increases as students with low pre-scores stop participating. The following figure shows this behavior by showing the quintiles of student performance for each subgroup.
Figure 3-17: Pre-FMCE performance of the MOOC students at various stages of the MOOC. One Box & Whisker for each checkpoint of the MOOC: Pre-FMCE, Exam 1, Exam 2, Exam 3, Post-FMCE, and the Certificate Earners. The leftmost edge of the Box & Whisker shows where the boundary is between the lowest 20% of students and the 20-40% group of students. The left ‘whisker’ indicates the region of Pre-FMCE scores where the lower 20-40% of students reside. The box represents where the middle 40-60% students reside. The right ‘whisker’ represents where the upper 60-80% are. And, the area to the right of the rightmost part of the Box & Whisker is where the top 20% (80-100%) group of students Pre-FMCE scores lie. The average for the group is indicated by a thin line on top of the Box & Whisker for that group. This figure shows a trend for the students with lower Pre-FMCE scores to stop engaging in the MOOC.

The average pre-FMCE score was 44%. However, by Exam 1, the students who were still engaged with the course had an average pre-FMCE score of 58%. By Exam 2, the students still engaged had an average pre-FMCE score of 63%. By Exam 3, 65%. By the post-FMCE, the average pre-FMCE score of the participating students was up to 66% and the Certificate Earners had an average pre-FMCE score of 68%. This same trend is seen for each quintile – each 20% group of students: the lower 20%, the lower-middle 20%, the middle 20%, the upper-middle 20%, and the top 20% – where the pre-FMCE score dividing
point between the quintiles increases with from the set of students who took the pre-FMCE to the set of students who were Certificate Earners. In essence, the group of students who finished the MOOC were the better prepared students from those who originally engaged with the MOOC.

This trend might be explained by instances of negative reinforcement: students who fail an exam or an assignment are discouraged to open the next assignment and continue with the course. Similarly, there might be instances of positive reinforcement: students who succeed on an exam or an assignment are encouraged to continue with that positive reinforcement. And so, the MOOC might be discouraging the lesser-prepared students while encouraging the better-prepared students.

3.3.3 Demographics of Certificate Earners

The demographic survey can be used again to further analyze the students at the end of the MOOC: the Certificate Earners. The same types of analyses as used in Section 3.3.1 will be used again. Similarly to the issue found in Section 3.3.1, this survey can only provide information about the students who chose to fill it out. There were a total of 225 Certificate Earners, but only 68 (30%) filled out the demographics survey. The following is an analysis of those 68 students.

3.3.3.1 Geographic Distribution

The students come from 31 different countries and three of the students didn’t provide their country. The most represented country, with 21 students making up 31% of the population, is the United States. India is the second most represented country with only 5 students, 7% of the population. The Netherlands, Brazil, Mexico, and Spain are the next tier of representation with 3 students, 4% of the population, each. Greece and South Africa each have only 2 students and then there are 23 countries which each have only 1 student. To get a sense for how these students are spread throughout the world, the following figure shows the distribution of students by continent.
The countries with only one or two students tend to cluster in Asia and Europe, making those continents the second and third most represented. This distribution did not change drastically. By percentages: North America has 37% (down from 44%), Europe has 26% (up from 20%), Asia has 23% (down from 24%), South America has 9%, Africa has 3%, and Oceania has 2%.

### 3.3.3.2 Geo-Economic and Income Distributions

To get a sense for the economic well-being of these students there are, again two measures. The first is the geo-economic distribution and the second is the reported annual household income. For the Certificate Earners, there is not a very large change for the number of high or low income countries represented. However, there is a large change for distribution of students in the middle income countries, tending to favor the upper-middle income countries. The breakdown is demonstrated in the figure below.
The favoring of the upper-middle income countries is not similarly reflected by any significant changes in the distribution of reported annual household income, found in the following figure.

*Figure 3-19: Breakdown of the MOOC Certificate Earners’ countries by GNI, as classified by the 2012 UN Statistics (United Nations, 2012)*

*Figure 3-20: Distribution of annual household income of the MOOC Certificate Earners.*
There is the same large percentage, 38%, which preferred not to answer. There are 26% with household incomes <$20k and the other bins each have about 10% of the population each. This indicates that there is not a large dependence on wealth which separated those who finished with those who did not.

3.3.3.3 Age and Gender Distributions

The next pieces of demographic information to delve into are the age and gender distributions. These distributions are provided in the following figures.

![Age Distribution of Certificate Earners](image)

*Figure 3-21: Distribution of ages of the MOOC Certificate Earners.*

The average age of the MOOC population increased by one range from 25-34 to 35-44. There is also a more normalized distribution of ages than there were at the beginning. The original set of students were prominently either 18-24 or 25-34. The distribution of Certificate Earners favors the typical college-student age-range even less. There are no children <12 years old who stayed through and earned the certificate, but there were a few adolescents between 12-17 years of age.
The gender breakdown also changed significantly. There were originally 30% women and there are only 16% women who were Certificate Earners. The gender breakdown can also be analyzed across the different age groups, as demonstrated in the following figure.

Figure 3-23: Distribution of ages and gendered breakdown of the ages for the MOOC Certificate Earners.
The gender distribution across the age groups is more even than it was originally. Originally there was a higher percentage of women in the 18-24 and 25-34 age ranges. For the Certificate Earners, there is actually the highest percentage of women in the 12-17 and 65+ age ranges, each with one of the three being female. There are, however, no women in the 55-64 range.

3.3.3.4 Educational Background

The final analysis will be for the population’s overall education. The first two figures show the distribution of degrees and the types of degrees.

![Highest Attained Level of Education of Certificate Earners](image)

*Figure 3-24: Distribution of educational level of the MOOC Certificate Earners.*
There are only 6 students, <10%, who do not hold any type of degree. The most prominent level of education is at the Bachelor’s and Master’s Degree level. These degrees are mostly in engineering and the ‘other’ category. The people who finish the MOOC are better educated than the people who originally enrolled.

As for the Certificate Earner’s previous physics experience there is not a very large change in the distribution.
There are still some who had never taken a physics course and there are still some who had taken graduate-level physics courses. The previous physics experience of the group does not significantly change, even though, as seen in Section 3.3.2, there was a higher percentage of high scorers on the pre-FMCE than there were originally.

3.3.4 Student Engagement in Course Content

In the papers examined in Section 1.2.1.4, *Who does what in a massive open online course?* by Seaton et. al., the level of student engagement is analyzed based on which resources students accessed and how students were using each resource. The study looked into specific clicks made by students and measured the time in which a browser window was opened to perform this analysis. While these types of data are available for this MOOC, the level of the analysis is beyond the scope of this paper. However, a similar analysis of student engagement in the course materials can be made which relies on
the number of unique student interactions with the different content. In the following figure, the number of unique students engaged in the course content is plotted over the time period of the course:

Figure 3-27: This figure presents how the MOOC students engaged in the various content of the MOOC. The * indicates that the discussion boards data is different from the data for the other content because there is not a similar data stream. The lectures, homeworks, exams, and surveys numbers represent the number of unique students who participated in those activities and the time represent the due date for that content. The discussion boards numbers represent the number of views a discussion thread has and the time represents the last time a user viewed the thread.

The due date for each lecture, homework assignment, or exam is used to place these data temporally. The surveys (demographic survey, pre-/post-FMCE, and pre-/post-CLASS) are also included in the exams category. The engagement in the discussion boards is measured in a different manner based on the total number of views received by each specific forum thread. Each forum thread is then located temporally by the latest activity, or post. As the discussion boards are measured in this slightly different way.
manner, there is an expected over counting: the number of views on a thread can be counted multiple
times based on the engagement across multiple threads for each individual student.

The figure above presents the same trends found in the Section 3.3.2 for the retention on lectures,
homework assignments, and exams, but all together. Generally, the number of engaged students falls
off over time. This same behavior is found in the level of engagement in the discussion boards, with
some slight differences. At first, the discussion boards retain roughly the same level of engagement.
Then, after a few fluctuations, the numbers drop off to a smaller level of engagement.

The level of engagement in each activity for the entire set of MOOC students is different from the level
of engagement for the Certificate Earners. To get a sense for how the Certificate Earning subgroup
engaged the various pieces of content, the same data is plotted for just the Certificate Earners in the
following figure.
This figure presents how the Certificate Earners of the MOOC engaged in the various content of the MOOC. The * indicates that this figure only represents the 68 (30%) of the Certificate Earners who filled out the demographic survey. The Certificate Earners all participated in the exams and homework assignments, which were for credit, and mostly all watched the lectures, which were not for credit. This figure was made to parallel results from a previous study on MOOCs, presented in Figure 3-29 below.

The engagement in the discussion boards could not be ascertained in the same way, so it is left out of this figure. The Certificate Earners are actually less engaged in the lecture videos, relative to the other content, than all of the MOOC students are. One likely cause for this is that the Certificate Earners had to submit all of the exams and homework assignments, but the lecture videos were not required for credit. For the more casual participant in the MOOC, just watching lecture videos might be enough.

As these figures were made to parallel one of the results from the Seaton et. al. study Who does what in a massive open online course?, which had just over 150 Certificate Earners, a figure from the study is
The authors of this paper used the full clickstream of the Certificate Earners data from the MOOC they ran, whereas this thesis used numbers of participants from submissions. While these methods are different, the figures demonstrate similar types of information. What the Seaton et. al. study demonstrated for their MOOC was that the lectures videos and homework were the most engaged activities while the discussion forums gained engagement over the course of the MOOC (Seaton, 2014).
This is slightly different from what the Physics 1 for Physical Science Majors MOOC numbers showed for all of the students and for just the Certificate Earners. Where the lecture videos are the highest engaged in one MOOC, they are the lesser engaged in the other. A similar finding from the study and from this thesis is that the Certificate Earning students do not engage the not-for-credit content as much as they do the for-credit content. To see if this is true for the clickstream data of the CU MOOC could be the topic for a future study.

3.3.5 Homework Assignments

It is challenging to develop a clear sense of the student performance on the homework assignments. As demonstrated in Section 3.2.5, there are more students watching the video lectures than there are participating taking the homework assignments. Similarly, the retention of students in the course means that the set of students who submitted any one assignment will be different from that which submitted the other assignments. In addition to this, the students were provided multiple submissions to help circumvent problems with internet connectivity and any other unforeseeable issues. However, this also means that students could submit an assignment once and then resubmit it again for a better score. For the purposes of grading, Coursera uses the best scoring assignment. This latter component is similar to the brick and mortar PHYS 1110 course, which allows for multiple attempts on each homework question, but the retention issues still present a problem for analyzing the homework performance.

To account for the retention issues, the homework averages presented here are for the MOOC students who demonstrated a higher level of commitment to participating in the MOOC, by attempting at least one of the exams, and then also for the Certificate Earners. As can be seen in the following figure, the averages are generally greater than 80%.
The subset of Certificate Earners has a consistently higher average homework score. This difference can be better understood by looking at the overall average across all of the homework assignments: 83.6% for students who participated in at least one exam and 89.3% for the Certificate Earners.

### 3.3.6 Exams

The exam averages show a similar trend as the homework assignments where the Certificate Earning students score higher than the rest of the participating MOOC students.
3.3.7 FMCE

There were 1,492 students who attempted the pre-FMCE. However, after these participants are filtered by the number of blanks left by each student, the number of usable pre-FMCE scores is 997. These 997 students had an average score of 44% with a distribution seen in the figure below.
As presented in Section 3.3.3, the number of active students dwindled over the course of the MOOC. This meant that only 197 students attempted the post-FMCE. After applying the same filtering process to remove students who left too many answers blank, the number of usable post-FMCE scores was 185. The average post-FMCE score of these 185 students was 82%. However, as discussed in Section 3.3.3, the average pre-FMCE score of the students that persisted was higher than the initial average pre-FMCE score of all the students who took the pre-FMCE. As such, these averages – an average pre-score of 44% and an average post-score of 82% – cannot be used for determining the effectiveness of the MOOC.

Instead, the intersection of the pre- and post-FMCE scores will be used to find a set of students with matched pre-/post-FMCE scores. The process of matching the two groups yields a set of 136 students who took both the pre-FMCE and the post-FMCE. The following figure shows the distribution of these 136 students’ pre-FMCE scores as compared to the original distribution of pre-FMCE scores.

Figure 3-32: Pre-FMCE Distribution for all of the MOOC students who took the Pre-FMCE.
Figure 3-33: Pre-FMCE Distributions for all of the MOOC students who took the Pre-FMCE and for all of the MOOC students with matched pre-/post-FMCE.

The high attrition rates have removed many of the students, but more of the lower-scoring students left than did the higher-scoring students. This shift is seen in the average pre-FMCE score which is 68% for the matched subset, 24% higher than the original average pre-FMCE score.

3.3.7.1 Overall Performance

The overall performance of this set of matched pre-/post-FMCE students can be calculated. The distribution of these matched scores is displayed in the following figure.
For all of these pre-/post-matched MOOC students: the average pre-FMCE score was 68% and the average post-FMCE score was 85%. The relative gain on these averages is 0.53 and the average relative gain is 0.54 (where 16 of the 137 pre-FMCE scores were 100% and are excluded from the calculation of the average relative gain).

These FMCE results can be further analyzed by breaking down different subgroups and seeing how they compare.

3.3.7.2 FMCE Performance of Certificate Earners

An important subgroup of the MOOC students is the group of students who earned the certificate for completing the course above a certain level of achievement. These Certificate Earners are, essentially,
the students who successfully completed the course. Of the 225 Certificate Earners, only 42 had matched pre-/post-FMCE scores with a distribution displayed in the following figure.

For these pre-/post-matched Certificate Earners: the average pre-FMCE score was 75% and the average post-FMCE score was 91%. The relative gain on these averages is 0.65 and the average relative gain is 0.73 (where 6 of the 45 pre-FMCE scores were 100% and are excluded from the calculation of the average relative gain).

To see the comparison of the Certificate Earning subgroup with the rest of the pre-/post-matched students more directly:
Figure 3-36: Average Pre-/Post-FMCE score comparisons for MOOC Certificate Earners versus all matched pre-/post-FMCE students in the MOOC. Error bars represent the standard deviation of the averaged data.

3.3.7.3 Breakdown by Self-Reported Physics Background

Another way to look into the FMCE distributions is to separate the students by the amount of physics background they had before taking the MOOC. This can be done with the demographics survey, which will limit the number of data points to those who took both the pre-FMCE, the post-FMCE and then also filled out the demographics survey. However, the little data that are available to do this type of breakdown can help better understand how different types of students learn from the MOOC.

Using a filtering process on the demographics survey to select a subset of students that took both the pre- and post-FMCE produces the following distribution of physics backgrounds:
Some students selected multiple responses, but this is accounted for by binning students into three categories: no physics background, only high school physics background, and college physics and beyond. Any student that marked any college physics experience is binned into the last category. Any student that marked only high school or never taken physics is binned appropriately. Those students that preferred not to answer are not considered in this analysis.

With the three subsets selected, the FMCE analysis is possible. After applying the filter for the number of blanks left, the final numbers are: 8 students with no physics background, 40 students with only a high school physics background, and 85 with college physics and beyond. The pre-/post-FMCE distributions for each of these subsets of students are included in the Appendix E.
Figure 3-38: Average Pre-/Post-FMCE score comparisons for different physics preparation of students in the MOOC.

Error bars represent the standard deviation of the averaged data.

For the 8 students with no background in physics, the average pre-test score was 43\% and the average post-test score was 72\%. The relative gain on these averages is 0.50 and the average relative gain is 0.54.

For the 40 students with only high school background in physics, the average pre-test score was 64\% and the average post-test score was 82\%. The relative gain on these averages is 0.50 and the average relative gain is 0.46 (where 2 of the 40 pre-FMCE scores were 100\% and are excluded from the calculation of the average relative gain).

For the 85 students with college and beyond background in physics, the average pre-test score was 76\% and the average post-test score was 90\%. The relative gain on these averages is 0.56 and the average

93
relative gain is 0.48 (where 10 of the 85 pre-FMCE scores were 100% and are excluded from the calculation of the average relative gain).

This analysis is limited by the small numbers present to work with, but still demonstrates the differences between these groups. For one, there are very few students with no prior physics background who completed these parts of the MOOC. There are ten times as many students with college-level physics experience as there were students without any physics experience. The better background is evident in the average pre-test scores, with the better prepared students’ pre-test scores even surpassing the post-test scores of the lesser prepared students. The relative gains for each group are quite similar, though it is difficult to properly analyze the gains when there are students scoring 100% on the pre-test.

3.3.7.4 Breakdown by Gender

Yet another breakdown that is possible using the demographics survey is by gender. Using the same process as described for the breakdown by physics background, but this time with male students and female students, there are 111 male students and 23 female students available for analysis.
For the 111 male students, the average pre-test score was 71% and the average post-test score was 87%. The relative gain on these averages is 0.55 and the average relative gain is 0.54 (where 15 of the 111 pre-FMCE scores were 100% and are excluded from the calculation of the average relative gain).

For the 23 female students, the average pre-test score was 53% and the average post-test score was 74%. The relative gain on these averages is 0.45 and the average relative gain is 0.53. (where 1 of the 23 pre-FMCE scores were 100% and are excluded from the calculation of the average relative gain).

This thesis will not delve into a full gender analysis, but presents these results to demonstrate another possible further study involving the data made available by the MOOC. A previous study done on the brick and mortar course to analyze any potential gender differences found that there are many differences between the genders in terms of their preparation for the course, experience with the
course and outcomes from the course (such as grades) (Kost, 2009). However, interestingly, the authors find that, “...when we bin students by pretest score, we find no difference in post-test scores between males and females with similar pretest scores.” (Kost, 2009 p.12). The results of this study on the brick and mortar course are included in the figure below.

![Figure 3-40: Post-FMCE averages binned by Pre-FMCE score and split by gender to demonstrate gender differences. The error bars represent the standard deviation of the averaged data. The percentages above each bar represent the portion of students from the gender which are found in that pre-FMCE bin. Figure taken from a previous research study of gender differences in the PHYS 1110 brick and mortar course. (Kost, 2009 p.7)](image)

The results in the above study used much larger sample size, >2000, than the MOOC provided, but the same type of analysis can be performed for the MOOC and is included in the following figure.
Figure 3-41: Post-FMCE averages binned by Pre-FMCE score and split by gender to demonstrate gender differences in the MOOC. This figure was made to parallel Figure 3-40 which is taken from previous gender research on the PHYS 1110 brick and mortar course off of which the MOOC is based. The error bars represent the standard deviation of the averaged data. The percentages above each bar represent the portion of students from the gender which are found in that pre-FMCE bin and the * indicates only 1 student in the bin.

The students who scored higher on the pre-FMCE show smaller gender gaps on the post-FMCE than the students who scored lower on the pre-FMCE do. This is different from what the study of the brick and mortar course found, but may be in part due to the smaller sample size. A more in-depth analysis of gender issues on the MOOC platform could be explored in future research.

3.3.8 CLASS

The Colorado Learning Attitudes about Science Survey was administered similarly to the FMCE: as a pre-test at the beginning and then as a post-test at the end. There were 1,817 students who took the pre-
CLASS and 198 who took the post-CLASS. The pre-CLASS indicated a population of students with beliefs that are already well-aligned to the expert-opinion.

To analyze how the MOOC affected students’ attitudes about science, only the students who filled out both the pre-survey and the post-survey can be used; there were 183 students with matched pre-/post-CLASS results. An in-depth analysis of the CLASS results for the full pre-survey and the full post-survey, and the matched pre-/post-subset is included in Appendix E. The following is a brief overview of the results for all of the matched students and for the matched Certificate Earners.

### 3.3.8.1 Overall Effects

The overall results of the pre-/post-analysis are demonstrated by the following figure.

![Overall CLASS Shifts for MOOC Students](image)

*Figure 3-42: CLASS shifts for the MOOC students. Results show a slightly positive shift. Analysis produced using the CLASS Excel tool developed by Adams and Perkins.*
The CLASS indicates that the MOOC has a slightly positive effect on the students’ beliefs. These improvements were made in all of the areas, but more notably in the areas of General Problem Solving and Problem Solving Confidence. There was both a shift towards expert-like thinking and a shift towards novice-like thinking in the area of Applied Conceptual Understanding. All of the shifts in all of the categories are demonstrated in the following figure.

![CLASS pre/post: PRE and POST](image)

*Figure 3-43: Pre-/Post-CLASS Distribution of the MOOC students. Displaying the % of student responses which are favorable (expert-like) vs the % of student responses which are unfavorable (novice-like). Analysis produced using the CLASS Excel tool developed by Adams and Perkins.*

This figure demonstrates the students’ trend to be more favorable and expert-like. There were 6 questions in which students showed a shift towards more expert-like opinions. There were 2 questions in which students showed a shift towards more novice-like opinions.
3.3.8.2 **CLASS Measures of Certificate Earners**

The number of pre-/post-matched Certificate Earners is 163, which is 89% of the total set of matched pre-/post-surveys. Because the Certificate Earners make up such a large percentage of the overall analysis, there are very similar, if not better, results.

![Overall CLASS Shifts for Certificate Earners](image)

**Figure 3-44**: CLASS shifts for the MOOC Certificate Earners. Results show a slightly positive shift. Analysis produced using the CLASS Excel tool developed by Adams and Perkins.
Comparatively, these figures demonstrate the same trends as the original data. The better shifts are seen in the actual question-by-question breakdown, which is included in Appendix E. There were 7 questions where the students demonstrated a shift towards expert-like opinions while only 2 questions had shifts towards novice-like thinking.

### 3.3.8.3 CLASS Measures of Non-Certificate Earners

While the Certificate Earners are an important subgroup, there are the remaining 20 students who took both the pre- and post-CLASS and did not earn certificates. These 20 students had similar pre-CLASS scores. However, this group actually shows a degradation in their attitudes and beliefs about science. There are 9 questions in which the students show shifts towards more expert-like thinking while there
are 14 which show shifts towards more novice-like beliefs. The differences between the Certificate Earners and these non-Certificate Earners can be further explored because of these 20 students, 18 filled out the demographics survey. The continuation of this analysis, however, will can be found in Appendix E.

3.3.9 Non-Standard Measures of Success

The measures of success so far mentioned are all similar in that each is used to determine how well the students are learning physics and what it means to be a physicist. These measures are critical for assessing how well the course is introducing and teaching the subject to the students. However, these types of measures can only address one aspect of the MOOC’s goals. The other goals that are left unaddressed are discussed below along with possible or existent measurement tools.

3.3.9.1 Goals of the Students and Users of the MOOC

The initial MOOC population was discussed in Section 3.3.1 which demonstrated the wide range of demographic subgroups participating in the MOOC from the beginning. Some of the specific goals and expectations for these students were also discussed in Section 3.2.5 wherein it became clear that not every student approached this MOOC in order to learn the physics content provided. Some students initially took this course to improve their English while others took this course to learn pedagogical techniques for teaching in their own classrooms. One such example, posted in one of the forums:
In future studies of MOOCs’ impacts, it could be worth determining a means for measuring these outcomes.

3.3.9.2 Publicity, Advertising and Recruiting for the University

Another goal of the MOOCs comes from the administrative side of the implementation. These goals are for publicity and recruiting. As Prof. Lightner describes, “it’s a great way to advertise...can we get what we’re doing out there?” (Lightner, October 8, 2013 T.0:39:09). And, as Dean Sieber describes, we could, “…recruit the best students...give Fellowships to the top 50 students who finish the MOOC...and end up getting students we would never, would never otherwise have attracted...” (Sieber, October 24, 2013
T.04:51). One of the students of the physics MOOC posted in the forums their appreciation for CU MOOC:

![Comment](image)

*Figure 3-47: Screenshot of a comment left by a student in the CU physics MOOC forums. Comment found by Kate Goodman of the CU PER Group.*

While there is not yet any reliable means, except finding similar posts in the forums, for measuring the advertising capabilities of the MOOCs, these avenues are still possibilities to consider for future studies.

### 3.4 Summary

The data presented in Section 3 reaffirms several of the conclusions found in previous MOOC studies:

- MOOCs have a very broad reach and very low retention rates. The initial enrollment of the MOOC was almost 16,000. This thesis found the low retention rates across the different content with a retention rate of 17% on the lecture videos and 11% on the homework assignments as well as an overall completion rate of only 1.5%.

From the demographics survey administered, which represents approximately 30% of the active students, we find that the MOOC students lived in countries from all over the world and had a large spread in age, gender, educational level and background, physics background, etc. This study found that the retained 1.5% of students were different than those who started the MOOC: generally older (mode age at 35-44 vs. at 18-24/25-34 starting), more male (84% vs.
67% starting), better educated (83% with degrees vs. 67% starting), and had a better initial knowledge of physics (pre-FMCE average of 75% vs. 68% starting).

The MOOC environment demonstrated surprising outcomes for the students who did finish: both high normalized learning gains on the FMCE (0.65) and positive shifts in the Certificate Earners’ attitudes and beliefs about science on the CLASS (+3% overall). These outcomes are surprising because the MOOC students’ absolute learning gains, as measured by the FMCE, were relatively small. The MOOC Certificate Earners were already well educated and had high pre-scores on both the FMCE and on the CLASS. In short, the MOOC served an audience that came in with a significant level of mastery of the domain both in terms of content mastery and attitudes and beliefs.

This thesis demonstrated that a MOOC created from an already existing course can be inexpensive, but not free. Comparatively little money (tens of thousands vs the hundreds suggested) was invested to create the CU MOOCs. However, the time input required of the instructors was high and took away from non-MOOC related work. For the physics MOOC, the time the instructor spent monitoring or developing MOOC content was time not spent monitoring and helping the on-campus course’s students. The MOOC instructors were also deaf to most of the standard face-to-face feedback that can be provided by students; the communication modes for the MOOC are limited. All of the social cues provided by students in an on-campus lecture hall are non-existent in a MOOC. MOOC students cannot meet the instructor in-person to get help or provide feedback on the course. Students can only provide feedback to the instructors via the discussion forums. This serves to distance the instructor and lead to an overall dissatisfaction in teaching the MOOC.

Future avenues for studying the MOOC includes performing correlational studies between the different MOOC content and the demographic information provided by the students. For instance, future correlational studies could attempt to answer some of the following questions. Is there a correlation
between the students’ performance on the pre-FMCE and their scores on any one of the exams? Is there a correlation between students’ level of participation on the homework assignments and their scores on any one of the exams? Is there a correlation between the students’ reported age/country/annual household income/etc. and their retention in the MOOC? Is there a correlation between the students’ participation in the lecture video content and their performance on the exams? There are plenty more avenues for correlational studies to delve into how students’ engagement of the different MOOC content affects their performance or retention. If we were to match students in the MOOC to the “brick and mortar” students, how do these environments compare for similarly prepared students on entry?

Another avenue for future research into the MOOC would require additional information not already available. These studies would be longitudinal: looking at how the MOOC students actually apply what the MOOC taught. This type of study would require the development of an exit survey to be administered to the students who finished the MOOC, if that is possible. A different type of study could explore the broader impacts of the MOOC, beyond what the homework assignments, exams, FMCE and CLASS can measure, and looking into how the MOOC affects students’ identity and what type of community, if any, the MOOC provides for students.
4 RESIDENTIAL COLLEGES OF CU BOULDER

The Andrews Hall Residential College is the primary focus of this part of the thesis. However, the first and second research questions are designed to be more general for presenting a basis for understanding the AHRC and other similar communities. As such, a second residential community will be used to begin to generalize the data from the AHRC. This second community is the Global Engineering Residential Academic Program (GE RAP).

4.1 RESEARCH QUESTION 1: WHAT DOES IT TAKE TO MAKE A RESIDENTIAL COMMUNITY?

For the creation of these residential communities, there are several key components required:

- A physical space
- A live-in faculty
- A vision and identity for the community
  - A unifying first-semester course
  - Website and online application
- Student leadership

Each of these components can be found in the histories of the two residential communities examined in this thesis. In Sections 4.1.1 and 4.1.2, the details for how the two communities were created will be presented in greater detail.

4.1.1 How was the AHRC Created?

The origin story of the AHRC actually begins with the formation of Engineering Honors Program (EHP), Section 4.1.1.1. The AHRC was originally intended to be solely dedicated to EHP, though it evolved to encompass both EHP and the GoldShirt (GS) Program. The GS Program, along with the GEEN 1010 preparatory physics course, will be further detailed in Section 4.1.1.4.
4.1.1.1 The Formation of EHP

Early decisions for beginning an honors program in the College of Engineering and Applied Sciences (CEAS) began in 2004. One of the CEAS Associate Deans brought together a committee of faculty to discuss: “...the simple question: ‘Are we providing the best possible education for our very best students?’” (Douglass, October 13, 2013 T.0:02:10). The committee came up with two answers to the question posed. Firstly, the committee agreed that the courses and curricula of CEAS were rigorous and challenging enough for all of the CEAS students. In contrast, the committee agreed that there was insufficient structure and support for CEAS students outside of the classrooms, that there had: “always been incredible opportunities...but it was somewhat haphazard whether or not they [the students] would find these things.” (Douglass, October 13, 2013 T.0:03:56). In order to address the insufficiencies in the informal and out-of-the-classroom educational experience for the very best CEAS students, the committee recommended to the Deans that Professor Scot Douglass be the founding director of EHP (Douglass, October 13, 2013).

Professor Douglass is an Associate Professor in CEAS with an appointment in the Herbst Program for Humanities. His vision for EHP was one of a residential community. This vision aligned with the strategic plan for the CU campus called Residential Campus Vision 2020 which was, in 2004, still accepting applications for programs interested in moving into a newly remodeled residence hall (University of Colorado Boulder, 2014c). The Vision 2020 was inspired by the Oxford and Cambridge models and Prof. Douglass’s proposal, “...included the first ever proposal for a faculty in residence” at CU for, “…promoting the community on an organic, day-to-day level..., not only the vertical integration between students, but also the family, with children, pets, just normal life things.” (Douglass, October 13, 2013 T.0:06:36; T.0:06:45). The proposal would eventually be accepted, but Prof. Douglass would
not be scheduled to move into Andrews Hall until 2009 due to the ongoing competition and remodeling schedule of Vision 2020.

Instead of waiting for the proposal to be accepted and for a Residence Hall to be renovated, Prof. Douglass began EHP in 2006 without a residential component (Douglass, October 13, 2013). The first class of EHP had 24 students, all individually invited by Prof. Douglass. These students lived in various Residence Halls across the campus and so the unifying aspect of the program was the first-semester course invented by Prof. Douglass: Critical Encounters, a more detailed explanation of which can be found in Appendix F. As Prof. Douglass explains: “Critical Encounters establishes all the framework, establishes the vocabulary, establishes the goals...[and] is also the way to ask students to-to buy into the vision” of EHP (Douglass, October 13, 2013 T.0:10:23). With the class of 2006 and Critical Encounters, EHP had begun.

In the following year of 2007, Prof. Douglass had drafted an online application process and used it to accept 45 more students. As the first step towards a residential-based community, these 45 students moved into Hallett Hall to live together (Douglass, October 13, 2013). The first student leader, referred to as SL1, stepped up that year to be a Residential Advisor (RA) in Hallett Hall and live with the new students. The Critical Encounters course also provided a means for student leadership wherein Prof. Douglass, “set-up recitation sections led by non-first-year students.” (Douglass, October 13, 2013 T.0:12:30). The precedent set in the second year of EHP continues through to the current year of the AHRC with student leaders stepping up to be RAs and to be recitation leaders for Critical Encounters.

In the third year of EHP, with the entering class of 2008, there were 60 new students accepted to the program. This year saw the first informal student mentors:
I [Scot] gave stipends to encourage six students who had emerged as leaders, or who were beginning to emerge as leaders, including [SL1 who]...was no longer an RA in the Res-Life system, but we had two RA’s, who also were from EHP, as we attempt to do that...” (Douglass, October 13, 2013 T.0:17:54)

With the six students and two RAs, there was one junior, seven sophomores, and 60 freshmen composing the entire on-campus component of EHP, all housed in one wing and on one floor of Hallett Hall, thus enhancing the intentionality of having these students in the same living space as each other (Douglass, October 13, 2013). The recitation leaders for Critical Encounters included both juniors and sophomores from both on- and off-campus.

4.1.1.2 Moving into Andrews

During the 2008-’09 school year, the Andrews renovation was nearing completion. The six informal mentors living in Hallett were tasked not with scheduling programs or events, but rather with trying to think about and live out their ownership of the residential community such that the first-year students would buy into it as well. The CU Boulder campus’s residential culture at that time was largely defined by the freshman because, “the number of students who returned was less than 2%, that it was, like, 98+% first-year students.” (Douglass, October 13, 2013 T.0:07:30). With Andrews on the horizon Prof. Douglass said:

...we wanted as many of those first-year students returning to the following year as sophomores, kind of bucking the culture. This is the first attempt that we really did of trying to change the Res-Life culture. (Douglass, October 13, 2013 T.0:19:16)

The mentors were largely successful at this and many of the traditions and major events of Andrews, like the Open Mic Nights, were created. By the time the EHP students were given a tour of the skeleton of
Andrews and shown all of the prints detailing room numbers and locations, 41 of the 60 of the freshmen (68%) were committed to moving into Andrews the next year. To fuel this excitement, and practically organize the students, the first room/roommate sign-up session was created. For this process, a randomized lottery of all the EHP students intending to live in Andrews was set-up. This method for room/roommate selection has been used each year since, with a stipulation that each class of students (first-year, second-year, etc), beginning with the oldest, have a separate lottery.

The counter-culture excitement to return to live on-campus in Andrews Hall can also be seen in the older EHP students who had moved off-campus after their first year. There were a total of 14 juniors, from the class of 2007, moving into Andrews. Of these, 7 lived in Hallett their sophomore year and 7 had lived off-campus. Similarly, there were 4 seniors, from the class of 2006, who moved into Andrews. Of these, one was SL1 who became the Senior RA (SRA) for Andrews Hall. The other three had lived off-campus for their sophomore and junior years. Prof. Douglass describes this:

...there was this enticement back of students who had already lived off-campus and had tasted what life was off-campus and then had chosen, out of a commitment to the success of the program, I think, to move back. (Douglass, October 13, 2013 T.0:24:30)

The three seniors took the rooms across the hall from the Douglass Apartment, setting another precedent for those students committed to the community and the vision to occupy that living space. Between all of the returning classes, there were 59 upperclassmen living in Andrews Hall during that first year making it 26% upperclassmen, 13 times more than the average percentage across the campus (Douglass, 2014).

Between the returning upperclassmen and the new class of freshman, EHP students occupied 129 of the 227 Andrews Hall beds, making up 57% of the population (Douglass 2014). The rest of Andrews was
then opened up and offered to the 12 first-year GS students. Andrews was opened up further to other students affiliated with the CEAS’s Broadening Opportunities through Leadership and Diversity (BOLD) center, which got another 34 students. The rest of the space was then filled with students from the College of Arts & Sciences (A&S) who had majors aligned with the engineering mentality, meaning chemistry, physics, biology, etc. (Douglass 2014).

4.1.1.3 Building the Andrews Community

The vision and mentality of vertical integration between the first-, second-, third-, etc.-year students was established with the EHP students in the years preceding the move into Andrews. This already established community set the tone and was:

...very successful in terms of turning around this behavior culture that was true of all the dorms...that very first year we had 8-10 judicial write-ups, for the year, we had...students in here who would have been in other dorms. And...somehow the culture we set from the beginning won the day. (Douglass, October 22, 2013 T:0:33:25)

The community of Andrews was established by the returning EHP upperclassmen right from the beginning. And yet, Andrews was not immediately the same as the AHRC it is today because the different student groups remained, fundamentally, separated. Amplifying this separation, the unifying potential of the Critical Encounters course was limited because it only reached the EHP students. In essence, a tipping point of engaged students and culture had been established, but there was no coordination between the different programs and student groups. With each successive year, however, these issues could begin to be addressed.

One of these issues solved itself as more and more students returned for a second, third, etc. year. The number of returning students and the number incoming freshmen to the EHP and GS quickly reached a
steady-state which nearly filled the whole of Andrews (Douglass, 2014). The identity issues for these programs evolved accordingly and, in the fall of 2012, Prof. Douglass opened up the Critical Encounters course to the GS freshmen while simultaneously inviting GS leaders to be recitation leaders (Douglass, October 22, 2013). This move lessened the sense of the EHP identity, but strengthened the sense of Andrews’ identity (Douglass, October 22, 2013). Critical Encounters could serve as the identity-building course for nearly all of the first-year Andrews students as students of the AHRC.

In 2013-2014 academic year, the fifth year of Andrews, the different identities are still being sorted out: where the AHRC ends and EHP or GS begin. However, at this point, nearly all of the students from the first year of Andrews have graduated from CU. This leads to an interesting time in the history of the AHRC because the identities of the two major programs, and the AHRC itself, are, “trying to just substantively create a sustainable culture that has its expectations pitched about the things that are really worthy of the hard work it takes to make this work” (Douglass, October 22, 2013 T.0:07:55). This excerpt is meaningfully vague, in the sense that, creating a sustainable culture does not seem to have one simple solution. However, the solutions chosen should be worthwhile and will take energy and input from both Prof. Douglass, the live-in faculty, and the student leadership.

4.1.1.4 The Subgroups of AHRC Students

Although the AHRC was originally intended for EHP, the community developed to include the GS Program, BOLD students, and other students. The total number of students involved with Andrews Hall and the AHRC through the years (including the first-, second-, and third-year EHP students who were a part of the formation of EHP) is 834. The following sections will detail the programs not already described and each group’s relative representation in the AHRC over the years.
4.1.1.4.1 EHP – Engineering Honors Program

The details of the formation of EHP and its relationship to the AHRC are described in Section 4.1.1.1. This subgroup of students consists of the largest fraction of students: of the 834 AHRC students, 421 (50%) are EHP students (Douglass, 2014). This is reflected in the current year, 2013-2014, of the AHRC: of the 227 AHRC students, 107 (47%) are EHP students (Douglass, 2014).

4.1.1.4.2 GS – GoldShirt Program

The GoldShirt Program’s first year coincided with the first year of the Andrews community, in 2009, and had an initial 16 students (Ennis, 2011). The:

GoldShirt Program is designed to provide a performance-enhancing preparatory year for highly motivated students who lack adequate preparation for engineering as they complete high school. (Ennis, 2011 p.3)

This preparatory year then sets the GS students up to graduate from CEAS within five years. The program expanded to have roughly 30 new students each year who are required to live in Andrews for their first two years at CU (Ennis, 2011).

The admission process for GS students begins when students apply to CEAS. The college selects students to admit and then the GS administration combs through the students who were not admitted and searches for candidates with high standings at their high school (Ennis, 2011). These candidates are then interviewed in-person by the director of the GS Program. Students selected for the GS Program are admitted to CEAS and provided a $2,500 scholarship (Ennis, 2011).

The requirements for graduation from CEAS remain the same for GS students as for non-GS students (University of Colorado Boulder, 2012b). The first year of coursework, however, is different as the GS students are required to take a series of preparatory courses to address any deficiencies in their pre-
college education. The first-year students all take the same courses together, including GEEN 1010: Engineering Explorations through Physics, the preparatory physics course. In the first years of the program, the physics preparation course was PHYS 1000: Preparatory Physics, which was taught by the GS Program director. In 2013, the course changed to GEEN 1010 and became more laboratory-based, as described in Section 1.2.3.2 (Stites, 2013).

This subgroup of students is tied as the second largest fraction of students within the AHRC: of the 834 AHRC students, 130 (16%) are GS students (Douglass, 2014). The GS students comprise an even larger portion in the current year, 2013-2014, of the AHRC: of the 227 AHRC students, 59 (26%) are GS students (Douglass, 2014).

4.1.1.4.3 BOLD – Broadening Opportunities through Leadership and Diversity

The Broadening Opportunities through Leadership and Diversity (BOLD) center is actually open to all students of CEAS to participate in events, study sessions and more (University of Colorado Boulder, 2012a). As such, the EHP and GS students could both be considered BOLD students. The GS Program is actually run through the BOLD center. However, the BOLD students in the AHRC are typically students who have a BOLD-sponsored scholarship or who were a part of the Achieving Student Performance, Interest and Retention (ASPIRE) Summer Bridge Program, but who are not EHP or GS students. This subgroup of students is tied as the second largest fraction of students within the AHRC: of the 834 AHRC students, 130 (16%) are BOLD (and neither EHP nor GS) students (Douglass, 2014). In the current year, 2013-2014, of the AHRC, of the 227 AHRC students, 25 (11%) are BOLD (and neither EHP nor GS) students (Douglass, 2014).
4.1.1.4.4 Other Students

The presence of other students, not a part of the already-mentioned programs, is due to the inability of the other programs to fill the beds of Andrews Hall. Some of these students have been RAs on staff, in the early years after the renovation. In essence though, the one commonality between these students is the lack of commonality and programmatic relation with one another. This has not prevented these students from becoming a part of the AHRC culture, participating in events, and returning throughout the years.

These other students make up a significant portion of the AHRC: of the 834 AHRC students, 154 (18%) are either other CEAS students or A&S students (Douglass, 2014). While they comprise a larger percentage than the GS and BOLD groups, there is no real unifying cohesion and their representation is declining as for the current year, 2013-2014, of the 227 AHRC students, 36 (16%) fall into this other category (Douglass, 2014).

4.1.2 How was the GE RAP Created?

The Global Engineering RAP was inspired by the AHRC model. The director of GE RAP, Associate Dean Diane Sieber, taught a course to the GS students in the fall 2009 semester, during the first year of Andrews. As Dean Sieber puts it:

...I was there for entire semester and I would hang out there, before and after class. And then I, students would invite me to events.... really felt the love of the faculty of, you know, what this place was. And, saw how different it was. (Sieber, October 24, 2013 T.0:23:17)

And, she continues later that:

...having this sense that one might be invited to participate in student lives as a faculty member was-was really powerful to me. (Sieber, October 24, 2013 T.0:26:29)
Dean Sieber was impressed by the community she found in Andrews: that students were interested in auditing her course simply because they were interested and that somehow the Douglass children were a part of the community as well (Sieber, October 24, 2013). All of these things have led the Associate Dean to advocate for a new strategic vision for first-year CEAS students which has every first-year student living in a RAP modelled after the AHRC. The first step in this plan was beginning a new community, not yet officially a RAP, in the newest renovated Residence Hall, Kittredge Central (Sieber, October 24, 2013).

The vision for the GE RAP stemmed from Dean Sieber’s desire to address the issue students have with maintaining their foreign language skills and global mindset. On July 1, 2012, Dean Sieber approached the head of CU’s Housing and Dining to propose the GE RAP (Sieber, October 24, 2013). The GE RAP website went up and started accepting applications in late November, which was, “…in terms of University calendars, this was lightning fast. …[but] way slower than I could believe.” (Sieber, October 24, 2013 T.0:36:43). The steps between the proposal and the approval included: the reconvening of a committee to review the proposal in September, convincing the Engineering Advisory Council to support the proposal, and getting the Chancellor of the CU Boulder campus to approve the proposal and funding (Sieber, October 24, 2013).

As soon as the GE RAP was approved, the website went up and the online application was opened. A handful of AHRC students were recruited into GE RAP and became the upperclassmen presence (Sieber, October 24, 2013). The application process selected 57 students for 2013, the first year of the GE RAP. All of these students took Dean Sieber’s first-semester course: The Meaning of IT, which is further detailed in Appendix F.

The community engendered by the GE RAP had a similar effect on the other non-GE RAP students of Kittredge Central that the EHP community had on the non-EHP students of Andrews in its first year.
That is to say, several students from elsewhere in the Residence Hall desired the GE RAP community enough to ask to apply to join the next year (Sieber, October 24, 2013). While it remains to be seen how the GE RAP will develop, it has found early success for developing and encouraging community.

4.2  **RESEARCH QUESTION 2: WHAT LESSONS WERE LEARNED?**

4.2.1  **Multiple Programs**

The integration of the various programs within the AHRC was neither smooth nor simple and, “it’s rife for all sorts of issues and struggles and misunderstandings.” (Douglass, October 22, 2013 T.0:25:11). In the first year of Andrews, EHP was the most dominant presence. The GS program was only in its first year with 16 students and no student leadership, which led to a situation where, “…GoldShirt students often expressed feelings of isolation and exclusion…” (Ennis, 2011). At the same time, EHP moved from an environment that was solely EHP into one with multiple identities which, “…hindered some of our [EHP leadership’s] ability to do things and communicate about things…” in an effective manner without it being seen as exclusionary (Douglass, October 22, 2013 T.0:30:01). These issues within the first year of Andrews inhibited the potential of the community as a whole because the identities of the students suffered along with the identities of the individual programs.

In response to these issues, the Prof. Douglass became more involved with the GS students by teaching at their summer bridge (Ennis, 2011). Prof. Douglass then went further in working to add Critical Encounters to the list of the GS first-year courses and transform the course from the center-point of EHP to the center-point of the AHRC (Douglass, October 22, 2013). These programmatic moves were also supported by relational and social responses, as discussed in Section 4.2.6, to foster community between the students of the separate programs.
4.2.2 Live-in Faculty Voice in Building Design

During the renovation process of Andrews, Prof. Douglass made a series of suggestions for the layout of the building. Not all of these suggestions were accepted, but one very critical one was. This suggestion involved the common room and the classroom spaces. In the other renovations, one of the wings was separated from the common room and the space above the common room was made into the classroom space. Scot fought for a two-story, vastly open common space and a connected third wing so that all students had easy access to the common room and the front desk area. The space closed up with the connecting hallway was then used for the relocated classroom space. The success of this campaign provided a much more centralized and used common room than the rest of the Kittredge area Residence Halls, as seen by the overflowing use during events such as the Taste of Andrews, Art Night, and on a day-to-day basis (Douglass, October 13, 2013).

What this anecdote serves to illustrate is the importance of faculty input in the design of the living space. Dean Sieber was unable to make any suggests for the design of the building which houses the GE RAP, and, as such, has to deal with a number of debilitating design flaws (Sieber, October 24, 2013). For one, the faculty apartment is isolated from the students:

I walk out, and I am isolated by this Leadership RAP office space. And then, there is a door that closes at night that I keep having to prop open that leads to the rest of the building. So one, students can’t get to me through the building, they have outside which is wrong. (Sieber, October 24, 2013 T.0:37:35)

Similarly, the classroom space is too small to be of use for the GE RAP course and the common room is left largely unused (Sieber, October 24, 2013).
These hurdles are overcome by the GE RAP. Similarly, the suggestions made for Andrews which were never implemented were not of vital importance to the success of the AHRC. However, the functionality of the living space for the community is still important to consider because: “...buildings can be a detriment to community...” (Douglass, October 13, 2013 T.0:29:16).

4.2.3 Student Voice in any Application Processes

The application process for students to get into the AHRC is slightly complicated by there being two programs. For GS students, the process is very involved and includes in-person interviews. The application for EHP students is, while less in-depth, still critical for selecting students who fall into both categories that they are “honors” students and that they would fit in the AHRC community.

The original EHP applications were reviewed by, “3 to 5 faculty who, and one Associate Dean,” (Douglass, October 22, 2013 T.0:17:45). When the program moved into Andrews, it became apparent to Prof. Douglass that the EHP students, “had a much deeper sense of what it meant to live in this hallway and what they were looking for: what students work, what students didn’t work,” than the faculty did (Douglass, October 22, 2013 T.0:18:19). And so, the application process was changed, from the first year of Andrews onwards, to involve almost entirely student graders. In other words, a large fraction of the AHRC was selected from applicants by the current and previous AHRC students.

4.2.4 Desired Traits for Administrative Support

In the fall of 2011, an administrative assistant was hired to help coordinate all of the e-mailing, event planning, and other programming details for the AHRC (Douglass, October 22, 2013). Before hiring an assistant, student leaders took on these tasks. While this method of having students do all of the work aligned well with the idea that students should step up as leaders and fuel the community themselves, it also meant that the process for coordinating of people and events was very inefficient (Douglass, October 22, 2013).
As for what type of role this assistant should have, there seemed to be two important functions: detail-oriented task skills support and being able to understand and engage the community. The latter of these traits seemed more crucial to Prof. Douglass when hiring the first assistant (Douglass, October 22, 2013). However, the former of these traits turns out to be more imperative as it became clear that, “in the areas where we can be super-efficient and administratively supportive, we really need to be excellent in that” (Douglass, October 22, 2013 T:0:10:33). When hiring administrative support for these communities, finding a staff that finding, “someone who can participate in the vision” is secondary to finding someone who can get all of the details sorted through (Douglass, October 22, 2013 T:0:08:48).

4.2.5 Level of Students’ Responsibilities

4.2.5.1 Invitation Model

The EHP and AHRC model really relies on student involvement and student leadership. One method by which students are engaged is when Prof. Douglass approaches them with a responsibility. However, Prof. Douglass has learned that:

   for this to work well you have to be in the situation where students take on things that number one, that they really want to do... and things that are just too much for them. (Douglass, October 13, 2013 T:0:57:50)

One example of a responsibility that follows these guidelines is related to the Open Mic Nights of Andrews. In the fall 2011, during the first Open Mic Night of that fall, one of the freshman students volunteered to work with the sound equipment. The equipment was borrowed and unreliable and Prof. Douglass had been looking to upgrade it. This student was offered a budget of $3,000 dollars to invest in better equipment for the community and within three days had a list of what to buy, where to buy it, etc. (Douglass, October 13, 2013). Prof. Douglass describes this as an Invitation Model where he
metaphorically draws a line in the sand and asks students to step across it; in this case the student, “...stepped across it and acted brilliantly.” (Douglass, October 13, 2013 T.0:55:18). This Invitation Model then expands as Prof. Douglass draws another metaphorical line in the sand. For this student, a later responsibility was to help purchase, “$25,000 worth of computer components and [help other] students in Andrews are going to build the computers,” and so another line was stepped across (Douglass, October 13, 2013 T.0:56:05).

4.2.5.2 Students as Mentors

Though there are several examples similar to the one just described, like the Andrews Orrery project, the Invitation Model does not always consist of giving a student a budget and a specific job. In many cases, the Invitation Model leads to students as informal mentors. The six students who returned to live in Hallett Hall, described in Section 4.1.1.1, are one instance of this. There are other instances of students desiring to promote research or international service or the intramural sports on-campus where Prof. Douglass then turned that into a paid student position within the AHRC (Douglass, October 13, 2013). Prof. Douglass describes the idea behind these positions and the idea of student mentoring:

I want the mentoring position to be, to validate what they’ve been about. It’s not a situation where we have a job need and we ask, you know: “We need a responsibility, therefore can I enter into a contract with you to do this responsibility, I’m going to give you this money and I expect this many hours, expect this many things.” What I’m really looking for are students who are about stuff, have been about stuff, have proven themselves to be about things and I want the mentorship to validate that and the money portion of it is to-to just cement the intentionality of the fact that they’re going to be doing something now and that there’s now just a slightly greater focus in terms of how they want to live this out. (Douglass, October 13, 2013 T.0:43:02)
The AHRC is functional and successful because the students are involved and engaged. This Invitation Model is a way of rewarding that engagement and encouraging it with or without stipends.

Having students as mentors is critical to these learning communities because of the reliance on vertical integration between the different classes. As Prof. Sieber describes: “the [live-in] faculty member is not going to be the mentor that people need, it’s going to be the sophomores and juniors and seniors” (Sieber, October 24, 2013 T.1:20:21). And so, finding ways to encourage the students to take on that responsibility is crucial for the success of these communities.

4.2.5.3 Paying Students

This model of paying students, however, had some issues. The issues, counter-intuitively, actually arose from trying to pay the student mentors too much. In the first year of Andrews, two mentors were provided their full room and board, which amounted to a roughly $13,000 stipend (Douglass, October 13, 2013). However, the students responded to this in a negative way because there was too much pressure put upon them by the amount of the stipend. The next year, with the same two mentors, Prof. Douglass lowered the amount to roughly $4,000 and the students, “were just more free to be themselves” which was essentially the purpose of the original stipend, to encourage and validate these students (Douglass, October 13, 2013 T.0:59:50).

4.2.6 Dealing with Problems

When there are problems and issues in these communities, there has been a certain type of response from the live-in faculty. This response is described by Prof. Sieber in terms of social capital (Sieber, October 24, 2013). The community benefits when everybody contributes to it. When there is a problem, “the person who precipitated the crisis lost social capital,” and that becomes the mechanism for addressing the issue (Sieber, October 24, 2013 T.1:21:19). This method requires that students be invested in the community and is designed to remove programmatic policy from the community. As
Prof. Douglass puts it: “...real community is messy. And, I think, we wanted to just resist policy answers to problems.” (Douglass, October 22, 2013 T.1:01:09).

4.3 Research Question 3: What are the outcomes/successes of this community?

Measuring the success of AHRC, and indeed any similar community, poses a challenge for the research community. For example, in order to produce generalizable results, a multitude of unconstrained variables and factors have to be accounted for, including the community’s demographics and the influences of other agencies on community members. For the AHRC, nearly all of the students are in the CU College of Engineering and Applied Sciences which begs the question of generalizability to students not studying engineering. As such, producing a full analysis of the successes and failures of the AHRC and the subsequent generalizability to other RAPs and live-in learning communities is beyond the scope of this thesis.

The following overview of successes and failures of the AHRC will be presented in order to sufficiently compare the environment to other learning communities of this thesis, the MOOC and the brick-and-mortar course.

The first source of data for analyzing AHRC is from an internal review of the CU RAPs. The review is an analysis of the AHRC which acknowledges the difficulty of measuring a community by resorting to measuring the: “symptoms of success...: GPA, retention, graduation rates, number of BS/MS students, number of non-first-year returners living in Andrews, student conduct, participation in programming, and awards and noteworthy achievements” (Douglass, 2014).

The second source of data for analyzing the AHRC will serve as a link back to the MOOC and the “brick and mortar” physics-specific courses. The first-year GS students are required to take a preparatory physics course offered through the CU CEAS. This course is introduced in more detail in Section 1.2.3.2.
This course, while not the same as the MOOC or the “brick and mortar” course, still has similar objectives and administers the FMCE for both a pre- and post-test gain analysis.

4.3.1 Returners

One of the largest successes that the AHRC has seen has been in reversing the CU Boulder campus’s residential culture, as discussed in Section 4.1.1.3, from one dominated by freshman to one that includes a vertical integration of older students: sophomores, juniors, seniors, and graduate students (Douglass, October 13, 2013). The details for each year of the AHRC, including the pre-AHRC formative year in Hallett, are included in the following table.

Table 4-1: Table of AHRC students living in Hallett Hall (2007-’08 and 2008-’09) and students living in Andrews. The program composition is described for the first-year students. The class composition is described for the non-first-year students. The maximum capacity of Andrews is 227. Data provided by the AHRC. (Douglass, 2014)

<table>
<thead>
<tr>
<th>Year</th>
<th>First-Year Students</th>
<th>Non-First-Year/Returning Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>EHP</td>
</tr>
<tr>
<td>Hallett</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-’08</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>2008-’09</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td>Andrews</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-’10</td>
<td>172</td>
<td>70</td>
</tr>
<tr>
<td>2010-’11</td>
<td>140</td>
<td>53</td>
</tr>
<tr>
<td>2011-’12</td>
<td>147</td>
<td>66</td>
</tr>
<tr>
<td>2012-’13</td>
<td>109</td>
<td>56</td>
</tr>
<tr>
<td>2013-’14</td>
<td>133</td>
<td>55</td>
</tr>
</tbody>
</table>

The breakdown of the first-years by program is to demonstrate the relative sizes of the different programs within the AHRC. However, after their first-year, the returning students have already been enculturated and identify with both their program and with the AHRC community as a whole. The non-
first-year students follow a pyramidal structure wherein there are more of the younger students than there are older. Many, but not all, of the first-years stay into their second-year. Similarly, many of the second-year students, but not all, stay for a third year, and so on. The returning rate for each year is presented in the following table.

Table 4-2: Table of rates that students returned to Andrews, calculated from the data presented in Table 4-1. For example, the 2008-’09 rate of sophomore returners is calculated by dividing the 2008-’09 number of sophomores by the 2007-’08 number of freshman. Data provided by the AHRC. (Douglass, 2014)

<table>
<thead>
<tr>
<th>Year</th>
<th>Returning Sophomores</th>
<th>Returning Juniors</th>
<th>Returning Seniors</th>
<th>Returning Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-’09</td>
<td>18%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2009-’10</td>
<td>72%</td>
<td>214%</td>
<td>600%</td>
<td>0%</td>
</tr>
<tr>
<td>2010-’11</td>
<td>34%</td>
<td>34%</td>
<td>60%</td>
<td>0%</td>
</tr>
<tr>
<td>2011-’12</td>
<td>37%</td>
<td>24%</td>
<td>79%</td>
<td>33%</td>
</tr>
<tr>
<td>2012-’13</td>
<td>56%</td>
<td>46%</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>2013-’14</td>
<td>56%</td>
<td>25%</td>
<td>33%</td>
<td>33%</td>
</tr>
</tbody>
</table>

For the year before Andrews, 18% of the sophomores moved back into the dorms. For the first year of Andrews, 72% of the sophomores moved back (Douglass, 2014). The numbers for the returning juniors and seniors are greater than 100% because students moved back on-campus after having already lived off-campus. These rates were at a peak with the first year of Andrews, but have since settled with sophomore return rates >50% and the junior-and-beyond return rates >20%.

To get a better sense for how radically the composition by class changed within Andrews, the following figure shows a percentage breakdown by class for each of the years.
Figure 4-1: A 100% filled line chart demonstrating the relative numbers of students in each class. The physically higher sections in the graph represent older years of students. Data begins with EHP’s two years in Hallett Hall and ends with the last five years of Andrews Hall. Data provided by the AHRC. (Douglass, 2014)

The 2007-'08 year is very representative of the CU Boulder campus culture with 38 first-years and one sophomore RA. For the 2008-'09 year, Prof. Douglass had invited the 6 upperclassmen mentors, along with the two RAs to be a part of changing the campus residential culture. The trend continued drastically into the beginning years of the AHRC and the proportion of first-years in the community settled around 40-50%. Prof. Douglass uses these numbers and trends as a measure of success for the community and as a measure of student commitment to the community (Douglass, October 22, 2013).

4.3.2 Participation
There are many events sponsored by the AHRC for the students. These events are both formal and informal, planned and spontaneous and range from the purely social (Friday Night Hoops and Open Mic
Night) to the intellectually driven (Research Nights and Symposia). The following table provides some participation numbers for the major planned events sponsored by the AHRC.

Table 4-3: Table of major scheduled AHRC programs and events. The numbers are estimated using photographs and informal observations of each event. The total number of residents in the AHRC is 227, which is less than some of the reported participation because all of the events are open to off-campus AHRC community members, students who lived in Andrews but moved off-campus. Data provided by the AHRC. (Douglass, 2014)

<table>
<thead>
<tr>
<th>Regular Programs</th>
<th>Average</th>
<th>Low</th>
<th>High</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Cultural Event</td>
<td>207</td>
<td>192</td>
<td>231</td>
<td>Annual</td>
</tr>
<tr>
<td>Spring Cultural Event</td>
<td>235</td>
<td>212</td>
<td>275</td>
<td>Annual</td>
</tr>
<tr>
<td>Art Night</td>
<td>96</td>
<td>63</td>
<td>127</td>
<td>Annual</td>
</tr>
<tr>
<td>Pumpkin Bumpkin Bash</td>
<td>57</td>
<td>28</td>
<td>72</td>
<td>Annual</td>
</tr>
<tr>
<td>EHP Banquet</td>
<td>205</td>
<td>186</td>
<td>224</td>
<td>Annual</td>
</tr>
<tr>
<td>Open Mic Night</td>
<td>≈118</td>
<td>≈95</td>
<td>≈145</td>
<td>3-4 times per year</td>
</tr>
<tr>
<td>Research Nights</td>
<td>46</td>
<td>24</td>
<td>87</td>
<td>3-4 times per year</td>
</tr>
<tr>
<td>Midnight Movie Premier</td>
<td>237</td>
<td>188</td>
<td>294</td>
<td>1-2 times per year</td>
</tr>
<tr>
<td>Symposia</td>
<td>44</td>
<td>31</td>
<td>63</td>
<td>2 times per year</td>
</tr>
<tr>
<td>Leadership Retreat</td>
<td>29</td>
<td>24</td>
<td>34</td>
<td>2 times per year</td>
</tr>
<tr>
<td>Friday Night Hoops</td>
<td>37</td>
<td>13</td>
<td>97</td>
<td>Weekly</td>
</tr>
</tbody>
</table>

Programming Notes:
- Cultural Events: La Traviata, “Soul Food Night,” Ailey II Dance Theater, Stomp; at the DCPA: King Lear, When Tang met Laika, Traces, The Color Purple, Sense and Sensibility
- Andrews Symposia: student speeches on such topics as “Language,” “Home,” “Ambition,” “Expression,” “Expectation,” and “Self.”
- “Open Mic Night” numbers estimated from multiple pictures taken at each event and head counts at various times throughout the 4-5 hour event.
- Because our community includes those currently living in Andrews Hall and those who formally lived in Andrews Hall, our major events draw numbers larger than the 227 number of students who currently live in Andrews Hall. In the recent showing of Ender’s Game, 201 of the 294 attendees currently live in Andrews.

The capacity of the AHRC’s physical space is only 227, but the AHRC community extends beyond the physical space as students move off-campus. This is seen in the table above because the numbers include students who have moved off-campus, but still participate in the AHRC community and the AHRC events. So, some of these events have a reported attendance greater than 227. The total number of students who have been affiliated with the AHRC is 833, though not all of them are still CU students.
The events presented in the table above are the simplest to measure, but there are other, more informal, events which are not mentioned. These events include meals (small groups of students eating together), service projects (such as volunteering at the Butterfly Pavilion’s Bug-a-Boo event or for Habitat for Humanity projects), intramural sports, RA-sponsored activities (floor-based activities such as paintball excursions or night hikes), etc. The informal nature of these events makes it difficult to properly measure the participation quantitatively.

Another form of participation is demonstrated by the student projects to improve the living spaces of the AHRC. The most prominent example of these projects is the student-built orrery mounted in the common room of Andrews Hall. This orrery, a model of the solar system, was completely designed and built by a group of AHRC students. Other projects designed to improve the living space of the AHRC include mobile white boards, a Victorian reading room, a granite study bar, and an expansion of the kitchen.

A final form of participation is seen in the CEAS as a whole. The AHRC students have held leadership positions in Engineers Without Borders and on the Engineering Excellence Fund Committee and have had the Outstanding Graduates for CEAS for multiple years. These students have participated in the International Mathematical Modeling Contest and the International AECOM Water Student Design Competition and won first-place prizes bringing the University prestige on the international front. It is not just that the students are active in the AHRC community, but also in CEAS in general.

4.3.3 Behavior – Disciplinary Concerns

Another symptom of success that the AHRC has exhibited has to do with the number of judicial problems. The AHRC Program Review contains the numbers of judicial incidents and numbers of substance-related judicial incidents for all of the CU Boulder campus residence halls. The judicial
incidents include any violation of the Res-Life rules including fire-code violations, noise violations, and other safety violations. The substance-related judicial incidents include any drug and alcohol violations.

The following table shows the breakdown of the 22,266 judicial incidents during the 2010-’11, 2011-’12, 2012-’13 academic years.
Table 4-4: Table of Judicial Incidents for the academic years 2010-‘11, 2011-‘12, and 2012-‘13. The Yearly Average per Resident for each residence hall is normalized against the Andrews Yearly Average per Resident in the rightmost column. Data provided by the AHRC. (Douglass, 2014)

<table>
<thead>
<tr>
<th>Residence Hall</th>
<th>Hall Capacity</th>
<th>3 Year Total</th>
<th>Yearly Average</th>
<th>Yearly Average per Resident (YApR)</th>
<th>YApR per Andrews YApR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aden</td>
<td>116</td>
<td>122</td>
<td>41</td>
<td>0.35</td>
<td>2.46</td>
</tr>
<tr>
<td>Andrews</td>
<td>227</td>
<td>97</td>
<td>32</td>
<td>0.14</td>
<td>1.00</td>
</tr>
<tr>
<td>Arnett</td>
<td>210</td>
<td>202</td>
<td>67</td>
<td>0.32</td>
<td>2.25</td>
</tr>
<tr>
<td>Baker</td>
<td>498</td>
<td>2585</td>
<td>862</td>
<td>1.73</td>
<td>12.15</td>
</tr>
<tr>
<td>Bldg A &amp; B (Closed)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Brackett</td>
<td>120</td>
<td>114</td>
<td>38</td>
<td>0.32</td>
<td>2.22</td>
</tr>
<tr>
<td>Buckingham</td>
<td>204</td>
<td>796</td>
<td>262</td>
<td>1.28</td>
<td>9.02</td>
</tr>
<tr>
<td>Cheyenne Arapaho</td>
<td>420</td>
<td>1708</td>
<td>569</td>
<td>1.36</td>
<td>9.52</td>
</tr>
<tr>
<td>Cockerell</td>
<td>140</td>
<td>254</td>
<td>85</td>
<td>0.60</td>
<td>4.25</td>
</tr>
<tr>
<td>College Inn (1yr)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Crosman</td>
<td>146</td>
<td>363</td>
<td>121</td>
<td>0.83</td>
<td>5.82</td>
</tr>
<tr>
<td>Darley North</td>
<td>314</td>
<td>1377</td>
<td>459</td>
<td>1.46</td>
<td>10.26</td>
</tr>
<tr>
<td>Darley South</td>
<td>200</td>
<td>759</td>
<td>256</td>
<td>1.28</td>
<td>9.00</td>
</tr>
<tr>
<td>Farrand</td>
<td>391</td>
<td>2191</td>
<td>730</td>
<td>1.87</td>
<td>13.11</td>
</tr>
<tr>
<td>Hallett</td>
<td>478</td>
<td>1627</td>
<td>542</td>
<td>1.13</td>
<td>7.97</td>
</tr>
<tr>
<td>Kittredge Central (Closed)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Kittredge West (1yr)</td>
<td>330</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Libby</td>
<td>410</td>
<td>1966</td>
<td>655</td>
<td>1.60</td>
<td>11.22</td>
</tr>
<tr>
<td>Reed</td>
<td>70</td>
<td>54</td>
<td>18</td>
<td>0.26</td>
<td>1.81</td>
</tr>
<tr>
<td>Sewall</td>
<td>330</td>
<td>1308</td>
<td>436</td>
<td>1.32</td>
<td>9.28</td>
</tr>
<tr>
<td>Smith (2yr)</td>
<td>338</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Stearns East</td>
<td>429</td>
<td>1278</td>
<td>426</td>
<td>0.99</td>
<td>6.97</td>
</tr>
<tr>
<td>Stearns West</td>
<td>419</td>
<td>1633</td>
<td>544</td>
<td>1.30</td>
<td>9.12</td>
</tr>
<tr>
<td>Willard</td>
<td>464</td>
<td>1352</td>
<td>451</td>
<td>0.97</td>
<td>6.82</td>
</tr>
<tr>
<td>Williams Village North (2yr)</td>
<td>500</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

The residence halls’ capacities are used to compare the yearly average number of judicial incidents per resident for each hall. This method is used to normalize the behavior issues between the halls with different capacities. For instance, while Reed has the lowest yearly average, it also has the smallest capacity and so the yearly average number of incidents per resident for Reed is 1.81 times that of Andrews. By this measure, Andrews has the least amount of judicial incidents. This table shows that
the CU Boulder campus residence hall with the most number of incidents has 13 times more activity per resident than Andrews. The average residence hall has 7 times more activity per resident than Andrews.

The other judicial statistics are for substance-related activity only. The following table shows the breakdown of the 5,989 judicial incidents during the 2010-'11, 2011-'12, 2012-'13 academic years.

*Table 4-5: Table of Substance-Related Judicial Incidents for the academic years 2010-'11, 2011-'12, and 2012-'13. The 3 year totals include both drug- and alcohol-related incidents. The Yearly Average per Resident for each residence hall is normalized against the Andrews Yearly Average per Resident in the rightmost column. Data provided by the AHRC. (Douglass, 2014)*
Again, the residence halls’ capacities are used to calculate the average activity per resident for each of the halls. By this measure, Reed has the least amount of substance-related judicial activity, with Andrews a close second. Reed’s substance-related judicial activity is 0.98 times that of Andrews’ activity. The residence hall with the most number of incidents has 9 times more activity per resident than Andrews. The average residence hall has 5.5 times more activity per resident than Andrews.

For this outcome, there is one residence hall of important note: Reed Hall. Reed Hall is devoted to upperclassmen who desire to live on-campus beyond their first-year (University of Colorado Boulder, 2014a). Because of this, the number of upperclassmen in Reed Hall should be proportionally higher than the other residence halls. This commonality between Andrews and Reed could explain why they both have the lowest number of judicial incidents per resident and the lowest number of substance-related judicial incidents per resident on the campus.

4.3.4 Statistics for Engineering Honors Program Subgroup

The AHRC Internal Review performed a more in-depth analysis on the subgroup of EHP students. The CEAS retention, CU retention, graduation rates, participation in graduate studies, and GPA statistics were provided and were also calculated for a statistically similar subgroup of non-AHRC, non-EHP students and the details of this analysis are included in the Appendix F. Over the eight total years, 441 EHP students, there is an 89% retention in CEAS and an over 95% retention at CU. There is not a direct comparison available for these retention statistics, but there is for the rest of the analysis. For the EHP students: the 6-year graduation rate at CU is 91%, the percentage of students pursuing graduate studies is 23%, and the cumulative GPA is 3.51. For the comparable group of non-AHRC, non-EHP students: the 6-year graduation rate at CU is 65%, the percentage of students pursuing graduate studies is 2%, and the cumulative GPA is 2.95.
The high performance of the EHP subgroup could be partially attributed to the nature of the subgroup. However, the Internal Review strove to choose students with similar high school backgrounds to demonstrate the bolstering effects of the AHRC community; to attribute, in part, the 0.56 boost in the GPA and the 26% boost in the graduation rate to the AHRC community.

4.3.5 Faculty Engagement

The live-in faculty are highly engaged within these communities. It is useful to turn to the typology presented in Section 1.2.2.2 in the 2007 paper by Cox and Orehovec: *Faculty-student interaction outside the classroom: A typology from a residential college*, for describing the engagement of the live-in faculty with the students of the community. The typology consists of 5 tiers: Disengagement, Incidental Contact, Functional Interaction, Personal Interaction, and Mentoring (Cox, 2007).

For the AHRC, Prof. Douglass describes that a typical walk from his apartment to the AHRC classrooms to teach class necessitates passing by students’ rooms and students studying in the common spaces (Douglass, October 13, 2013). This walk must happen multiple times throughout the week as Prof. Douglass teaches Critical Encounters and other courses in the AHRC classrooms and each time produces a plethora of Incidental Contact encounters. Prof. Douglass sometimes takes advantage of these brief moments to create excitement for the up-coming Friday Night Hoops or other AHRC events (Douglass, October 13, 2013). In this way, the Incidental Contact encounters actually do serve to facilitate the higher-engaged tiers of engagement. The method of advertising helps lead to some of the success seen in the participation of the students in AHRC activities.

Prof. Douglass engages individual students or groups of student leaders for lunch or coffee/tea, creating moments of Personal Interaction (Douglass, October 13, 2013). Measuring the prevalence of Mentoring in the AHRC is beyond the scope of this thesis, though it appears to be present in the interactions. The Cox and Orehovec typology suggests a pyramidal structure in terms of the frequency of occurrence for
the types of interactions, and so any Mentoring would happen less frequently than the Personal Interaction (Cox, 2007). The live-in faculty of the AHRC is very engaged with the students of the community.

The high level of engagement is also found in the GE RAP, where Dean Sieber describes the walks she has to go visit the students. Even though the building is not as well-suited for the Incidental Contact moments, Dean Sieber still visits and attempts to encourage that level of engagement with planned visits to where the students live (Sieber, October 24, 2013). As Dean Sieber models the GE RAP after the AHRC, she intends to invest a similar amount of time and energy into engaging the students and getting to know who they all are (Sieber, October 24, 2013).

The levels of faculty engagement here are largely based on the interviews with each of the live-in faculty. The study performed by Cox and Orehovec used focus groups of students as well to better validate the measures of involvement. While this thesis relies on informal observation and experience living in the AHRC, there is potential for much better measurement and formal observation of the faculty involvement within the community. There are other faculty who are engaged with the students of these communities, but the level of engagement for those faculty is not captured in the data of this thesis.

4.3.6 Performance of Physics Subgroup

While the general performance of the AHRC community is a useful means of measuring outcomes and successes in the context of residential communities, there is another method for comparing this community to other communities such as the brick and mortar physics course and the MOOC. One possible comparison would be to compare the AHRC students’ performance in the brick and mortar course in terms of their homework, exam and FMCE performance. However, IRB requirements and time
constraints prevent this thesis from being that comprehensive. In future analyses, this type of comparison – in physics and in other subjects – could be useful.

A comparison that is possible for the scope of this thesis is to look at a subset of AHRC students who took a preparatory physics course. This course is tied to the AHRC because the students who take the course are the first year GoldShirt students. More details about this physics course and subgroup can be found in Section 1.2.3.2 and Section 4.1.1.4, respectively. While this course is not the same as PHYS 1110 or the MOOC, it is still aimed at teaching students physics. And, the students take both a pre-FMCE and a post-FMCE to measure learning gains.

For these students: the average pre-FMCE score was 15% and the average post-FMCE score was 62%. The relative gain on these averages is 0.55 and the average relative gain is also 0.55. The distribution of the students’ pre-/post-FMCE scores is provided in the figure below.

![Pre-/Post-FMCE Distribution of GEEN 1010 Students](image)

*Figure 4-2: Pre-/Post-FMCE Distributions for the GEEN 1010 students. Data provided by Prof. Stites.*
4.4 SUMMARY
The data presented in Section 4 demonstrated that creating a residential community like the AHRC or the GE RAP requires a physical living space, an invested live-in faculty member, and an engaged student population. In order to create an invested student population, the live-in faculty member has to create a culture-driving course and vision and then invest time and energy into the students’ lives. The students who respond to the vision rise as leaders within the community and serve as mentors for the following years’ classes which creates a vertical integration between the freshmen, sophomores, juniors and seniors who are a part of the community.

There are certain details about this process which can be improved upon. For instance, the live-in faculty’s voice in the construction of the physical space can be crucial to how well the community can take advantage of the space. Similarly, while the students’ energy and time is meant to be invested in the community, there is value in having administrative assistance that can smooth the coordination and planning of events and other tasks.

The AHRC has seen very positive results for changing the current residential experience for first-year CU students and has provided its students with a place to thrive and engage. In the measures of academic success, the AHRC shows positive results in retention and participation as well as in graduation rates and overall GPA. The AHRC demonstrates significantly lowered numbers of judicial incidents. The physics-specific subgroup of students live out the benefits of being a part of this residential community in their course: GEEN 1010, which saw high learning gains of 0.55 on the FMCE.
5 COMPARATIVE ANALYSIS

The environments highlighted by this thesis operate with very different modalities for encouraging learning and academic success. Neither the MOOC nor the residential community operates in the same manner as a standard brick and mortar University course. This section will highlight the strengths and weaknesses of the MOOC and the residential community in Section 5.1 and then will bring the brick and mortar course into the analysis in Section 5.2.

5.1 STRENGTHS/WEAKNESSES OF EACH COMMUNITY

While Sections 3 and 4 served to focus on the MOOCs and the residential communities separately – answering the research questions posed by this thesis for each environment – this section serves to bring the two into the same space in order to compare the benefits and short-comings more directly against one another.

5.1.1 MOOC

The data presented in Section 3 on the Physics 1 for Physical Science Majors MOOC – in the form of ethnographic data (the interviews and forum posts) and survey or content data – provides support for a set of strength and weaknesses found in the theory and implementation of MOOCs. This set of strengths and weaknesses is developed in part from the data presented in Section 3, in part from observations of the MOOC, and in part from a presentation on technology in education from the 2013 AAPT National Meeting which detailed the affordances and constraints of online education (Finkelstein, 2013).

5.1.1.1 Strengths

- Low cost for students to engage
  - Free ($) to sign-up and participate
  - Time requirements are asynchronous and on students’ schedules
- Lecture videos can be rewatched and rewound
- Exams scheduled when it works
  - Non-standard students can participate for a multitude of reasons

**Extensive population**
- MOOC reaches students worldwide
- Large course size (only limited by servers’ capacities)

**Potential for atypical benefits to those involved**
- Non-standard students can learn content different from explicit course content
  - Students learn foreign languages in the context of their field
  - Students who are professional teachers learn teaching styles/techniques
  - Students can use the MOOC to refresh their knowledge
- Has advertising potential for the institution
- Expose students to the University experience without students being at the University

**Has rerun potential**
- All of the materials are made
- Effort required is still undetermined
- Future levels of participation are still undetermined

**Vast amount of data available and accessible**

**New and popular in the media**

### 5.1.1.2 Weaknesses

- Creating lecture recordings can be time-consuming and unsupported
- Attrition rates are massive
  - Low motivation for students
- Certifications for completion do not yet have a detailed meaning
- If students achieve their non-standard outcome there is no measure
- Not well understood pedagogically or monetarily
  - Questions still to its use and place in higher education
    - What are the MOOCs’ relation to on-campus courses?
    - What is the benefit to the sponsoring institution?
    - Is there an overall benefit to society/institution/faculty/students which justifies the time/energy/money spent on creating MOOCs?
- Deficiencies in funding (at least for the MOOCs of this study)
- Limited bandwidth for community and communication
  - Only video/text and audio
  - Cannot implement interactive labs or group work
  - Dehumanized
    - Faculty displeased during experience with lack of student contact
    - Students engage primarily with a computer and screen
- Students are not, typically, from the local University mounting the MOOC
  - Motivation for faculty is not employment-based
  - Funding/purpose for MOOC is unknown

5.1.2 Residential Community

The data presented in Section 4 on the Andrews Hall Residential College learning community – in the form of ethnographic data (the interviews and forum posts) and an internal program review – provides support for a set of strength and weaknesses found in the theory and implementation of these
residential communities. This set of strengths and weaknesses is developed in part from the data presented in Section 4 and in part from participant observations of the environment.

5.1.2.1 **Strengths**

- Increases student involvement
- Increases student connectivity between the years/classes
- Increases depth of student-faculty interactions
- Full bandwidth for community and communication
  - No limits on communication modes: audio, visual, physical, etc.
  - Students engage primarily with other students within the community
    - In academics both in-class and on collaborative homework assignments and group projects leading to more social learning
    - In extracurricular activities
      - Intramurals sport teams and pick-up games of basketball and other sports
      - Open Mic Night
      - Cultural and popular events off-campus at plays or movie premier nights
      - Service work in the larger area community
  - Humanized
    - Students engage one another and live together
    - Live-in faculty engages with students and brings family to the community
    - Student-led efforts to improve the living-space
- Can positively affect academic success in a broad spectrum
  - GPA gains seen across varied (engineering-centric for AHRC) course types
o Graduation rates for undergraduate and graduate education levels

5.1.2.2 Weaknesses

- Expensive
  o Students pay RAP fees
  o Student housing on-campus is more expensive than off-campus
  o Remodeling to include faculty apartments (though already planned)
  o Facility staffing for maintenance of building and judicial issues

- Limited reach/access
  o Hundreds of students
  o Located in one physical space

- Time-intensive
  o Faculty live-in is always “at work” for the community
  o Student mentoring and leadership positions in addition to schoolwork
  o Student projects can have a timeline beyond students’ University careers

- Counter-culture approach (on the CU-Boulder campus)
  o CU infrastructure not intended for AHRC-type community University-wide
  o Faculty living on-campus is atypical
  o Students returning beyond their freshmen year is atypical

- Vast amounts of data but difficult to access any of it

5.2 Brick and Mortar Course

5.2.1 Physics MOOC with PHYS 1110

The PHYS 1110 brick and mortar course, described in Section 1.2.3.1, will be used as a direct comparison for the MOOC: comparing the students who complete PHYS 1110 to the MOOC Certificate Earners. The
homework assignment and exam performance of the PHYS 1110 students can be seen in the following figures:

![Average Scores for Each PHYS 1110 Homework Assignment](image)

*Figure 5-1: Average Homework performance for the PHYS 1110 FA13 students, both the students who finished the course and all of the students who submitted each exam. Data provided by Prof. Lieberman.*
Figure 5-2: Average Exam performance of the PHYS 1110 FA13 students, both the students who finished the course and all of the students who submitted each exam. Data provided by Prof. Lieberman.

There are some differences between these averages and the MOOC averages presented in Sections 3.3.5 and 3.3.6. To illustrate these differences between the groups of students who completed the courses, the following figure shows the average of the homework averages, for both the MOOC and PHYS 1110, as well as the average of the exam averages, for both.
The homework scores are essentially equivalent while the exam scores are a full letter grade (10%) higher in the MOOC. To explain the discrepancy in the exam scores, it is useful to remember the demographic types found in each environment. The students who finished the MOOC had a significantly higher average pre-FMCE score than the students who finished the PHYS 1110 course. The demographic breakdown of the MOOC’s Certificate Earners showed that the students who finished were both older and better educated than the brick and mortar course’s students. The homework and exam performance, while useful, may not be the best comparative effort.

5.2.2 FMCE to compare MOOC, Residential Subgroup, PHYS 1110

A better tool is the pre-/post-FMCE, which can be used to demonstrate both where students were before the course and where they were after in terms of their understanding of the physics concepts.
Also, by using the pre-/post-FMCE scores, the physics subgroup from the AHRC can enter the comparison.

![Comparing Average FMCE Scores (%) for the Different Environments](image)

Figure 5-4: Pre-/Post-FMCE Comparisons for the different physics environment where error bars represent the standard deviation of the averaged data. Data for PHYS 1110 FA12 provided by Prof. Pollock. Data for PHYS 1110 FA13 provided by Prof. Dubson. Data for GEEN 1010 provided by Prof. Stites.

This figure demonstrates how much better prepared the MOOC Certificate Earners were than the other groups. The average pre-FMCE score for the MOOC Certificate Earners was higher than the average post-FMCE scores for the PHYS 1110 and GEEN 1010 students. Even for the larger batch of MOOC students, the average pre-FMCE score was similar to, if not more than, the average post-FMCE scores for the PHYS 1110 and GEEN 1010 students. This emphasizes the point that these different physics environments have different audiences. While the GEEN 1010 students are selected out to prepare for
later taking PHYS 1110, the MOOC students are already as well-educated in the physics concepts as the PHYS 1110 students are after PHYS 1110.

In terms of the absolute learning gains (average post-score minus average pre-score) for each environment, as measured by the FMCE, Figure 5-4 demonstrates that the more community-based environment provides the largest absolute learning gains. The MOOC students are the best prepared students and are in the environment with the least amount of human interaction. The MOOC environment provided the smallest absolute learning gains, as is apparent in Figure 5-4, with the difference between the pre- and post-scores being 16%. The PHYS 1110 courses are more community-based and involve in-person interaction in the classroom. The absolute gains for the PHYS 1110 environment are 35%. The GEEN 1010 course is even more community-based than the PHYS 1110 course because of the AHRC component. The GEEN 1010 course students had an absolute gain of 47%. What Figure 5-4 demonstrates is that the more community-focused environments provide higher absolute learning gains.

As for the normalized learning gains for these different groups:

Table 5-1: The Learning Gains for each of the physics environments based on the Pre-/Post-FMCE Thornton Scores. Data for PHYS 1110 FA12 provided by Prof. Pollock. Data for PHYS 1110 FA13 provided by Prof. Dubson. Data for GEEN 1010 provided by Prof. Stites.

<table>
<thead>
<tr>
<th>Environment</th>
<th>Learning Gain on Average Pre-/Post-Scores</th>
<th>Error on Learning Gain on Average Pre-/Post-Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOOC Certificate Earners</td>
<td>0.65</td>
<td>0.16</td>
</tr>
<tr>
<td>MOOC All Pre-/Post-FMCE</td>
<td>0.53</td>
<td>0.17</td>
</tr>
<tr>
<td>PHYS 1110 FA12</td>
<td>0.58</td>
<td>0.3</td>
</tr>
<tr>
<td>PHYS 1110 FA13</td>
<td>0.59</td>
<td>0.15</td>
</tr>
<tr>
<td>GEEN 1010 (AHRC Subgroup)</td>
<td>0.55</td>
<td>0.3</td>
</tr>
</tbody>
</table>
These statistics are useful for comparing relative effectiveness of each environment. The MOOC Certificate Earners are the best taught group, by this measure. For the MOOC as a whole, there are similar learning gains as are seen for the two brick and mortar courses. This says then, on some level, these different environments are similarly effective for teaching the groups of students of that environment.
### 5.3 List of Traits for Each Environment

Table 5-2: Table demonstrating the different qualities of each environment side-by-side. The Costs ($ and time) are estimated values. The * Notes studies done on the EHP subgroup of AHRC

<table>
<thead>
<tr>
<th></th>
<th>MOOC</th>
<th>Brick &amp; Mortar</th>
<th>Residential Community</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Students Served</strong></td>
<td>16,000</td>
<td>700</td>
<td>30</td>
</tr>
<tr>
<td><strong># Staff</strong></td>
<td>1 Instructor</td>
<td>1 Lecture Instructor</td>
<td>1 Instructor</td>
</tr>
<tr>
<td></td>
<td>1 Tech Support</td>
<td>1 Recitation Instructor</td>
<td>1 TA Coordinator</td>
</tr>
<tr>
<td></td>
<td>1 Forum Monitor</td>
<td>Approx. 5 TA Support</td>
<td>1 LA Grader Support</td>
</tr>
<tr>
<td></td>
<td>3+ Research Support</td>
<td>Approx. 10 LA Support</td>
<td>1 Hall Director</td>
</tr>
<tr>
<td><strong># Staff per Student</strong></td>
<td>0.0004</td>
<td>0.025</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Cost ($) of Production</strong></td>
<td>Payment for Staff</td>
<td>Payment for Staff</td>
<td>Payment for Faculty</td>
</tr>
<tr>
<td></td>
<td>Infrastructure of PHYS 111</td>
<td>Infrastructure in Place</td>
<td>Lab Equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stipends for Students</td>
</tr>
<tr>
<td><strong>Cost (time) of Production</strong></td>
<td>1 Lecture Section: 1 hour</td>
<td>Lecture Section: 1 hour</td>
<td>Faculty Engagement</td>
</tr>
<tr>
<td></td>
<td>Lecture Already</td>
<td>Lecture Section: 1 hour</td>
<td>Lab Section: 2 hour</td>
</tr>
<tr>
<td></td>
<td>Monitor Forum: Variant</td>
<td>TA Grading Tutorial</td>
<td>TA/LA Grading HW/Lab</td>
</tr>
<tr>
<td></td>
<td>Technical Problems: Variant</td>
<td>Staff Help Room</td>
<td>Office Hours</td>
</tr>
<tr>
<td><strong>Per Week (underestimate)</strong></td>
<td>Approx. 40+ hours</td>
<td>Approx. 110+ hours</td>
<td>Approx. 60+ hours</td>
</tr>
<tr>
<td><strong>Value for Students</strong></td>
<td>Nebulous</td>
<td>Rewarding to teach</td>
<td>Rewarding to Mentor</td>
</tr>
<tr>
<td></td>
<td>Learn English/Teaching?</td>
<td>Pre-requisite course</td>
<td>*Boost GPA 0.56</td>
</tr>
<tr>
<td><strong>Value for Faculty</strong></td>
<td>Nebulous</td>
<td>Rewarding to teach</td>
<td>Rewarding to Mentor</td>
</tr>
<tr>
<td></td>
<td>Advertising?</td>
<td>Educating Students</td>
<td>Increases Retention</td>
</tr>
<tr>
<td><strong>Average Age</strong></td>
<td>25-34</td>
<td>18-24</td>
<td>18-24</td>
</tr>
<tr>
<td><strong>Geographic Extent</strong></td>
<td>World-wide</td>
<td>Classroom</td>
<td>Andrews Hall</td>
</tr>
<tr>
<td><strong>Retention</strong></td>
<td>Overall 1.4%</td>
<td>90%+</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>HW 11%</td>
<td></td>
<td>Junior &gt; 20%</td>
</tr>
<tr>
<td></td>
<td>Lecture 17%</td>
<td></td>
<td>*CEAS 89%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*CU 95%</td>
</tr>
<tr>
<td><strong>Alumni/Past Participant Involvement</strong></td>
<td>None</td>
<td>LA Program</td>
<td>LA Program</td>
</tr>
<tr>
<td><strong>Data Available</strong></td>
<td>Extremely high</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Modes of Communication</strong></td>
<td>Limited: Audio/Visual</td>
<td>High: in-person</td>
<td>High: in-person</td>
</tr>
</tbody>
</table>
5.4 RECOMMENDATIONS

These three environments are designed for the same purpose: to teach students and have students learn. While this learning is more focused in the brick and mortar course and in the MOOC, the same goals for engaging students in thoughtful academics exist. The modes by which this is accomplished are different for each community and so there are opportunities for melding the strengths from each. One form of this blending is seen with the idea of the flipped classroom where students watch recorded lecture videos for homework and then attend on-campus courses for more engaged group work. Another form of this blending is seen with the GEEN 1010 course, where all of the students live in the same residential community and the classroom becomes an extension of that community.

The option for creativity is available when these different options are all brought together. Ideally, there would be an option that was cheap and had the global potential of the MOOC while maintaining the invested and humanizing elements of the residential community. Maybe the future will see MOOCs replace the classroom in the same spirit that a flipped classroom does. But, instead of students watching videos and gathering in the classroom for group work, the students take courses online and gather in residential learning communities which guide their learning and connect them. These MOOCs, with staffing for monitoring the content, would connect students from one campus to another and free up the faculty’s time to engage with the local students in the residential communities.

This is just speculation, however, for a different future. But, that future is feasible and made possible by the MOOCs. In that sense, there is a way of synthesizing the newer technology with the historied idea of living learning communities. The classroom has been an iconic, useful and extremely effective tool for education, but it is also just another tool to be used.

The FMCE was a useful tool for comparing these environments based on one subject. When comparing these environments with the FMCE, the more community-based course had the highest absolute
learning gains. However, when looking at the normalized learning gains, the different environments all perform similarly. Both of these measures are important to consider, but the absolute gains speak more to the overall amount of learning happening in the environments, which suggests that the more community-based environment is more effective.

The different students being served by these environments is also important to consider. The MOOC served older and better educated students than either PHYS 1110 or GEEN 1010. The MOOC served mainly non-CU students. From a service-perspective, the MOOC’s broad, non-traditional reach is very effective, but the types of people reached are generally those who have had access to education. The residential community is limited in scope, but encourages high levels of involvement and community in those served. From a financial perspective, for both the institution and the students, the MOOC can be inexpensive and the residential community requires a much higher investment of resources.

Overall, the recommendation of this thesis is to continue studying these different environments. The potential for each of the environments can be better realized with further studies. Some of the potential future studies specific to each environment are describe in the summary sections: Section 3.4 and Section 4.4. A future study for comparing these environments would be to look at sample populations of the PHYS 1110 “brick and mortar” course students, representative of either the MOOC or the residential subgroup (GEEN 1010) students, to look into answering how the MOOC or residential subgroup (GEEN 1010) students would have performed had they been in PHYS 1110.
6 CONCLUSIONS

This thesis presented two radically different education environments: the MOOC and the residential community. Comparing these two environments is difficult because of the differences inherent in their natures. The MOOC is topic-specific and content-driven whereas the residential community has no specific course content. The MOOC has a world-wide reach while the residential community is physically limited by the size of its building space. However, despite the differences in these details, these two environments have the same goals: to encourage student learning and to promote academic thinking. At the administrative level, there have to be decisions made about where to allocate the university’s money and resources. At that level, when those decisions are being made, the residential communities and the MOOCs have to be compared against one another. This provides the motivation for bringing these two radically different learning environments together and comparing them with the tools available. The conclusions of this thesis come three-fold.

For those interested in creating a MOOC, this thesis has presented one method by which MOOCs were successfully implemented from existing university-level courses. Any future MOOCs should take into account that the CU MOOC instructors felt dissatisfied while teaching their MOOCs because of the depersonalization inherent in the environment. The technology of the MOOCs is not at the forefront of educational technology, but it has the capability of serving hundreds of thousands of students at once. Just because the MOOC can serve hundreds of thousands of students does not mean that many students will enroll in a MOOC and the retention rate for MOOCs is extremely low. The types of students who enroll in MOOCs are non-traditional, but already generally well-educated with the majority having some form of higher education degree.

For those interested in creating a residential community, this thesis has presented one type of residential community which was successfully implemented twice on the CU campus. Any future
residential communities should take into account the lessons learned by the leaders in these environments: that the live-in faculty should have a voice in the building design, that students should have a voice in any application processes, that involving multiple programs in the community will cause identity issues, and that community is not precise or policy driven and requires effort to effectively guide. The students involved in a residential community can be very active members of the community which can lead to high levels of participation in community events and to low levels of behavioral problems.

The comparison of these two environments was done with respect to a typical “brick and mortar” course on-campus using a standardized test for students’ conceptual mastery of physics. This thesis found that the more community oriented environment provided the highest learning gains in absolute terms and that all of the environments provided similar normalized learning gains. There is potential for both MOOCs and residential communities to make a positive impact on the University of Colorado campus and globally, but both are competing with each other – and with other environments and policies not mentioned in this thesis – for the university’s resources. This thesis is intended to better inform policy- and decision-makers by injecting research and data into the discussion about implementing these different education technologies.
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A. EXTENDED LITERATURE REVIEW

A.1 OVERVIEW OF UNIVERSITY RESIDENTIAL COMMUNITIES
The following is a brief overview of several higher education institutions’ residential programming. The results of this study are summarized in Section 1.2.2.1.

A.1.1 Method and List of Universities
This overview begins with the University of Colorado at Boulder because that is where the environment of this study resides. This overview will then expand to explore the other Colorado institutions’ websites to find similarities and differences. The next stage for comparison will be based on a Google search using the pertinent keywords. This will expand the search to other universities within the U.S. Following this will be an overview of the top U.S. schools’ websites for residential academic programming, or the equivalent as there is no unifying terminology. Finally, this overview will expand outside of the U.S. to the origins of residential colleges. In total, ‘fifteen different universities’ live-in learning communities will be detailed based on their websites:

1. University of Colorado at Boulder (CU)
   - http://www.colorado.edu/admissions/undergraduate/lifeatcu/housing/RAPs

2. Colorado State University (CSU)
   - http://admissions.colostate.edu/residentiallearningcommunities

3. University of Northern Colorado (UNC)
   - http://www.unco.edu/housing/parents_family/residential_learning_communities.html

4. Denver University (DU)
   - http://www.du.edu/housing/
5. Colorado College
   - http://www.coloradocollege.edu/offices/residentiallife/

6. Colorado School of Mines
   - http://residence-life.mines.edu/

7. University of Massachusetts, Amherst (UMass)
   - http://ualc.umass.edu/rap/aboutrap/

8. Michigan State University (MSU)
   - http://admissions.msu.edu/academics/learningCommunities.asp

9. University of Missouri (MU)
   - http://reslife.missouri.edu/lc-fig

10. Northwestern University (NU)
    - http://www.northwestern.edu/living/about-us/academic-initiatives/index.html

11. Princeton University

12. Harvard University
    - https://college.harvard.edu/student-residential-life/residential-life/upperclass

13. Yale University
    - http://yalecollege.yale.edu/content/residential-colleges

14. University of Cambridge

15. University of Oxford
A.1.2 Overview of Colorado Institutions

At CU Boulder, there are 14 different RAP choices. These different programs offer an enriched curriculum and programmatic activities, faculty advisement, and upper-division student mentoring.

Some of the individual RAP sites mention that there are special courses or seminars. Faculty and peer mentoring are also mentioned in a few places. The focus of these RAPs seems to be on the freshman experience and on encouraging success at CU.

For CSU’s Residential Learning Communities, half of the 14 communities are described in a few brief sentences describing which students can apply and where the program is housed. For the other half, five are a part an overarching Key Program and are housed together, one is for honors, and the other is for leadership development. For the latter, there are more detailed webpages – linked directly from the CSU website – which include lists of the programs and activities offered such as service projects, workshops, Key Mentors (students), etc. For the more detailed communities, there is an emphasis on the freshman experience but not to the exclusion of the upper-division students as there are programs designed for second year students.

UNC also uses the Residential Learning Community terminology and has 15 different communities. These programs are delineated into two types by either being academically focused or by being interest-based. The different programs group students through a range of topics ranging from interests in biology or business to simply wanting to live with a pet. A few of the UNC residential programs offer classes. There is an emphasis on bringing together students with overlapping interests.

The rest of the Colorado universities analyzed have residence halls, but no explicit RAP information found on the websites during this overview. However, DU’s housing page describes a vision of students
living and learning together and calls itself by Housing and Residential Education for students to apply to programs. The Colorado College and Colorado School of Mines websites both describe the residence halls and amenities.

A.1.3 Overview of Other U.S. Institutions

A similar analysis of other US universities provides similar results. Using Google to search “Residential Academic Programs” brings up a list of universities: University of Massachusetts, Amherst (UMass), Michigan State University (MSU), and University of Missouri (MU). Similarly, using Google to search “Residential Academic” finds UMass and MSU again, but also Northwestern University (NU). The housing websites for these universities provide just as much detail as the CU website did. Notable differences from CU that these universities offer include: live-in faculty or Faculty in Residence (FiR), history (up to 50 years of tradition), and program sizes (as in the number of involved students).

The names for these universities’ programs vary just as much as the Colorado universities’ did with the UMass program being called RAPs, MSU’s being called Academic Living-Learning Communities/Living-Learning Residential Programs, MU having General/Thematic Learning Communities, and NU having Residential Colleges/Communities. Each residential university offers students a place to live and learn. Each university then takes the idea of a community that promotes learning and success and develops its own RAP-like system with its own RAP-like name to entice, and hopefully help, students.

As a final, though by no means conclusive, summary of U.S. RAPs, a sampling of the top universities’ RAP-like programs are reviewed. These institutions were chosen by using the top three universities from the U.S. News’ list of National University Rankings: Princeton University, Harvard University, and Yale University. These institutions’ housing websites follow the same general trends as the others, but offer more detail in terms of the history of the programming. Overall, there are special housing
specifications, involved faculty, special classes or tutors, and other unique aspects that change with the university.

For Princeton, its 1906 University President Woodrow Wilson drafted a plan for a residential living program in a quad-style, but it took until 1978 before the idea picked up again and Princeton instituted its Residential College system with 6 residential colleges. The Harvard residential programming is different for its freshmen and upper-division students in that all freshmen live in the same area, the Harvard Yard, which does not have any advertised academic-specific programing. After their first year, Harvard students get placed into one of twelve Upperclass Houses. These Houses are similar to the residential programs mentioned so far in that specific faculty sponsor each House and provide mentoring via shared meals, events and coordinating House tutors. And, very similar to these but different in its own ways, the Yale Residential College system sorts students into its twelve colleges before students even arrive, striving to create demographically equivalent communities. Yale has 70 years of tradition surrounding its programing which involves faculty who serve as either a Master or a Dean for each college. These two roles split up the students’ welfare into two categories wherein the Master is responsible for students’ safety and their educational and social development while the Dean takes on a more administrative role by helping students sign up for classes and tutoring programs.

A.1.4 Overview of Residential College Origins

This thesis will be delving into the AHRC, which is a RAP on the CU Boulder campus, but which distinguishes itself from other CU RAPs by titling itself a residential college. The importance of naming, and particularly in the diverse nature of names amongst the US university RAP systems, leads this study of RAPs to the origins of residential colleges. Residential colleges have their beginnings in the United Kingdom at the University of Oxford in the 13th Century. Oxford’s collegiate system began with University College in 1249, Balliol College in 1263, and Merton College in 1264 and now consists of 38
independent and self-governing colleges. Each college has its own page and offers classes and facilities almost like a separate institution, but remains a part of the larger university system. However, instead of offering associated faculty who sponsor events or teas or seminars, the Oxford College model relies on a tutoring system. This tutoring system consists of weekly meetings between a couple students and a Tutor to discuss weekly readings and to allow students to express their ideas and opinions. The Tutor, an Oxford faculty member, endeavors to help students grow individually as academics during these meetings. The other UK university to institute a similar model was Cambridge, which opened its first Residential College, Peterhouse, in 1284. Cambridge now has 31 Residential Colleges and its newest was founded in 1979, just one year after Princeton’s first Residential College. The advertisement for Cambridge’s system makes specific note that these colleges are not just residence halls, but are designed to foster community, offer financial assistance, and academic support. Like the Oxford Tutors, Cambridge has a supervision system which it credits for encouraging student achievement and academic success.

While AHRC and other U.S. institutions take the name from these British institutions, the actual model for residential learning communities is not the same as the Oxford or Cambridge models. As can be seen in the diversity of the naming for these communities, each university has its own unique programming for live-in learning communities. One consistency among all of the different RAPs – be they called Residential Colleges, Residential Learning Communities, or Residential Academic Programs – is the element of university students living together. And yet, as Cambridge’s website indicates, the living together aspect is different from students simply living in a residence hall together. Somehow, the commonality of the living space is elevated to an intentional community. The modes by which this transition happen are not mentioned in any of the RAP descriptions except that involved faculty foster community and that students should be invested in order to make the community their own.
A.2 1991 – Mentoring and Undergraduate Academic Success: A Literature Review – Maryann Jacobi

A well-cited, though older literature review on mentoring as it relates to higher education and undergraduate success was published by Maryann Jacobi in 1991 in the Review of Education Research on behalf of the American Educational Research Association. This review consisted of a comprehensive overview of the significant studies done on mentoring between 1963 and 1991. Jacobi delved into the definition of mentoring, the links found between mentoring and undergraduate success, and the theoretical models of mentoring in the context of higher education and academia. Her review took into account articles in the fields of business and psychology to help supplement the smaller field of mentoring in higher education.

Firstly, in trying to find the working definition of mentoring in the literature, Jacobi found that there really was none. In her words, this: “…variation in operational definitions continues to plague mentoring research and has almost certainly devalued the concept for application in ‘hard’ research.” (Jacobi, 1991 p.508). However, instead of simply lamenting the lack of definition, Jacobi used her study to take the first steps towards creating one. In order to narrow down the list of studies’ definitions to combine, Jacobi applied a strict criteria of having a description that was sufficiently generic, original (ie: based on observation), detailed (with at least 3 different attributes), and relevant (by number of citations in other mentoring research). This smaller set of definitions for mentoring came from eight different studies (Jacobi, 1991). From these Jacobi made a list of 15 distinct functions:
Table A-1: Jacobi’s mentoring functions as applied to various mentoring literature. (Jacobi, 1991 p.509)

<table>
<thead>
<tr>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance/support/encouragement</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Advice/guidance</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bypass bureaucracy/access to resources</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Challenge/opportunity/“plum assignments”</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Clarify values/clarify goals</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Coaching</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Protection</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Role model</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Social status/reflected credit</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Socialization “host and guide”</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sponsorship/advocacy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stimulate acquisition of knowledge</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Training/instruction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Visibility/exposure</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

These 15 functions all fit into three broader categories: emotional and psychological support, professional development, and role modeling (Jacobi, 1991).

This synthesis of the various mentoring definitions helps to understand what mentoring is, but does not help to understand who the mentor or mentee are. Some common trends for confusion within the mentor-mentee relationship are: age/gender/ethnicity differences, duration of the relationship, intensity and frequency of meetings, formality, and reasons for being in the relationship (especially with regards to the mentor). Many studies presume that the mentor be older, but mentoring in higher education sometimes refers to peer-to-peer mentoring which blurs the lines of the age gap requisite.

Some studies assert that a mentoring relationship can occur within one meeting while others maintain that the mentor-mentee relationship should last several years. The issue of motivation for the mentor is also debatable because the relationship is typically very mentee-centric (Jacobi, 1991). However, for the mentor to be motivated to stay involved, they must derive some form of benefits from the relationship.

By considering these problems and the synthesis of previous authors’ definitions, Jacobi presents an operational definition to be used in further studies. This definition consists of five overall qualities. Firstly, the mentorship is beneficial to the mentee by being helpful and supportive (Jacobi, 1991).
Secondly, the mentorship serves multiple functions related to the three categories of emotional and psychological support, professional development, and role modeling (Jacobi, 1991). Thirdly, the mentor-mentee relationship is reciprocal in that not only the mentee but also the mentor benefit from the relationship. Fourthly, the relationship is personal and involves some form of direct person-to-person contact (Jacobi, 1991). And lastly, the mentor has more experience, influence or achievement in the environment of the mentor-mentee relationship.

The second part of the piece consists of a more detailed look into the existent links between mentoring and success for the undergraduate student mentee. There is found to be, again, a dearth of rigorous studies available and those that are available either are lacking in methodology, external validation, etc. For informal mentoring, several studies found that faculty contact had an impact on student achievement (Jacobi, 1991). However, other studies found that the benefits of this faculty contact might be an inefficient means of promoting academic success and that there might be better alternatives. In other fields, like business, there is evidence that managers with mentors are more satisfied with their job and believe themselves to be more successful. However, one of the largest oversights in most of these studies is the issue of deriving causality from correlation when one possibility is that, for the above mentioned case, managers who are satisfied with their job and believe themselves to be successful are more likely to attract a mentor (Jacobi, 1991). In this sense, many of the studies on informal mentoring might be missing the true nature of the relationship.

For formal mentoring programs, there is a different problem. There exist a great number of studies which suggest how to create a mentoring program but then lack any empirical evidence to support the method. Despite this theme in other studies, one done by Cosgrove in 1986 is thought by Jacobi to be: “among the strongest methodological efforts to systematically assess the effects of a formal mentoring program.” (Jacobi, 1991 p.517). In the study, Cosgrove used random assignments to sort freshmen into
experimental and control conditions. The data was gathered using standardized measures for student satisfaction, behavior, and development and showed that students received benefits from the mentoring program. However, even in being one of the best studies, it still did not account for other variables or influences which might have affected students’ results and the study did not look into academic successes. Too, Cosgrove’s study was only performed at one institution and was not well verifiable.

The lack of methodological rigor in the field that Jacobi finds may be due to inherent constraints of the research. While there exist a plethora of mentoring programs and definitions and while researchers do not agree on what variables to measure, this may be partly due to a distinct lack of measurement tools or validation techniques (Jacobi, 1991). Because there are a number of different mentoring programs, isolated from one another, most studies are done in one department at one institution and have no generalizability to help progress the field. While most studies are unable to account for outside influences on student performance, this might be because the effects of other intervention techniques are not well studied either and so are simply not well known. And finally, Jacobi calls for more studies to be done to investigate the effects of mentoring over time. However, the timescale and development of a mentoring relationship is not well known and studies requiring many collections of data to determine these attributes might be invasive to the relationship itself. As a result, it seems that most studies sample at one time to assess student perceptions and performance.

The overall theme of this study is a clear lack of hard research and scientific understanding on mentoring. The roles and relationships are loosely defined and poorly examined, but that can change. In her concluding remarks, Jacobi states: “mentoring remains unclear and imprecise, and the effectiveness of informal or formal mentoring in promoting undergraduate academic success is assumed rather than demonstrated.” (Jacobi, 1991 p.526). And, as universities and colleges continued to
implement more and more mentoring programs, there existed more and more opportunities to investigate mentoring and its effects on undergraduate academic success.


The review done by Jacobi in 1991, while slightly out-of-date, is still representative of the mentoring literature today. This is demonstrated in a follow-up review which delves into the literature between 1990 and 2007 and seeks to assess how the mentoring research community responded, or did not, to Jacobi’s review. In brief: “Though the progress of mentoring literature appears to have grown steadily, it has lagged behind program development and implementation efforts and has yet to adequately resolve the issues broached 16 years ago by Jacobi.” (Crisp, 2009 p.526). The research community still lacks a consistent definition of mentoring and rigorous, empirical and quantitative studies which allow for external validation.

In this updated literature review, the authors take a similar approach that Jacobi took and look into the definitions for mentoring, the empirical studies, and the state of the theoretical research. Too, the authors present a methodology for their literature review and describe the keywords they used and the data bases they searched. The review consists of 52 articles covering mentoring in academia, business, and psychology followed by a more focused review of 42 articles involving only studies on undergraduate and graduate university students which specifically mention mentoring (Crisp, 2009).

Using the more broad review, with the 52 articles, the authors found over 50 different definitions for mentoring (Crisp, 2009). There are particularities within each field – business defines the mentor as an older employee; psychology defines mentoring with a strong focus on psychological development; and academia tends to be vague, if even defining mentoring at all – but the tendencies of each field do not coalesce into any field-specific definitions (Crisp, 2009). These many different definitions, however, do
strengthen the three main functions put forth by Jacobi. The studies agree with the functions, but then disagree on how to apply them to a definition.

One study, performed by Kram in 1983 in the field of business, proposed a set of development stages for a mentoring relationship (Crisp, 2009). The first stage, initiation, is the beginning of the relationship and can last up to a year. The second stage, cultivation, is for the next 2-5 years and is when the mentee develops because of the mentoring. The third stage, separation, occurs when fundamental and organizational changes interrupt the mentoring relationship. And finally, the last stage, redefinition, is when either the relationship ends or it evolves into something else. This study into the development of the mentoring relationship is one of the most comprehensive empirical studies found (Crisp, 2009). However, as this study was done in the field of business, the results may not be generalizable to academia or, more specifically, to university students. Still, the results stand as a possible time-structure for a mentoring relationship.

In the review focused on studies from higher education environments, 42 papers, the research was disconnected except for the core topic of mentoring. The bulk of studies concerned undergraduate students and 4-year institutions to the exclusion of 2-year colleges and technical schools, but with significant increase in the demographic diversity of studies (Crisp, 2009). Of these 42 articles, 19 were quantitative (Crisp, 2009). The majority of these quantitative studies lacked experimental method and design, partly in not having a well-defined definition for mentoring, partly in using only self-reported data and sampling at only one time, partly in not using comparative groups, and partly from not detailing how the study sample could be extrapolated to a larger population. Despite the deficiencies of the bulk of the studies, this literature review found three studies worthy of mentioning because of their solid methodology.
The three reliably framed studies were by Paglis et al. in 2006, Santos and Reigados in 2005 and Campbell and Campbell in 1997. The earlier of these studies, by Campbell and Campbell, is deemed by the reviewers as the most rigorous quantitative study on mentoring (Crisp, 2009). The study looks into the effects of mentoring on minority students’ academic success. The students’ successes were defined in the study as their GPA and retention. The study used both a control group and an experimental group and assigned students to either using a randomizing process. The study found that the mentored students had statistically significant differences in their success: having higher GPAs and higher retention rates (Crisp, 2009). The study also delved into the differences found between the mentored students and found that students with more frequent and longer mentoring encounters received more benefits from the overall mentoring. The major limiting factor of the Campbell and Campbell study was the sample size, with less than 350 students (Crisp, 2009).

The other two reliable and rigorous studies found in the literature review looked into other aspects of mentoring, such as the role of ethnicity within mentoring relationships and how mentoring impacts student productivity and self-efficacy. The Santos and Reigados paper demonstrated that ethnically homogenous mentoring pairs led to more satisfaction in the mentoring program and better adjusted to college mentees (Crisp, 2009). The Paglis et al study, which only sampled graduate students in the sciences and engineering, showed that mentoring improved student productivity (Crisp, 2009).

The remaining studies of this review were the qualitative ones focused on mentoring in academia. These studies delved into the students’ perceptions of mentoring and generally used descriptive narrative to demonstrate their findings. Overall, these qualitative studies lacked empirical support and relied heavily on programmatic reviews as data sources wherein the main focus of the programmatic review was in program issues and the aspect of mentoring largely assumed (Crisp, 2009).
The rest of the literature review deals more in depth with the major issue of properly defining mentoring and the process of mentoring. The authors look into the other fields, citing a 1978 paper by Levinson et al and a 1983 paper by Schockett from psychology and the 1988 paper by Kram from business. Too, the authors delve into studies on K-12 teachers, nursing students, medical students, first generation and low-income students, and so on. What the authors conclude is, much as stated before...

...researchers have yet to identify an externally and theoretically valid model of mentoring.

Although several attempts have recently been made to conceptualize mentoring within the context of higher education students, the majority of work to date has been primarily qualitative and exploratory in nature, rather than confirmatory and verificative. (Crisp, 2009 p.538)

The theory of mentoring is, essentially, not well realized. This has an impact on the studies into mentoring, as can be seen in the studies showcased by this review. Even the quantitative study found to be rigorous and methodologically sound was performed on too small a sample to properly extrapolate and generalize. In short, many of the problems mentioned in the first literature review, by Jacobi, are still unsolved.
B. SURVEY DETAILS

B.1 CLASS
The CLASS is designed to measure students’ attitudes and beliefs about science (Adams, 2006). The survey consists of 42 statements which the students respond to on a Likert scale from Strongly Disagree to Strongly Agree. These questions are included in the table below.

Table B-1: CLASS Survey Questions. There are a number of statements for which the opinion of experts is known and the expert opinion for these statements is included parenthetically after the statement. (Adams, 2006)

<table>
<thead>
<tr>
<th>CLASS Survey Questions in Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A significant problem in learning physics is being able to memorize all the information I need to know. (Expert Disagrees)</td>
</tr>
<tr>
<td>2. When I am solving a physics problem, I try to decide what would be a reasonable value for the answer. (Expert Agrees)</td>
</tr>
<tr>
<td>3. I think about the physics I experience in everyday life. (Expert Agrees)</td>
</tr>
<tr>
<td>4. It is useful for me to do lots and lots of problems when learning physics.</td>
</tr>
<tr>
<td>5. After I study a topic in physics and feel that I understand it, I have difficulty solving problems on the same topic. (Expert Disagrees)</td>
</tr>
<tr>
<td>6. Knowledge in physics consists of many disconnected topics. (Expert Disagrees)</td>
</tr>
<tr>
<td>7. As physicists learn more, most physics ideas we use today are likely to be proven wrong.</td>
</tr>
<tr>
<td>8. When I solve a physics problem, I locate an equation that uses the variables given in the problem and plug in the values. (Expert Disagrees)</td>
</tr>
<tr>
<td>9. I find that reading the text in detail is a good way for me to learn physics.</td>
</tr>
<tr>
<td>10. There is usually only one correct approach to solving a physics problem. (Expert Disagrees)</td>
</tr>
<tr>
<td>11. I am not satisfied until I understand why something works the way it does. (Expert Agrees)</td>
</tr>
<tr>
<td>12. I cannot learn physics if the teacher does not explain things well in class. (Expert Disagrees)</td>
</tr>
<tr>
<td>13. I do not expect physics equations to help my understanding of the ideas; they are just for doing calculations. (Expert Disagrees)</td>
</tr>
<tr>
<td>14. I study physics to learn knowledge that will be useful in my life outside of school. (Expert Agrees)</td>
</tr>
</tbody>
</table>
15. If I get stuck on a physics problem on my first try, I usually try to figure out a different way that works. (Expert Agrees)

16. Nearly everyone is capable of understanding physics if they work at it. (Expert Agrees)

17. Understanding physics basically means being able to recall something you’ve read or been shown. (Expert Disagrees)

18. There could be two different correct values for the answer to a physics problem if I use two different approaches. (Expert Disagrees)

19. To understand physics I discuss it with friends and other students. (Expert Agrees)

20. I do not spend more than five minutes stuck on a physics problem before giving up or seeking help from someone else. (Expert Disagrees)

21. If I don’t remember a particular equation needed to solve a problem on an exam, there’s nothing much I can do (legally!) to come up with it. (Expert Disagrees)

22. If I want to apply a method used for solving one physics problem to another problem, the problems must involve very similar situations. (Expert Disagrees)

23. In doing a physics problem, if my calculation gives a result very different from what I’d expect, I’d trust the calculation rather than going back through the problem. (Expert Disagrees)

24. In physics, it is important for me to make sense out of formulas before I can use them correctly. (Expert Agrees)

25. I enjoy solving physics problems. (Expert Agrees)

26. In physics, mathematical formulas express meaningful relationships among measurable quantities. (Expert Agrees)

27. It is important for the government to approve new scientific ideas before they can be widely accepted. (Expert Disagrees)

28. Learning physics changes my ideas about how the world works. (Expert Agrees)

29. To learn physics, I only need to memorize solutions to sample problems. (Expert Disagrees)

30. Reasoning skills used to understand physics can be helpful to me in my everyday life. (Expert Agrees)

31. We use this statement to discard the survey of people who are not reading the questions. Please select agree (not strongly agree) for this question to preserve your answers.

32. Spending a lot of time understanding where formulas come from is a waste of time. (Expert Disagrees)

33. I find carefully analyzing only a few problems in detail is a good way for me to learn physics.

34. I can usually figure out a way to solve physics problems. (Expert Agrees)

35. The subject of physics has little relation to what I experience in the real world. (Expert Disagrees)
36. There are times I solve a physics problem more than one way to help my understanding. (Expert Agrees)

37. To understand physics, I sometimes think about my personal experiences and relate them to the topic being analyzed. (Expert Agrees)

38. It is possible to explain physics ideas without mathematical formulas. (Expert Agrees)

39. When I solve a physics problem, I explicitly think about which physics ideas apply to the problem. (Expert Agrees)

40. If I get stuck on a physics problem, there is no chance I'll figure it out on my own. (Expert Disagrees)

41. It is possible for physicists to carefully perform the same experiment and get two very different results that are both correct.

42. When studying physics, I relate the important information to what I already know rather than just memorizing it the way it is presented. (Expert Agrees)

The questions are then broken up for analysis into the following categories: personal interest, real world connection, problem solving general, problem solving confidence, problem solving sophistication, sense making and effort, conceptual understanding, and applied conceptual understanding (Adams, 2006).

There is a tool that was developed by the CLASS authors which can quickly analyze the CLASS data and sort out student responses according to whether or not they align with the expert opinion. Too, this tool can calculate shifts towards and away from the expert opinion for input sets of match pre-/post-CLASS responses. This tool also provides the coding for which questions fit into which categories, which is displayed in the following table.

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Interest</td>
<td>3, 11, 14, 25, 28, 30</td>
</tr>
<tr>
<td>Real World Connection</td>
<td>28, 30, 35, 37</td>
</tr>
<tr>
<td>Problem Solving (General)</td>
<td>13, 15, 16, 25, 26, 34, 40, 42</td>
</tr>
<tr>
<td>Problem Solving (Confidence)</td>
<td>15, 16, 34, 40</td>
</tr>
<tr>
<td>Problem Solving (Sophistication)</td>
<td>5, 21, 22, 25, 34, 40</td>
</tr>
<tr>
<td>Sensemaking / Effort</td>
<td>11, 23, 24, 32, 36, 39, 42</td>
</tr>
</tbody>
</table>
The analysis tool calculates statistically valid shifts towards either expert-like opinions or towards novice-like opinions for each of the questions and also creates a chart demonstrating where the students’ average response for each of the above categories resides in terms of both agreeing with and disagreeing with the expert opinion. These are the type of data that are reported about the CLASS in this thesis.

B.2 DEMOGRAPHICS SURVEY
The actual survey questions are:

1. This subject is relevant to my academic field of study.
2. This class teaches skills that will help my job/career.
3. I want to earn some sort of credential that I can use to enhance my CV resume.
4. Because this course is offered by a prestigious university.
5. I think taking this course will be fun and enjoyable.
6. How many hours per week did you expect to spend on this course when you first enrolled?
7. What country are you from?
8. What is your highest academic degree?
9. In what field(s) do you hold your highest degree(s)? (Select all that apply.)
10. Have you taken any physics courses before, and if so, at what level(s)? (Select all that apply)
11. Have you ever taken any online course(s) before this one?
12. If your answer to the previous question is "Yes", what class(es) did you take?
13. Which of the following component(s) do you think is important in an online course? (Select all that apply.)
14. Which component of the class do you believe will most help your learning?
15. In my academic pursuits, I usually keep trying, even after experiencing setbacks.
16. In my studies, I often set a goal but later modify my goals or choose to pursue a different one.
17. In my studies, I usually finish whatever I begin.
18. In my schoolwork, I am more likely to finish work when a group project depends on it.
19. What do you expect to get out of this class? (check all that apply)
20. If you chose "other" in question 19, please explain that other here.
21. Do you plan to finish this course?
22. Do you plan to work with other people while you're learning / taking this course? (check all that apply)
23. If you live in the USA, what is your zip code?
24. What is your gender?
25. How old are you?
26. What is your annual household income (in US dollars)?

B.3 FMCE
The FMCE is designed to measure students’ conceptual mastery of introductory physics mechanics topics (Thornton, 1998). The test consists of 47 multiple-choice questions and can be found on “...the Workshop Physics On-line Instructor Resource Guide on the World Wide Web at http://physics.dickinson.edu” (Thornton, 1998). The survey can be scored simply out of all 47 questions, but an alternative scoring method has been developed, which combines questions and attempts to represent fluency amongst all of the measured concepts more evenly. This scoring, named for the developer of the FMCE and the alternative scoring method, is referred to in this thesis as the Thornton Scoring and was provided in an FMCE analysis tool by Prof. Pollock of the PER group at CU.

<table>
<thead>
<tr>
<th>Thornton Scoring Question #(#s)</th>
<th>FMCE Question #(#s)</th>
<th>Scoring Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 4</td>
<td>1 – 4</td>
<td>4 (Scored Individually)</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>8, 9, 10</td>
<td>2 (All or nothing)</td>
</tr>
<tr>
<td>7</td>
<td>11, 12, 13</td>
<td>2 (All or nothing)</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>9 – 19</td>
<td>16 – 26</td>
<td>11 (Scored Individually)</td>
</tr>
<tr>
<td>20</td>
<td>27, 28, 29</td>
<td>2 (All or nothing)</td>
</tr>
<tr>
<td>21 – 23</td>
<td>30 – 32</td>
<td>3 (Scored Individually)</td>
</tr>
<tr>
<td>24</td>
<td>34</td>
<td>1</td>
</tr>
</tbody>
</table>
This is the scoring method that is used throughout this thesis for calculating averages and normalized learning gains.
C. INTERVIEW TRANSCRIPTIONS

C.1 SCOT DOUGLASS (FIRST) — OCTOBER, 13 2013
Interviewer: Jack Olsen (Jack)
Interviewee: Scot Douglass (Scot)
Topic: CU Boulder’s Andrews Hall Residential College
Special Note: The interview was conducted in a car, picking up supplies for an Andrews event.

C.1.1 Time: 0:00

Jack

So, it is recording now and, uh, we might need to pause the recording and we’ll just make note of that
and then note when it is unpaused so those breaks are noted. So, if you want to introduce yourself and,
uh, I don’t know, acknowledge that you’re being interviewed and recorded and that you consent to that.

That’d be great

Scot

So, I am Scot Douglass I am an associate professor in the College of Engineering an appointment in the
Herbst program and director of the Engineering Honors Program also faculty in residence and director of
Andrews Hall Residential College which is in its fifth year the engineering honors program is in its eighth
year and, uh, the residential component of that began two years prior to moving into Andrews, so seven
years ago in Hallett Hall. I understand I’m being interviewed by Jack Olsen a graduate student in physics who is concerned about education. And I consent to his interviewing me and I consent to him using whatever information comes out of this part of this research project, in whatever publications come out of that, I also give my consent. Anything else?

Jack

Uh, no. I screwed up the other interviews in not really asking any of those things so I have to get them, like, on paper. Anyways, uh, so the first question, uh, “how and why did you decide to start the, uh, RAP program? So, getting at the Andrews Residential college, uh, and all of its predecessor forms. Uh, how and why to begin to think about those?”

Scot

So taking, taking one step back, because it’s rooted in the particular genesis of the Engineering Honors Program itself and that, uh, so about nine years ago the then associate Dean John Bennett brought together all the usual suspects in the college of engineering of key faculty members who really care about undergraduate education and asked them the simple question: “Are we providing the best possible education for our very best students?” And, the answer was a very mixed one. That from a particular viewpoint, the answer was fundamentally yes, which I think is true of almost any engineering curriculum in America. That students don’t leave, certainly by their junior year, sophomore year in AERO, or their sophomore year in applied math, that once they get done with their basic courses saying: “wow, I really wish we had gone faster, I really wish there had been more to material, I wish it had been harder.” That being said, we recognize that there’s all sorts of ways in which we can improve pedagogy,
all sorts of ways of bringing together some very, very good students, honors students, um, that there could be curricular improvements and things could be done better in the classroom. But, uh, but fundamentally the answer was yes and that worked itself out in lots of different ways. I mean we talk to different departments about what would it mean to a senior honors thesis in chemical for example. Chemical is very clear and I utterly agree that the thesis requirements they have for the normal students couldn’t be made more rigorous, couldn’t be made more difficult, that they are already doing the top level that would expect a very good senior student in chemical engineering. But, the question is: “Are we doing the very best for our students outside of the classroom and all the informal components that go into education, all the overall experience of being in the college, all the extra things that go into, um, learning to be, um, you know, getting an engineering education?” The answer was kind of a resounding no. That there’s always been incredible opportunities in the college of engineering, uh, in terms – of the terms of students doing things, but it was somewhat haphazard whether or not they would find these things as well as a the fact that, and this is where I come in with the residential college and why I think they asked me to be the founding director of engineering honors program.

Jack

Who are ‘they’ that asked?

Scot

So ‘they’ would be associate Dean John Bennett and Dean Rob Davis, on the basis of John Bennett’s recommendation, and the committee, of which I was a part, but which was charged with talking about thinking through what and engineering honors program at CU would like.
And so, so one of my particular interests, and one of my particular commitments and beliefs in education is just the incredible power and value of interactions between peers. And so part of what I wanted to see done in the Engineering Honors Program is not only selecting the very best students and trying to network them with opportunities like internships and research, but just the incredible value of bringing them together with each other and creating a model that would allow the vertical integration of first-year, incoming first-year students with second-, third-, and fourth-year students. That students would be constantly exposed to, um, at the beginning of their education, of what really cool things students further along were doing. And not only cool things that students were doing along, but just seeing models of just what great students look like and what it meant to be engaged in their education, and being intentional about their education, and to be inspired not only in terms of “hey, what can I do?” But actually “who can I be?”

Jack

Okay.

Scot

Jack

Mhmm
C.1.2 Time: 5:47

Scot

So, when I saw an opportunity within, when CU had this vision 2020, I think it was called, residential vision 2020, um, that they were asking for applications campus-wide for a program that might be interested in moving into a remodeled residence Hall. That they were remodeling all the ones in the Kittredge complex. That they had this open competition for programs who might want to move in. And, it was open to existing RAPs, who might want to move, or new RAPs. And so we put in our proposal, but our proposal kind of transcended what all the other proposals had been and what the idea of a RAP could be and really pushed forward the idea of what a residential college could be. It included the first ever proposal for a faculty in residence that we wanted to… my commitment to community was such that I really wanted to be part of the community and promoting the community on an organic, day-to-day level of actually living together. I wanted to the organic integration of the community, not only the vertical integration between students but also the family with children, pets, just this normal life things. And so anyways, we also put forward a model of wanting to have returning students. That the residential culture at that time at CU for, in all the RAPs – and still is really in all the RAPs except ours may be slightly with the A&S honors RAP – is that they were all designed for first-year students, they were all designed to be a first-year experience, and, at the time when we moved into the dorm, the number of students who returned was less than 2%, that it was like 98+% first-year students, who are required to live on campus, and then everyone moved off.
Okay, so, you have kind of gotten at the next question a little bit, uh, but just so more explicitly in terms of times and those things: “what have you done to make this community, uh, to create it essentially?”

Uh, you mentioned 9 years ago was when these, uh, talks and people approached you, so that would be 2004 then? Is when –

Scot

Early decisions were made 2004, 2005 and the initial class was in 2006.

Jack

Okay, So then, I guess, then starting just essentially from there, uh: “what have you done to create this community, uh, to the best of your memory?”

Scot

So, I think one of the things that was, I thought, incredibly important and common-common experience, a common interaction between me and all the, and the incoming cohort. So we started, we rolled in one class at a time. So, in 2006 we started with, uh, 22 students and added two more eventually so 24 students. These students were invited, uh, by me as I went through application records and all that. And so, we had one first-year class of 24 students. The following year then we rolled in 45 students, uh, and this was by our application, it was our first application process, it was online. Um, and that year, I think, we had about 80-90 applicants for 45 spots. Uh, we had some technical problems in the application that delayed some of them, I think.... Anyways, um, and so we were rolling in one class at a time and I
thought it absolutely essential that I teach a class that really set the stage for all the things I envisioned for the ethos, the culture, the type person that we were looking for, um, what it meant in my definition of what an honors student is – and I’ll get to that in a moment. And so, I invented the course called Critical Encounters where the main clear idea that we would be having and promoting critical encounters within each other, with material, with culture, with individual student’s history, with their aspirations and desires. But with an, with an emphasis on “critical” and this emphasis because we wanted to be community based on the idea of “the encounter.” And so, part of the course, I think, as years have gone on and we’ve had to multiply sections of-of this, that I teach, is that Critical Encounters establishes all the framework, establishes the vocabulary, establishes the goals. Um, and is a chance, is not only a chance to layout all these things, but is also a way to ask students to-to buy into the vision. To buy into this larger vision that, uh, as we try to create a culture, one of our goals is to create a culture that is “deeply ambitious without being competitive.” And, what I mean by that is, uh, super ambitious of students, you know, they wants to go to PhD programs at Caltech, they want to solve water problems in Rwanda or Peru, they want to save the world or change the world, they want to start their own company, they want to be the best teacher ever, whatever they want to do. We really want students, talented students to be deeply ambitious about that. But to, focus then as to who they are and what they want to do and not to be horizontally sucking value out of that and part of the motivation not to be “wow I’m really doing better than the person next to me.” And that we really want collaboration, we want to create an environment where students will enjoy the successes of others, be inspired by it and not be intimidated by it, wouldn’t, uh, the constantly measuring their value based on how they’re doing vis-à-vis other people in the program. That that would be a moment, again, of encouragement and inspiration not a moment of, you know, they feel they belong. And so, Critical Encounters was set up to be a common experience, a place where they would start to know each other, a place where as we deal
with philosophical questions and literary questions, would be a place where all the things that we want
to value: intentionality, being able to ask questions, uh, acknowledging one’s desires, all these sorts of
things would have, would would right from the beginning everyone would have this common experience.

C.1.3 Time: 12:25

Scot

And then it also provided this area of vertical integration where we set up, starting the second year, we
setup recitation sections led by non-first-year students. So the first year, it was all, you know, the
sophomores led the, uh, first-year students. And that has grown now to where – and these recitations
are limited to, they have varied in sizes from 5 to 8 to 10 students, even we got down as low as 4 one
year. Um, co-led by two students. So it’s an opportunity for upper-division students to work together
with each other. They meet together, I together with them weekly and I have always met together with
them. So, it’s another opportunity for me to develop leaders in the program. Um, and it’s also an
opportunity for first-year students to meet, uh, non-first-year students. And so, it’s just a process where
that just becomes a foundational cornerstone of what we’re trying to do. Um, in addition to that, uh,
I’ve always been on the lookout for unique opportunities for students – and whether it be the orrery
project, whether it be setting up individualized research things, whatever the case may be – and just
trying – and whether it be working on projects around Andrews – uh, just, what does it mean to have
students own things. Because I think one of the, one of our main desires, way of building things is
instead of asking: “hey, how can we provide a program that will be, you know, super attractive because
they get things from our program, you know, that they couldn’t get elsewhere?” Which is a model of some places, you know. “What kind of classes can we offer? What kind of services can we provide?” I mean, from the beginning, I’ve always wanted to have a program that called people to want, in buying into the vision, who wanted to belong because they really want, they, uh, wanted to impact others, they wanted to create a community that had certain values in it, and it was always: “how can I contribute to something that I want to be involved in.” Also other issues in play….Feel free to interrupt me at any time.

Jack

Yeah.

Scot

Um, I think other issues in play was just spending a lot of time with people, and engaging their lives and having this holistic sense that, you know, who you are as an engineer and who you, how successful you’ll be as an engineer is deeply impacted by how successful a human being you’re going to be. And, and so, it’s clearly, obviously there needs to be a mastery of certain technical skills of certain scientific concepts. But, create a space, create a context, create a place where students feel free to engage who they are, explore who they are, try to figure out who they are, and try to figure out how the entire, and integrate their larger life goals for the philosophy of work with Flossie of who they want to be for the 50 to 60 years of their life.
So all of these thoughts went into the creation of the Critical Encounters and the trajectory of those first two classes who, just to clarify, didn’t live in Andrews yet because it was not renovated.

Scot

Correct.

Jack

So, did those students live on-campus then as freshmen? How did that work?

Scot

Right, so the very first year, they all lived on-campus and, because there were required to, I mean there may have been one or two students who lived at home, as you can do, those 24 students. Starting the second year, uh, we took over part of a floor in Hallet Hall in anticipation of Andrews. So, the process of moving into Andrews, the competition for the 2020 Residential Vision spot was already underway. And, I was already working on that-that process. And so, uh, that-that very first-year also then, I mean, I’m sorry, the second, the first year in Hallet, so we had 45 students who lived that first year in Hallet. And, uh, we worked out in the beginning of this leadership thing, we worked out where, uh, Eric Benzel, who was a then second-year student who went through the RA application process and he became the RA floor that we were on. And, in so there was that beginning of commitment. There was also the
commitment of leadership from the sophomores to the Critical Encounters course. And, uh, the first year in Hallet was kind of a mixed year. Um, we started late in the process, uh, we learned a lot that year. And, out of that, what we learned for starting the next year is – so, this would be the entering class of 2007, of which Jack belonged – um, that we took over the entire wings so we could be insulated. That we really felt that first year the combination of, you know, we were on both sides of the central hallway and so we weren’t all together. Um, there was other students living, from Hallet, who find that they were, anyways.... We had mixed group of students living on the floor. And so, in the second year of Hallet, we were able to take over an entire floor of one wing. And, we also, and so there was 66 spots and 60 first-year students and invited, I invited, I gave stipends to-to encourage six students who had emerged as-as leaders, or who were beginning to emerge as leaders, including Eric Benzel, Cody Cicowitz, Lauren Schmeisser, Molly Boatright, uh, Adam Peterson was also in the group, and I think that’s it. Um, and so, Eric Benzel was no longer an RA in the Res-Life system, but we had two RA’s, who also were from EHP, as we attempt to do that: Daniela Castaneda and, uh, Greg Rancourt.

Jack

Mhmm.

Scot

So, anyways, so the next year was this much more unified vision and-and plan.
C.1.4 *Interruption for Directions*

Scot

So go straight.

Jack

Okay

C.1.5 Time: 18:37

Scot

Um, that was in play. And with—well, I mean core idea for how do we create identity, how do we promote community amongst our 60 first-year students. That there wasn’t a, that—the—the leaders, the six leaders were very much community leaders and they weren’t program leaders. That they weren’t, their main goal wasn’t to put on, you know, special program, special meetings, and all that. But, really how do we promote community in which students will buy into the vision that they want to move into Andrews the following year. And so, one of their clear goals was, knowing we were going to move into Andrews and Andrews has 227 beds, that we wanted as many of those first-year students returning to the following year as sophomores, kind of bucking the culture. This is the first attempt that we really did of trying to change the Res-Life culture. Coming out of the first year, we invited these six students to come back—I mean the first year in Hallet—but there was no wholesale attempt, in any sense, to try to
convince any of the first students in Hallet to come back and live on-campus in Hallet the following year.

Jack

That was purely self-motivated, if the students came back?

Scot

Correct. And it was by very clear invitation of me that: “hey, I noticed who you are. I think you’d be great at doing this. And can we invite you, I’m inviting you to be part of inculcating a vision, a part of making something happen.”

Jack

Okay.

Scot

And, I think that a lot of the energy of the very first years that helped make EHP successful was that, uh, that isn’t true anymore, is, you know, we’re in a building, we’re in the beginning of things, your effort makes a difference, your involvement makes a difference. Whether you come back and live in Andrews next year isn’t just about what’s good for your living situation, where do you want to and can we provide something better for you, but do you want to be part of making something happen. And, back
to the sense of trying to create a culture where we are asking things of students as opposed to simply saying: “hey, it’s in your best interest as, given all of these options, to, you know, you get a better bag of goodies if you come to Andrews versus don’t.”

Jack

Right.

Scot

Um, and so, uh, and we also then, moving into the first year of Andrews, uh, and again, I think that we were very, very successful that second year in Hallet. Um, that, and of course, all of the credit goes to the students themselves who moved in, who were wanting that sort of thing. Our, we-we started promoting the program on the basis of what we’re trying to do, so we attracted the kinds of students who were interested in such things and, and from there then, I think, things just started working, positive feedback, working on themselves. And so, the following year we invited, and so the first year in Andrews and so again we have 227 beds to fill.

Jack

What year was this?

Scot
This was 2008 and we’re moving onto campus –

Jack

2009, right?

Scot

Yes. Sorry, sorry, sorry.

Jack

2009-2010.

Scot

Correct.

Jack

It was my sophomore year.

Scot
Academic year 2009-’10. You are correct. It was our first year in Andrews. My family is moving into Andrews. Um, but we’re also inviting students from, who had been off-campus to move back into Andrews. And so, for example, you know, three senior Boettcher Scholars: um, Mitch Kosht, Colin West, Mark Kissler, who had been living off-campus since their first year, moved back on-campus. There’s a-a few students: Kyla Maletski had been off-campus and moved back on-campus. Um, there was a number of juniors that year, who had been in that first cohort of the 45 in Hallet, who bought into what we’re trying to do and moved on.

C.1.6 *Interruption for Directions*

Scot

So, up here....

Jack

Yes?

Scot

Take 6th Avenue.

Jack
Right. Stay on 6th?

Scot

Yeah.

Jack

Okay

Scot

Um, and we're going to get off at the Union exit, to the right.

Jack

Okay.

Scot

Um....
So, the students who were in the second year of EHP, first year of Hallet, juniors then, who were invited back.

Right, yes. As were the first, the class of 2006. And I think about 8-10 of those students decided to move back. Because again, I had been cultivating all along, on the side, the vision, what we’re trying to do, how they could impact that, how they can contribute to that. Um....

And they weren’t all engineers, where they?

No. So, that very first year, uh, there was, uh, 60, uh, EHP occupied about half the building. There was 60 or 62 new incoming first-year EHP students and about 55 students who were returning, they were combination of the entering class of 2008 from Hallet and, who were now sophomores, and students who are from the classes of 2006 and 2007 who returned either as juniors or seniors to live in Andrews.
Jack

Um just so maybe we don’t have to go through the same explanation of who all was specifically living there, can I work with you, uh, to build a list of just numbers-wise how many were from the first who may be came back in....

Scot

Yes.

Jack

So we don’t have to spend too much time specifying out there were these people who came back, and all that.

Scot

Right. Yeah, the only reason that I am, yeah, perfect, but yes....

Jack

I do understand that it is important to the vision.

Scot
Right, well it’s important to that, it’s not only important to the vision, but I think it’s important to know, I mean, in this first year back, there was this enticement back of students who had already lived off-campus and had tasted what life was off-campus and then had chosen, out of a commitment to the success of the program, I think, to move back.

Jack

Right.

Scot

That’s-that’s –

Jack

The important part.

Scot

– the point there.

Jack
Uh, backtracking a little bit, was there anything in the renovation of Andrews, and, uh, just the process that was going underway for that, that you, uh, were part of, in terms of making the space something that you, uh, wanted for the community or any of those things?

Scot

Yes. Right, so, uh, so there’s lots of things that I worked together with, uh, a person from Res-Life at that time, Lori Landers, who was Associate Director, uh, in Res-Life. We worked on a lot of things, we talked about a lot of things that didn’t happen. That I think that the space, the space is good, but there’s a lot of things we wanted from the space that we were denied. And, we were the first Residential College. We, uh, I think it’s accurate to say, you know, they had this kind of boilerplate idea, that they had gone through the whole process of renovating Arnett before they renovated Andrews, and they kind of had figured all these things out. And so, any, all unique issues that we wanted to bring into being and all of that, many of them we weren’t able to do. But, I think would have made a huge difference. Um, but a view of the things that we were able to do... So, I mean, the idea that there’s study lounges, that’s through all the remodels. The idea, of course, we added the faculty apartment, which was completely unique and new at the time, but now they’re doing it in their new renovations. Um, one of the things that we were able to do, that I think has made a profound difference, is that I pushed really hard for there, uh, for the common room to be a central place located, well obviously located in the central, but that every wing would have access to it. Um, Andrews Hall, like all the other ones, had one wing that had a walk-under underneath it. And so, one of the things they were originally, had planned on putting the classroom, uh, in the, cutting the common room in half and putting a ceiling, you know, making it a two floors thing and having the classroom above it. Um, and so, there was a very hard push, that the value of the common room as being openness, that it was the best space in the entire building,
that the protection of the common room was absolutely essential to, I think, part of the success that we’ve had. And that the front desk could be a place where people can, would come to— and not have to come into the building, go up and over a bridge, back down to the first floor—so that students from the first floor North would have equal access to the classroom and that the two classrooms got placed in that, what was the walk under area. So that was essential. I mean, things that we wanted to do that we weren’t able to do, is kind of on the Hogwarts model, is that I wanted to turn all of the hallways in the, in the areas into private bathrooms for the entire thing use the space that is now currently the common bathrooms, the block in the middle, would be an open common space. So that, every one of the floors would have a—

C.1.8 *Interruption for Directions*

Scot

Yes, and go south.

C.1.9 Time: 28:10

Scot
Um, every one of them would have a common space. We wanted kitchens on every floor. Um, we looked at lots of different things, but just, we were, they were, it was too late in the process and there was not enough, there wasn’t any openness to the ideas anyways.

Jack

Alright. Uh, do is you think that the actual physical space is a critical component to the building of this community? Or, uh, what are your views on how those struggles for the specific building specifications? Uh, are those necessary, kind of thing?

Scot

Yeah, I think they really are necessary and I think that, I mean, I think that we could, I think ultimately what we want to do with community our-our individual relationships and all that trump the facility and I think, I think we could have been successful in other buildings. But, I also think that there is a lot of things that really matter. That, I think, buildings can be a detriment to community: the walkover, for example.

Jack

Mhmm.

Scot
Um, the success we’ve had with open mic nights and all this sort of stuff that we couldn’t have had that in any other common space in any of the other buildings, that they’re all smaller. I think that, you know, we also pushed out the common room, we picked up the next 20 feet in the common room, which I think was absolutely essential. So, those little things. I also think it matters a huge difference that our apartment is on the second floor and opens out into student area. That, for example, the new faculty apartment Kitt Central is isolated on the first floor. There is no one that lives on that first floor and for the faculty in residence that, uh, there they have to make weird special trip, and it’s not even internally connected, to get up to the second floor where their students are. And so, I think that, that type of thing where all the serendipitous things: that when I walk down to my office, I walk past, you know, 20 student rooms; when I go down to the common room; when I go to teach that I’m constantly walking through the West Wing on the first floor or the second floor. Um, I think that just helps immensely. Um....

Jack

Presumably immersed somewhat in the students.

Scot

Yes.

C.1.10* Interruption for Directions*

Scot
Yeah, and you’re going to turn right on Alameda, when we get to it. And it will be on the right, very quickly. It’s called Frijoles Colorado.

Jack

Alright.

Scot

And this is Alameda.

Jack

Should we pause the recording then?

Scot

Sure.

Jack

Alright, well let’s pause that here.
Uh, we have unpaused the recording, so it is recording again. Uh, so if you want to just pick up back where we left off. We were talking about: “What have you done, in time order, to bring this community together” and we were getting into the beginnings of the Andrews Hall stage.

Scot

Excellent. So, one of the things I think that is most important is what I call the Invitation Model or an image of that is, uh, well, I’ll get to the image in a second – um, this is union – is that I think is really essential for this community to function that every student beyond the first year who is – students first-year are required to be there – that all the students who are shaping making it beyond that have chosen to be there and chosen to want to be there. And our return rate overall, um, I may forgetting exact numbers, but our return rate has been somewhere like 60-60+ percent: 60-70% of the first-year students return for second year, and about half of those return for a third-year, and about half of those return for a fourth year, but I can get you exact numbers. Um, but, the point is, and even the students in that very first year who had lived off-campus and came back, that again they’re coming back because they buy into it, in taking ownership and, uh, they really have made a choice. And, one of the things that we’re trying to promote, one of the say... So, taking a step back, well one of the things that were trying to promote is this sense of intentionality. And one of the things that that makes our community work is that we really try to think through, in everything we do, that everything we do performs our values and contributes to our values and contributes to our end goals and these-these, this core set of things of: so being ambitious without being competitive, of being, uh, intentional about your education,
about believing that the education transcends the classroom, that there is this huge informal
component to it, uh, that we want students to own their impact. Uh, so it’s not just “well, I’m a leader
now and I’m putting on my leader hat and so I have to behave a certain way” but, to kind of, universally
be asking the question: “Hey, what is the, what is the net value of, the net impact of my having spent
time with people? What does it mean for other people to live down the hall from me?” Uh, and just this
sense too, then, of just owning one’s self. And so, the nice thing I like about this, and the way I think
about my class too in Critical Encounters, is that, uh, I like the University model of a classroom because
it’s very clean: you give your syllabus on the first day, it functions as a contract: this is what you have to
read, this you have to do, these are the homework, this is how I’m going to evaluate you. And there’s
just this very, this very clean, uh, contract, this clarity. But, in the midst of that, I think, as the professor
for that class and the professor in the hall, I’m always saying: “but, there’s more!” And, I draw a line in
the sand and for those students who want more, they step across and I need them there. And then, I
take a step back and draw another line in the sand and say: “but, there’s more!” And, this “more” can
take the place of owning a project, uh, like that orrery, it can take place thinking through what kind of
furniture should be there, but it’s also this sense of I want to think more about what it means to hope
for people, I want to think more about what it means to be intentional, I want to think more about what
it means to understand how my history impacts who I am. But, the nice thing about this is that I’m kind
of, I have committed to meeting students where they are, according to their own initiative and there’s
no penalty in any way, uh, if they choose not to cross any of the lines because we’ve already set up the
initial contract of you take this class, you do this work, you get this grade for these things, and that’s
valuable regardless of whether they asked for more, do more, or anything like that.
Um, I just had a thought while we were going that I wanted to get back to. Um....

Jack

Do you remember what on?

Scot

Well, it was... Yeah, it had something to do with this sense of, uh, students stepping across these lines, the different types of things they do... Oh yeah! One of the things I wanted to mention about Critical Encounters, is the sense of everything performing everything. Is that, is that so, right now, since the GoldShirt students also take Critical Encounters, is like Andrews has 227 student, there’s 91 students taking Critical Encounters in three sections I’m teaching this fall. And, there’s also 30 recitation leaders as we need 15 groups of 6, average 6, students per group. So, in any given week, uh, one of the things that makes this work, is I meet weekly with 30 students who are asking the question: “How are the first-year students doing? How can we help them? What’s going on? How can they be more intentional?” So, I have allies, peer-peer collaborators in trying to promote the things we’re doing. I also have an opportunity, once a week, to spend another hour and a half with, uh, non-first-year students going over all the same material that went over in Critical Encounters and talking more about why it’s important and how interfaces with that. I’m asking these students to develop specific hopes for their 6 students, to
begin seeing their 6 students. Um, sight, I think, is a big component of what we’re trying to promote of, you know, do you hear and see the other. And, what is it mean to hear and see the other, uh, and meet them in their unique other-ness is-is a big goal of the program. And so also then, on any given week now, there’s 120 people walking the halls of Andrews – I mean not all of the recitation leaders live in Andrews, I’ll talk later about on-campus/off-campus relationships and our plans and how we tried to with that. But anyways, as 120 people reading the Odyssey, there’s 120 people reading the Symposium, all asking the same type of question. So, half the dorm, uh, you know, working on the same assignment and thinking about the same assignment. So, again, this is another thing, not only does it create a common experience, a common vocabulary, a common way to think about things, but it’s also just, uh, a community builder that people are about the same thing.

Jack

Mhmm.

Scot

Um, and so, uh, this Invitation Model though is that, you know, students apply to become recitation leaders because they really want to. Um, we have students who are leaders within the program – mentors we call them. But there not mentors in the sense of “your assigned these 6 people.” Those are tapped on the shoulder usually. They arise naturally. Uh, they’re given some stipend, but, you know, some of them do specific tasks like they promote research so this networking thing is that…. We have a- a mentor in charge of promoting research and-and what she does this year, uh, is put on a program, which they did this last week, I think it was 50 to 80 people at it, uh, a student panel saying: “hey, these
are, I’m your peer, I’m an older peer and this is how I got involved in research.” So, mapping out different path to get involved. And there’ll be a panel in November of faculty saying: “hey, this is how, when you walk in the my lab, this is what I’m looking for.” Then, there’ll be opportunities, there’ll be things in the spring then where students just get to share what they’re doing, there’ll be a poster night. We also have a mentor in charge of promoting international service development, Engineers Without Borders, and they put on a couple programs per year. So, we have some students who are tasked with taking on the responsibility to promote things: certain values, certain opportunities, and what....But, most of our leaders are just asked to think about the community and be involved in planning, integrating with Res-Life, which has all sorts of resources on its own, and students, the RAs, are required to do certain programs and how to integrate those, and all that.

So, a question about the organic nature of these assigned mentor positions. How did they come into being, the first time they came into being? Were they created in the first class of EHP? Were they created in the first class that was living in Andrews?

Yeah, they were...

Jack
Uh, were they...Uh, and were they positions that students wanted that became solid positions? Or, were they positions that, uh, you, as a program director, thought were important pos...uh, positions and found students who might fill those positions?

C.1.13 Time: 40:02

Scot

It’s a combination. Um, in the beginning we had this-the 6 mentors who moved in the dorm with no program responsibilities and were simply: create a culture that will want to stay together, create a culture that will, uh, function well as community and it will be an attractive community that they will wants to be a part of it and they’ll take ownership of trying to create it for others. Um, but then we also had, then when we moved in, you know, there was people who came out of that who were tapped to be leaders within the, within the dorm also. And, every year we had students like that. And then, out of that, we realized: “wow, we really want to promote research. Um, what we want to do? Wouldn’t it just be easier if someone were able to do that.” Um, and so part of these things just naturally evolved, naturally grew out of needs, out of vision, and out of a desire to do things. And also, on my part too, is that I’m always looking for ways, with our budget – and I’ll talk about budget in a minute – of how can we get students, you know, ways to get students to own things by giving them certain types of responsibilities that they’re passionate about or interested in. So, Anna Blackney, who was our first, uh, mentor in charge of promoting research, it was, she started that her, the second year of Andrews.
Scot

Yeah, her sophomore year. She was a very first one and, uh, she was just very interested in research and had done research and wanted other students to get involved with research. And, I’m looking for ways also to help students, uh, you know, these research mentorship come with small stipends, not so small, like $3000 a year usually. And so, just trying to figure out what are more ways to help students financially, to help students own things. Um, we just added this last year, because of Jordan Burns having her big interest, the mentor in charge of promoting international things. And so, I think there’s this evolving thing. To get things going the very first year, we also had, really the second year, had a mentor in charge of – was Mickey in your year or the year after you?

Jack

He’s in my year.

Scot

Yup. So, the first year Andrews then. Um, asking a student to be like the athletic director, to promote intramurals and just facilitate that. Um...
Scot

So anyways, I’m just, I’m always looking for multiple things. I’m looking for things that students are passionate about. And-and part of the idea of a mentoring thing, or the way I view this thing, is that, uh, unlike other, I think, unlike other things that, uh, I look for students who are about stuff and I want the mentoring, I want the mentoring position to be, to validate what they’ve been about. It’s not a situation where we have a job need and we ask, you know: “We need a responsibility, therefore I enter into a contract with you to do this responsibility, I’m going to give you this money and I expect this many hours, expect this many things.” What I’m really looking for are students who are about stuff, have been about stuff, have proven themselves to be about things and I want to mentorship to validate that and the money portion of it is to-to just cement the intentionality of the fact that they’re going to be doing something now and that there’s now just a slightly greater focus in terms of how they want to live this out.

Jack

So, something they might already have been doing unofficially and making it more of an official position?

Scot
Exactly.

Jack

Um, so logistically speaking, in terms of the “what you’ve done” uh, it just, it sounds like it’s a very organic day-to-day process in terms of interacting and engaging students as you walk from your apartments to teach. And then you teach. And then you meet with upperclassmen students who go out and talk with other students. Um, so I guess it’s hard to map down every single detail about those things. Uh, but what are some of the other big picture things that you done to, uh, create this community?

C.1.14 Time: 44:53

Scot

Um, we pick out, uh, we like, I guess we want people to be uniquely ambitious about things they want to be about, intentional about their own agendas and all that. We try to keep programming to a minimum. And so, each year, I mean some of the things we attempt to do is a fall and spring cultural event, a banquet at the end of the year. We try have opportunities for students to come together that aren’t burdensome to their program, I mean they’re not burdensome to the types of things. We want to have a minimal number of requirements, but have enough times where they come together where there’s a reminder that they belong to a community. So, I think these things support the community. And, I think that, so when we have 200+ people go down to see a play in Denver November, we only do that once a
year because it’s a big event. Um, and we just want, it has to be where, for it to work the we want to work, it has to be, they already belong to community and have belonged to community and this becomes an expression of it as opposed to this is really a moment where we are creating community. Um, I think most of our events work because we’ve already done all the hard relational work. We’ve been in the process of doing things. When we come together, that enhances that it. It’s doesn’t create it or began it. And so, programming doesn’t, we don’t use programming to accomplish our goals or to create what we want. We use programming to enhance, to underline, to punctuate what we’re already doing. So we do, you know, a handful of big events. We do a handful of other, and most of these have nothing to do with engineering, uh, we’re seeing plays, we’re going to go see Enders Game, we saw The Hobbit, we’re going to see The Hobbit 2. Just these moments of coming together where students, I mean, where really, they kind of can celebrate community, for lack of a better term, but enjoy each other, see friends they haven’t seen for awhile, be reminded of belonging to something bigger than themselves. So, there’s that whole, every year, we attempt to do all these sorts of things. We also attempt, and of course we run the all sorts of problems, we also attempt to do things that tap into their commitment to Andrews of enhancing the physical facility. Um, we’re making these glass writing boards, we’re trying to do that, we’re, uh, made the orrery, which I think is a fantastic thing that really…. I mean, hundreds of hours were spent on that of students just living out and getting very little, if any, academic credit for it. I think Eiton actually got in independent study thing for it, but everyone else just engaged in it for the love of engineering. Um, other things we’re trying to do, uh, just get students to own that this is the building, this is where I live, this is what I want for it, this is my mark I’ve left on it, this is... Those sort of things.

Jack
Um, I think there’s also a, uh, fine balance between just promoting what students do without creating an environment of competition or whatever. I mean, I think that’s a very fine balance. I mean, so I-I err usually on the side of a lack of recognition than an over recognition. So, I mean, we have our little board in the hallway that people can stop and read and look at the plaques and all that, we have sent out emails occasionally: we’ve mentioned winners of the International Mathematical Modeling Contest, things like that. But, hitherto not been this, you know, we don’t have our parade of graduating students and saying, which we could, you know: “Sam Johnson, on her way to Caltech. And, but Matonya Horowitz, on the way to Caltech. And did I mention that they both got NSF Fellowships.” That were trying not to be, I think it’s a, it’s a delicate balance for our community that we attempt to pull off. Um, and we more often err on the side of not trumpeting accomplishment than-than we do. And, part of that is a function, I think, from my perspective of that we’ve got a lot of these hyper, you know, we get a lot of the type-A, driven students to begin with... and we don’t want to feed that.

Right. So, uh, you mentioned some specific programmatic events like: the banquet at the end of the year, and some cultural events. Um, you’ve also mentioned, uh, other events, and I-I know of other events like Friday Night Hoops for Open Mic Night. Do you have any involvement with those? Or, how do those come together?
Totally, in different models with different things. So we, and those are two interesting examples. I started Friday Night Hoops because I love playing basketball and it’s an interesting thing because Friday Night Hoops is sustained because there is a core group of people who just love playing basketball. And, on any given Friday night, we’ve had as many as, like, 80 students go to play, we’ve had as few as, you know, at crunch times during the semester, down to like 12 or 14. But, we average about 30, I think, 30-35 students. Um, that’s not even, sometimes 40. So, I mean, 1 out of 5 students in Andrews. Um, but the thing that allows it to work, what we didn’t, what we didn’t do was say: “okay, uh, Friday night’s the night where a lot of people do self-destructive, dissipative behavior and we really need something that, uh, can occupy them.” We used to do it from 10-Midnight. Uh, Carlson has pushed its hours back. Now we do it from 8-10. We, like, for two years we did it from 9-11. Um, but, the point being, we didn’t come up and say: “oh, okay. We need something on Friday night in order to occupy students who otherwise might make bad decisions. Um, what should we do? Um, well a lot of people like to play basketball, but other people like… We don’t want to be, you know, excluding people, other people like soccer, other people like volleyball… Why don’t we rotate it and make it, in the sense of making it into a Friday night alternative behavior program.” Instead, I think it works, it’s organic and works because there is a core group of people, there’s 10-15 people who show up all the time because they just love playing basketball, you open up gym, they’re there. There’s another 10, 10, probably another 30 people who love playing basketball, uh, and they make it when they can. And there’s another group of people too, as we live out being ambitious without being competitive, we at, that they love hanging out with other people and they’re not really that good at basketball but they like playing because, you know, we split up teams as evenly as we can, we don’t keep score, we rotate teams quickly, uh, it’s just fun. But it also
serves great, it functions well because we all meet together in walkover together. So, we get 15 minutes of just walking. And then, because we split up teams, we break everyone up. And so, people end up playing, you know, on teams that they, you know, that other Andrews students, other EHP off-campus students they wouldn’t normally interact with. And then also, the way we set up, usually run six teams and there’s only two courts, and so, you know, 1 and 2 on court one, 3 and 4 on court two, 5 and 6 off. And 5 and 6 then spend 10 minutes hanging out on the sideline together, just with each other. And then it’s, you know, 1 and 3 versus, you know, 1 and 5 versus 4 and 6, and 2 and 5 are out. So, it’s, we keep rotating who’s in and who’s out and so over the course of two hours, there is a constant mixture people. And then, they walk back together. A lot of them stop at the hub. And so, it accomplishes all these extra secondary goals that we have, but would only, it only works because people love playing basketball.

Whereas, it’s interesting, Open Mic Night, so that, so Friday Night Hoops began with my initiative and me getting people excited and me talking to them and I, you know, anyone can say, you know, say that, you know, I’m injured and when I’m going to be coming back, I’m going to be, you know, walking down the halls, everyone I see: “hey, are you coming to hoops this Friday night, I’m playing again.” That I promote that.

Jack

Mhmm.

C.1.15 Time: 53:19
But, Open Mic Night began the very first year in Hallet, uh, and was just because there were people who love playing music. And, uh, and that organically grew out of a student initiative and they had it, a couple of them, in Hallet before they moved over to Andrews. And then, we had in Andrews. And it just so happens that, you know, a lot of, a lot of Andrews students are also very, very, very good musicians. And so that has is naturally grown and become part of our culture, part of our expectations, part of the self-perpetuating thing.

Jack

Right. Uh, and there, even though it began student organically, there’s some programmatic support in terms of equipment and things like that, correct?

Scot

Yeah. So, so yeah, eventually we spent like $3000 on sound equipment, uh, just kind of out of, you know, is big enough now that we’re being frustrated with the equipment we’re borrowing: it doesn’t work. We want control over this, we can make this a quality experience, not just be something that frustrates everyone. We make an investment in good equipment.

Jack

So, did you out and find good equipment?
Scot

No, actually. Good question.

Jack

It’s almost like I know what happened... *Laughter*

Scot

Almost! So, again, me looking at things, I knew that David Rappaport, who was a first-year student at the time, was, had been a, uh, DJ in high school and had done all sorts of stuff with sound equipment, was very talented at this, and was very technical and his orientation towards that. And, I just went to him and said: “hey, if you had $2000 budget, what would you get? If you had a $3000 budget, what would you get? This is what we need, you’ve been through Open Mic Night. You saw that we do. You saw, you know, I’m sure you felt some of the frustrations, the technical frustrations of, you know, having to borrow equipment that doesn’t work very well.” Um, and so, he took ownership of that. And so, again, I did a line in the sand and he stepped across it and acted brilliantly. And, you know, within three days he had a list of: “hey, this is what you need to do. This is where you would get it. This is all the stuff.” And, we ordered it. And, at the same time, I think because he stepped across that line and did all that – we’re revamping our computer room upstairs – so now I went to him – because he is also CS hardware person in the same way that he was, uh, the technical equipment DJ person – and said: “here’s a $25,000 budget, uh, we need to revamp our computers and instead of just buying computers, wouldn’t it be
better —” and this is partly his idea too, I mean this is wonderful, I first went to him and said: “hey we need to get new computers.” He said, you know: “wouldn’t it be cool blah, blah, blah if…” Anyways, so he’s just bought $25,000 worth of computer components and students in Andrews are going to build the computers, put them together. And so again, it’s just this wonderful thing of student having proven himself given more and more responsibility, given more, bigger budget who, in his area of passion, he’s going to own the computer lab, now students, there’s probably can be 20-30 students within Andrews who will actually build all of the computers that will go in the computer lab and they’ll own that, they’ll show, they’ll take other kids there that, once the first-year students arrive next year, they’ll hear: “oh wow, these are really great machines... Yeah, we built them.” And they’ll own that. It’s just one more layer of students, of student investment just across the board.

Jack

Cool. Uh, I’m sure there’s more that can be set on that, but, uh, I’d like to get into my third and fourth questions, which go together nicely and are “What have you —”

Scot

I’m sure.

Jack

“What have you learned, in making this community?” And: “What would you do differently if you are going to try and make it again?”
Scot

Um, one of the things that I think that... Think one of the things that we’ve learned, or I’ve learned is trying to, there is a, just the absolute importance of knowing people well and reading people well, of not over-mat, you know, not giving them too much more responsibility than they can handle. Things that, things, for this to work well you have to be in the situation where students take on things that number one, that they really want to do. So you’re not convincing them to do something that they don’t want to do just to please you, or they might want to do under different circumstances but it’s not really good time, but they’re going to do it to please you. Um, and things that are just too much for them. I mean, for example, one thing is that, I think, that in the desire and because we had the budget and the desire to be generous and all that, the very first year we had two mentors that we actually just pay their full, uh, room and board for.

Jack

In the first year Andrews?

Scot

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In the first year Andrews. So, it was a $13,000 stipend, basically, to get a single room with a private bath. And what happened in that, and it was interesting, what happened and that was, uh, it just put too much pressure on them for what they felt they needed to do in order to have earned that money. Um, that, when that was reduced to $4000 the next year they were just more free to be themselves. And even though, and again, I wasn’t putting any, the second year I put any less pressure or more pressure on either of the years nor did any of my expectations change of what they would do as mentors. But, they felt much more comfortable doing it getting $4000 a year than doing it getting $13,000 a year.

Jack

Right.

Scot

Um, and, and I think, in a lot of ways too, I mean that, I mean one of the things, I mean I came in believing this, but I’ve just been underlined that, uh, I’ve seen a lot of programs start with this very good idea and is very key commitment, that we’re starting this program in order to serve people. And then, in order for the program to survive, it feels like, to the people leading it, uh, they transition from: “Hey, we want to reach people to serve them.” To: “we need to reach people in order to serve the program, in order to serve people.” And it becomes this, like, mutually exploitative relationship. And, I really have wanted to, and-and just to avoid that like the plague. Um, that really, that stay to the model of the invitation where people step across versus the pressure. Um, and it’s difficult because there’s all sorts of issues at play, there’s all sorts of fellow stakeholders who are watching and, you know, demanding
things, or making life difficult. And, you really want to be able to say, you know: “well look at this here, you know, we have, we had 150 returners or 140 returners” as a validation to –

Jack

That, in some sense, the numbers always get better?

Scot

Right, exactly. Right, and that, and that, you know, as a tool then to leverage getting the rights to do things. As we attempted to interact with other stakeholders and want stuff done in just, we just want to constantly be getting better. And all these sorts of things. But, there’s a difference between getting better in order to be better and to-to put pressure on people to be better, for the program to better than it actually is in order to impress people to do things. And, and I think we just never want to be in the business of that. And, I also think too, that one of the things that, I mean, real community is messy. And, uh, I think, we wanted to just resist, uh, policy answers to problems.

Jack

Okay.

Scot

But to work them through.
Jack

Uh, are there any specific cases that would, uh, highlight that?

Scot

*Unintelligible* Um....

Jack

Because, right, it’s “What did we learn?” And so, just trying to get back to the focus of the question.

Scot

Right

Jack

That’s all.

Scot
Right, um, right, while some examples of what I mean by that, I mean, it was about two years ago, maybe about well 2-3 years ago, the kitchen was, as we try to work out the use of the kitchen, it was getting very dirty and people weren’t being responsible and all that. And there was some pressure from Res-Life, or the local Res-Life people, to simply, you know, not allow students to use it except for special events.

Jack

Mhmm.

Scot

And that would, that’s just the easiest way to handle the fact that students aren’t doing it very well. Versus the long hard thing of training students, in dealing with students, and confronting students about all of that. Um, that, and I think that, uh, I think part of the thing, what does it mean to, what does it mean to ask things of students as opposed to trying to manage them? I think that’s one of the biggest, I mean, one of the better ways I think I would put it is, you know, we’re trying, we want to, we want to manage students, we don’t want to manage students, we want to make them take responsibility for their behavior and actions.

Jack

Right.
Scot

Um, we need to pause this just for a second...I need to make sure.

Jack

Yeah. Pausing.... So it is unpaused and it seems our allotted time for this interview has run up. So, I’m going to stop the recording and we can continue at a later time? Is that good?

Scot

Perfect.

Jack

Alright. Thank you
Alrighty, I think it’s recording. So, uh, in our last interview, uh, well this is our second interview to extend upon the first one. In the last one we went uh through some questions and we started with “How did we begin Andrews?” and “What have we done in time order?” And we’re now on the questions uh: “What did you learn in forming the community of Andrews” uh “What would you do differently, um, if you could do it again?” and we were, uh, unpacking those things and delving into specific issues of, uh, I think we were talking about the kitchen, right and, the kitchen of Andrews, and not having policy responses to, um, problems that arise. So, if you have any more you wanted to say on that, uh, go for it, if you’d like.

Yeah I think, uh, to continue that last thought when I was interrupted is, I think this sense of leading students as opposed to managing them is just a vital important difference. And I think that either you want to inculcate your student leaders the difference between leading and managing. And I think that
part of the issues that came up early on in Andrews was that there were some student leaders who took
ownership of making Andrews work and that was really fantastic and all that, but at the same time there
were also – they felt the pressure when things didn’t go quite right to manage, put pressure, make
things right. And – uh, we have a, for example we have a, we have a very low judicial load here – but we
have an RA Matt Sturm who had a student who was caught with marijuana on his floor. And, you know, I
think that’s happened two-twice in the five years that we’ve been here or something like that. I mean, a
very small number and certainly compared to other dorms. Again, where our judicial load is somewhere
in the 10-15 range per year and there’s probably over half the dorms average more than that per
weekend. And anyways, I think that, I think there was a sense then where he had to, in dealing with and
embracing the reality of things, he was feeling: “Wow, we don’t do that in Andrews. My floor has let the
rest of the dorm down.” Now, you know, this there’s this strange sense of-of-of making Andrews, again,
be better than it possibly could be. This sense of relaxing somehow. You know, we talk about being
HFFMs, we talk Hagian Skubalon, but I think really embracing that is that there’s just a lot of messiness
in putting 227 18-20 year-olds together. And again, I think the thing of, you know, the Gryffindor
common room in Harry Potter, a lot of stuff goes on there that Dumbledore and McGonagall don’t know
about that aren’t nice: you know students are mean to each other, there’s factions, there’s all sorts of
things that one shouldn’t expect when putting forth our ideal community. That we’ve got roommate
problems. We’ve got, you know, all sorts of issues and that, and that we really want to be in the position
of working through that. And I think that, I think if…it’s hard to know what it would have meant
specifically to these things differently, but I think that making that more than – somehow finding making
ways to making, of being HFFMs and Hagian Skubalan being more than a punchline that people laugh at
and something that they actually embrace. I think would be another, something I think that we would
want to think through and how we do that.
So, my interpretation of that along with what you said earlier about there being outside pressures of people wanting the program to always have...

C.2.2  *Interruption from Andrews Student*

Student

Yeah, sorry. Nevermind, I'll ask somebody else.

Scot

What do you need?

Student

I was going to ask Jack something real quick, but that’s okay. I’ll let that that is not related to you...

And yeah...

Jack

Okay.
I’m sorry for the interruption, but, um.... In the, in the sense that you were discussing in our last interview about there are external pressures from other people who are invested in things being, going well and there being good number output, for instance, in their being measurable successes. That you, kind of what I’m hearing is that you don’t want to somehow glaze over the real messiness of the living and community and that there’s, it’s real people not numbers and those things....
And that little things militate against that and that in the end all the statistics point towards things are working well here and therefore we’ve earned the right to, you know, have a piano...we’ve earned the right to build lofts and all these sorts of things. It seems that, at times, that the opposition to change is so, is so huge that, you know, it’s just easy to get to get discouraged if we’re not perfect.

Jack

Mhmm.

Scot

And the ability to present ourselves to others, is all.

Jack

Awesome. Are there any other things that you’ve learned in the past couple years of putting together?

Scot

Yeah, I mean, one of the things, I think, is and another thing that I think is, that were still trying to think about is, and I think actually we’ve come up with some good ideas in the last week or so, but, uh, what are we, what do we want to ask of students beyond their first-year? What’s the vision that brings people together? Especially now that we’re not, uh, you know, starting... this-this whole thing of trying to crystallize, you know, what is it, what is it that makes it worth being part of this community? What
falsely advertises itself and becomes a simulacrum of that that people either buy into and then realize it can deliver or whatever? But, trying to just substantively create a sustainable culture that has its expectations pitched about the things that are really worthy of the hard work it takes to make this work, the sacrifices it takes to make this work. And so, I mean, I think that, uh, I think... Well, a couple of things that, you know, I’ve learned and again how this gets into how this should have been, but so, I mean, for the first X number of years, so for the first four years of our existence, uh, five years, we didn’t have any administrative assistance. And, I think that, uh, when we did get an administrative assistant, uh, that I mistakenly thought: “you know, what we – we need someone that understands the vision, someone who can participate in the vision, someone who has all these people skills, and engagement skills, and all that.” But, I think, in retrospect, uh, and I think those are important but I actually think that we really needed and have needed is just incredible administrative, you know, just raw administrative task skills support. Of, I think the information flow hasn’t been as clean and as clear and as timely as it could have been. That we asked a lot of things of students because we haven’t been as organized as we could have been. Um, that, and this became quite evident to me in the last year or so, when we’ve had events that didn’t, that ended up being last-second again that didn’t need to be. We’re paying someone, you know, 40 odd thousand dollars a year to not have that. But it just seemed that... You know, one of the things that just struck me last year is just, there is a lot of administrative work that to go into supporting this community really functioning well. And, one needs an assistant who is just an Excel animal. Um, who just takes care of details and that, that that, I mean that’s one thing I’ve learned. I mean, not-not so much, I think, that one, you know, once to go back to and undo decisions, undo decision now. But, I think that, one of the things I’ve learned is just, uh, by being a program that’s tying to be organic, by being a program that’s, that, uh, that people work things out, and all that, it really means that, in the
areas where we can be super-efficient and administratively supportive, we really need to be excellent in that as well.

C.2.4 Time: 10:43

Jack

Mhmm

Scot

That, I think, for the first few years, I mean, there’s good will that carried us, but it can only carry us so far.

Jack

Right. Um, would you, would you say that it would be ideal to have, uh, a few assistants? In the sense that, maybe there’s some Excel beasts, quote-unquote, and some that are, uh, masters of knowing what the community is and what you want from it. Or, I hear that it’s hard to have that all bundled in one package.

Scot
Right. Right, yeah. Because, I mean, because there is a sense of which that we do need both because there’s also a sense of which I want, I want this, I part of, I want people who are doing things to also get what we’re doing enough that they notice things, they intervene, they act. And so, uh, yeah so, I mean, I think, see then the question then too then is becomes one of student leadership, paid leadership, paid student. For example, in our current situation with Aimee, uh, I think one of the things that allows her to survive, uh, that-that is-is good, but isn’t a given is, you know, she’s got Jimmy who helps her because he needs money, and so we’ve got money. So he-he puts in like 10-12 hours a week doing detail stuff that- that position should do.

Jack
Right.

Scot
And so part of the question is then, I mean, is learning just, I mean, kind of learning and I think it’s the next step for us, is what type of administrative support do we need? Who can do it? Who can best do it? Do we – we have money, we have a budget. Do we, you know, is it worth hiring student administrators? I mean, because, I mean the perfect, I mean the ideal person for this job – and of course, she’s 1000 times over qualified for its, and she doesn’t live in America anymore – but, Kyla Maletski did it for six months.
Mhmm.

Scot

After she graduated, but while she was waiting to go to Namibia. So, here you had someone who deeply understood the program, deeply cared for the program, uh, had been involved with the leadership of the program, and was a statistical animal.

Jack

Right

Scot

I mean, she would put out lists, she would be this, she would understand details. Nothing escaped her. Um, but I don’t, I don’t think we can get Kyla Maletski’s… I mean, I think, the question is, I mean, but we do have her as a student, or did have her as a student. Um...

Jack

So, it seems like, while it would be wonderful if there was always a student who could fill that role, who would naturally go into that role, it would be much preferable that there was some kind of structural position that made those details happen even, and so you’re not always relying on a specific individual personality type to be stepping up, being a leader, having those qualities, and all things.
Scot

Right, right. Right, and somehow, we have to think through, I mean, what’s, you know, what-what things are worth leaning on students for, volunteer students? Because, of course, that’s what we want, we want students to own things. But in the, in the repetition of-of, you know, I don’t want, for example, so with Alex Mault, for example, and David Rappaport, who helped us so much in getting all our, in ordering our sound system and all that, but I don’t want it to be just assumed that: “oh, Alex can you set up the, uh, sound system for Walter?” I mean, I asked him well in advance, so I’m fine with him doing that. But then, I don’t want the assumption to be then that he’s the one who has to put it away.

Jack

Mhmm.

Scot

Um, and the stuff is still out.

Jack

Right.

Scot
Um, and now that was, was that just last Sunday? Or was that two Sundays ago? It was two Sundays ago.

Jack

Yeah, it’s been there.

Scot

Um, and so, uh, yeah, so it’s been, yeah eight days or whatever, today’s Tuesday, nine days. Um, and- and so there needs to be some balance of everything. I mean, somehow we’ve got to figure out what things can we rely on that it’s reasonable that volunteers who own good things will own and what things do we need to find a way to pay people to do?

Jack

Mhmm.

Scot

...to do it.
C.2.5  Time: 15:38

Jack

Um, so, uh, just going back to the actual structure of the program, when you outset to create this community and Andrews, uh, were you the lead administrator? What kind of support did you have above in the college? Or in the other...?

Scot

None.

Jack

Okay. And, below, you had mostly students who were volunteering and putting their efforts into making the program

Scot

Correct, right.

Jack

Alright.
And so, yeah, so, the early days we had paper applications, I would grab Mitch Kosht, we’d go over and he and I would make 200 copies of the applications for all of the graders. And, uh, yeah, I took care of, yeah, for the first 3.5-4 years of the program I took care of everything, with help from students.

Um, I feel like that might be an interesting thing to get into, just the: how do the students apply and get reviewed and get into the program? How does that happen?

Mhmm. So, uh, so, we have an online application. I mean, so the very first year of the program it was by invitation only. And since then, we’ve had an online application. And, uh, this last year, we had 352 applicants, I think, for, I targeted 56 spots.

Just a detail question....
Please.

Jack

Uh, the application was made by you? Or...?

Scot

Yes, the application was made in combination of me and students. Um, students did all the coding for it to get online. But, the actual application itself was a combination of me sitting down with students and talking about certain things and coming up with essay questions. A lot of it was generated by me and then getting feedback and criticism on about this or that or whatever. And then, an interesting thing happened too, so the first two years of the application process, uh, so the entering of the classes of 2007, you’re entering class of 2008, uh, that there was, uh, 3 to 5 faculty who, and one Associate Dean, who did all the grading of the applications. And, the next year I-we changed that abruptly just because more applications came, it seems more, we were asking of that, is we now have, we were almost entirely now student graders. And, because it seems apparent to me, especially once we moved into Andrews and, uh, after the time and Hallet, that students were owning the vision of what it meant to be here. They had a much deeper sense of what it meant to live in this hallway and what they were looking for: what students work, what students didn’t work. Students, of course, put on their best face when they’re around me, and things like that. And so, beginning, uh, with the entering class 2009, students began grading applications. And we continue that into today and I think it’s been very good. And so, we of essays, I mean so, we have a lot of students, just briefly, we obviously, as an honors program, care about how good they are in math and science and education in general. And, but scores
only go so far in the process. We have a lot of students who apply with very good scores. And so, one of the main metrics we use, and one of the main issues we use is the essays and how they present themselves. And, in that sense, does a, does an authentic fella real person emerge from this application. Otherwise, is it just the generic, you know, we read 350 odd essays for each of the three things, so we have, like, over 1000 essays that were part of last year’s application, and they really, quite quickly fall into: “oh, this is just this generic, this is what we think they want hear, this is what my high school counselor told me I need to write, uh, this is the style, the gripping first line.” And, it was, I think, clear for most students reading it that- that: “wow, this one set apart because there’s a real person who’s emerging.” Um, and so, I mean, our application process now is online. We recruit via the engineering sampler, we recruit. Um, I go through and I invite people to apply: everyone who of these different metrics of, uh, you know, I go through everyone who has it SAT above 1400 or combine ACT of 34 or 33, I think it is, they just get an invitation. Then, I go through and say, alright, they don’t get above a 1400, but everyone who gets above a 750 in Math, uh, everybody who gets above a 750 in the Verbal. Um, then, I just go through, and so we’re eliminating of the 3000+ applicants to the College of Engineering, uh, and we start, you know, as we take those off than we become more selective of idiosyncratic things that, as we look through the information that interests us.

Jack

Mhmm.

Scot
So, in the end, we invited I think last year we invited, like, 420 students to apply. And, I also speak at the Engineering Sampler Day, I speak at Talented and Gifted Student Day, uh, we have an open house with Andrews students hosting them, we talk to the Boettcher people. So, we recruit students mainly that way. But, we don’t, we don’t have any real method of recruiting students, uh, who aren’t already coming to CU, or approaching CU. So, I mean, they have to apply to CU for us to send them an invitation to apply to us.

Jack

Mhmm.

Scot

We’re not doing anything where just sending things out to high school counselors or anything like that.

C.2.6 Time: 21:33

Jack

Um, this kind of reminds me, in our previous interview, you’d mentioned you have a definition of what it means to be quote-unquote honors and you might to that later and this might be a good time to get into that.
Scot

Yeah, so I think an honors student, in my mind here, and I think in the mind of the program, is, obviously students were smart, but then students, again, who are deeply intentional. Students who have moved beyond: “I’m performing well in school because I want to show that I performed well.” That—that really somehow are connecting their performance to some sort of future goals, some sort of future vision of who they are, some sort of future vision of who they want to be. That an honor student is the student who owns the education because they’re beginning to somehow own their life. I mean, all the stuff that we talk about in the Merton reading of, you know, part of the purpose of the University is for students know themselves, to know what they want to offer, to make that offering valid, to know—not just make good choices but who it is that’s making these choices, why they are making choices, not going the prefabricated definition of the world a la Ivan Ilyich. And so, I think part of what an, makes the honor student is that, uh, they take their talents and they take their energy and they apply its towards something in a way that makes sense with their desires. And maybe that would be my broadest definition of what it means where, what we’re looking for. And with that then is, they also understand that they belong to a community, and therefore they own they own their impact. I think, we’re trying to look for people who have this, I mean an honor student, who is a person who has integrity about their life in the sense that it’s not: “oh, I’m an honor students when I’m taking this class, but then I’m this over here. I behave this certain way when I’m around, I’m Andrews, but when I’m over here, I act this way.” That, the same thing with leaders, they’re not just putting the hat on, putting the hat off, but close out of some sort of sense of their own sense of being, uh, that’s consistent across the board.

Jack
Um, and, of course, the Andrews community isn’t just the Engineering Ours Program, there’s other pieces to it. Uh, so how do those pieces mingle then and come together?

Scot

So, uh, there’s fundamentally, I mean, there’s two programs that are intimately tied with Andrews: there’s the Engineering Honors Program and then the GoldShirt Program. So, you have the very best prepared students coming into the college and the least prepared students coming into the college. Um, and, and so, historically, I mean, I think that, I mean structurally, I think – taking a step back, structurally that creates the potential for all sorts of tensions and problems. And when you throw in things like the- the GoldShirt students spend the summer together with this wonderful bridge experience. When they arrive, they’ve bonded with each other. Um, everyone in the universe is insecure, everyone questions when they arrive here: “do I fit?” I think, gets exacerbated when you know that, uh, you know, you know, “I’m not sure I belong here. I actually didn’t get accepted immediately. I’ve got in through this other program and now I’m across the hall from someone who’s tested out of the first four semesters of math and they’re going straight into linear algebra, while I stay in Pre-Calc.” And I think it’s rife for all sorts of issues and struggles and misunderstandings. Um, and we’ve tried lots of different things then, to deal with this, because I really, the reason I invited the GoldShirt students to be a part of Andrews, is because I really thought this would be, I wanted the program to succeed, and I thought that this would be the very best environment for that to happen. Um, compared to some of the other dorms with their behavior issues, compared to... That, anyways....

Jack
The dorms’ behavior issues?

Scot

What?

Jack

You said behavior “their behavior issues,” I was just clarifying.

Scot

Yes dorms. The-the other dorms, their behavior in the context, you know, where there’s students already on third, over here, I mean in the new Kitt Central, that are coming down to the Global Engineering floor, off of their floors, because they can’t study there on weekends. Um, so that kind of, I wanted the GoldShirt students to have a safe environment, a healthy environment, a studious environment, and all that sorts of stuff. Um, they’ve taken, they take Critical Encounters now, as a way –

Jack

Did they not before?

Scot
Thing did not. So the first, uh, two years that, three years that they were in Andrews, uh, that was part of the EHP identity and EHP students took Critical Encounters. It was very much central to the forging of our identity. And, beginning last year, there was a section of GoldShirt students and then a mixed recitations. This year, all the sections themselves are mixed. Um, in the sense of, what I’m really trying to do is find ways to give dignity to them, uh, to make them feel like they belong, and to break down barriers, to break down labels, to not be labeling, label-type people. Um, and it’s this, very tricky, I mean I think that, one of the things I say to you the GoldShirt leadership is that the type, the work that they’re trying to do this is really difficult. And, it’s fraught with all sorts of issues and problems and-and I-I once there to be an atmosphere, amongst the people, in pulling off the GoldShirt program of just that it’s hard work. And-and we should expect all sorts of things, but to try to deal with them relationally, organically, back to our same things EHP. Um, whereas, I think, the GoldShirt program responds globally, they respond with policy, they respond, they think of cohorts as this homogenous unit and they make policy decisions based on that. And so, I think that creates tension within Andrews too. That there can be all sorts of students are frustrated with their GoldShirt experience, just as there are some with their EHP experience, uh, but then you throw a mingling thing into it and it some, just occasionally creates problems.

Jack

Um, so, uh, speaking to this having multiple communities within, multiple subcommunities within the overall Andrews community and trying to break down, uh, barriers between them and maintain identities within each and having an Andrews identity...um, would you say that it would be, uh, I guess looking back from the beginning going forward is it a good idea to have multiple programs? Do you think that that gives kind of a the flavor things that’s different if there’s just one program in the community?
Scot

Um....

Jack

And, it’s okay if you don’t know. I’m just...

Scot

I don’t know. I think it’s, it’s just, I think, I’m a very ambivalent about that. I mean, I think that, uh, I have strong feelings in both ways. I think that this would, I mean, in some ways the EHP community would be impoverished if there was no GoldShirt program here at all.

Jack

Mhmm.

Scot

Um, it brings an incredible amount of ethnic and socioeconomic diversity and I think it’s been good for Andrews and good for that. On the other hand, I think there’s been real costs. Um, I think that EHP identity itself has suffered. I think that, uh, the ability to just, you know, speak freely, especially as soon
as, again, once-again some issue, once there was some perceptions made of-of, uh, perhaps we’ve overreacted in this, of: “wow, EHP is elitist and white and all those sort of things and privileged.” I think that’s hindered some of our ability to do things and communicate about things and be a program and have students just be invested: “yes I’m in EHP, and everyone I see is in EHP.” And-and, I don’t think we’ve ever had a problem with the rest of the University in terms of we’ve never promoted an elite feel. We don’t have, you know, handshakes, labels, and all that sort of stuff. We don’t promote ourselves to the rest of the University or the rest of the college. And so, I don’t think there was ever much of a, of a fear or a temptation that we would, if we were just this homogenous group we would have lorded it over the rest of whatever, just get weird respect to rest of the college. So, I think that there has been a loss of some things. There’s been a loss of time, I mean, there has been a lot of time spent trying to work out these problems. But, I think for a lot of people, it’s been very valuable. Um, so I just have strong feelings both ways.

Jack

Right, I-I just asked because, uh, my thesis mainly about the Andrews community and I find it interesting that there are subcommunities within it. There are even students who aren’t in either program. And have been.

C.2.7 Time: 31:17

Scot
Right, right, right. So then we fill up. So, the reality of it is Andrews has 227 beds in it. And, we can’t, they all have to be filled. And so, from the very beginning, coming out of the first year in Hallett, where we didn’t, you know, as we rolled in one class at a time, by the time we opened Andrews, we didn’t have 227 students in the honors program living on-campus and off-campus combined.

Jack

Right.

Scot

Um, the first year we moved in here, we had, like, 160 students, uh, and, of course, the vast majority, I mean, the majority of those had moved off-campus after their freshman year like every other CU student does. And so, the very first year when we came over, we were faced with the situation that we’re inviting 60 new students in, we had 60 first-year students from, I mean, 60 students in Hallet, like yourself, that we wanted to move over here. I think 48 or 49 of those, of the 60 students moved in here. So now we’re talking, we’re at like 109, so we barely, and then so some students who moved back. So we barely, there was still like 90+ beds, uh, or 95+ beds that we could not fill, no matter what we did. And so, then the question is: what do we do? Um, partly we invited the 15 GoldShirt students to be a part of it. We turn to the BOLD with another engineering program. Um, but in those two programs too we couldn’t, that still didn’t fill. And then we turn to, like, 55 or 60 students who are A&S science students. So, we wanted chemists and biologists and physics students to have part of the feel the building remain that. But, I mean, we-we’ve then, and we’ve progressively taken bites out of that as we grown, but, I think, that, uh, we’ve always, we’ve always needed to have other people in the building.
Scot

And, I think that’s interesting. I mean, Andrews has remained, I mean, and the interesting thing about that is that we’re very successful in terms of turning around this behavior culture that was true of all the dorms. In Andrews, I mean that didn’t matter, but Andrews used to be, uh, one of the worst dorms, in terms of behavior, before it was renovated and we moved in and whatnot. And, uh, but it’s interesting that that very first year we had 8-10 judicial write-ups, for the year, uh, we had, you know, 80-90 A&S students in here who would have been another dorms. And, I’m not saying they would’ve contributed to all the problems, but I think that somehow the culture we set from the beginning won the day.

Jack

Mhmm.

Scot

And that, I think, part of that was luck, but of it also was what we are about. And every year, when we’ve had students coming back, and every year we invite more students in, I think, there’s a tipping point I think of-of a culture that, I think, makes a real big difference in these things. And it’s not, it’s not
driven by the RA’s, it’s not driven by Res-Life, it’s not driven by punishment. It’s driven, you know, just the other day, you know, walking to our apartment and hearing our Sami, a third-year student, a leader, just you know, it was like 8:30 I think, and I had to get something at my office, and I’m walking back upstairs and just walking around the corner, she doesn’t know I’m there and I hear her say, uh: “hey guys you need to turn, you need to turn your music down.” Um, you know: “we live on the same floor as, because we live in the same for as the Douglasses, this is bedtime now. Hannah and Thali are going to sleep.” So, it’s that type of, I think, peer engagement that is nothing to do with RA’s, she has no ability to write up sanctions for them if they turn their music up or whatever the case. But just some sort of, we’ve been successful in creating a community that polices itself.

Jack

Mhmm.

C.2.8  Time: 35:21

Scot

And, I think that, with all the different people under it then, the different people, I think, some of the unifying things is that, especially as we got more upper-division presence, is that students do things here. There’s been a lot of enthusiasm right from the beginning for going over the Sewall dinner, going to this, our Open Mic Nights. You know, the Kitt West RA that was over here at the end of this last Open
Mic Night said: “wow, this is really great because we had an Open Mic Night we had part 20 people show up and only 2 wanted to play any music.”

Jack

Hmm.

Scot

Um, and-and, I think that’s something deeply contagious about we’ve always been beyond the tipping point in terms of students being excited and being engaged in things. And, I think that, I think that we really maximize that within the programs that we directly deal with, and I think particular with EHP.

Jack

Alright.

Scot

Sorry.

Jack
Um, and maybe we’ll, we’ll move on to the next one just for time’s sake. We’re past half hour. So, uh,
“what are the strengths/weaknesses of, that you see, between this versus say and non-RAP or and non-
community-based, uh, environment in a dorm?”

Scot

Mhmm. Um, I think that we, I think that it’s just impossible to put a value on the importance of just the
countless small encounters students have with each other. And that, uh, that I think of, I mean, the first
year of EHP, we only had 22 students, and so we were a very tightknit group to begin with. Um, and they
saw themselves a lot, we tried to get together, you know, we had a study room and little small things,
you know, we had a study room that was in the engineering center that was dedicated just to honors,
but only honors students could use. Um, so there was that bringing them together. We had class
together first semester. We did, we are able to do more events and easier to pull off more program wide
events when we only had 22 students. I spent a lot of time with, I was very active, you know, getting
together with all the students on a regular basis: for coffee, to hangout, and have lunch, and all that.
But, it took just in incredible amount of effort. Um, and, as the program grew that was going to become
less and less possible. And so, I think that having a way, a place, a space where students interact, get to
know each other – I mean, again, I look at some of the relationships that are formed, uh, the big road
trip last year that had, uh, Casey Casias in it and, uh, Jared Young. That I think, if we live together, even
just for one year or had just been part of a program that they’d never would have engaged each other.
They never would have become friends, and certainly never would’ve gone on a, you know, be part of a
group that went on a long road trip. I think that, I think we bringing people together and providing just
the structure where there’s more engagement, more casual conversations, more conversations at the
front desk just lends itself then to, potentially I mean, if we do this whole thing right, of just very positive
engagement with each other. And-and interactions, it brings out the best in people and knowing each other and seeing each other and over time of really becoming to appreciate people deeply. Um, one of the things that I think, this is just a good illustration of this, in the recitation leaders’ meeting last week, uh, a senior MechE student said, a young woman, uh, said one of the difference between her now-now and when she had graduated from high school, she felt that in high school she had this group of close friends that she really thought were great friends but if a person fell out, another person would join everyone was kind of interchangeable and no one was irreplaceable and every, you know.... They, they performed friendship and who they were as individuals didn’t really matter. Whereas she saying now: “even for students that I’m not that close to, or whatever and all that, I have a relationship with these particular students and no one could replace that student if they left. No one could.” And, I think that that wouldn’t be true if we were just a program, that didn’t have a residential component to it. That, I think, that, you know, students, you know, matter, the 3 to, the 2-3 gatherings we did per semester and the, uh, you know, whatever odd classes they have together, especially after that first year, that, I think, that most of those types of relationships would-would never take place.

Jack

Uh, so, that’s contrasting, uh, with, uh, the non-residential program.

Scot

Correct.
What about with a residence that’s not programatized? That’s a terrible way of saying it, but doesn’t have, say, a live-in faculty trying to develop these things in students.

Scot

Right.... So, say that again. I thought you were talking about the A&S student living in Andrews, but it seems like you’re saying something different. Yeah.

Jack

Uh, I’m thinking of, like, a, uh, RAP as a short form of saying the-the residential college. Just the, a dorm on this campus, or other campuses, that are just students living together, there’s no binding-ness to it.

Scot

Right, right. And, I think, again, it depends on the culture of these-these places that, I think there’s a lot of schools that have, you know, just expect that when you go there, you live on campus for four years. That, uh, dorms then start to developing their own cultural, their own identity, that you have students enter into and existing culture. And, I think a lot of things, a lot of things that happen here could also happen there. I think that, uh, I think there’s some value of-of, at least, having some type of leadership, or direction, or vision trying to channel that, trying to frame that, trying to, you know, have certain goals out in front of people to make those things better than they otherwise would be. Um, but I think that on
CU’s campus, for example, that students arrive, they get thrown into random places, that by January they have decided they’re going to live off-campus, they’re signing leases by February, and so basically have 3 to 4 months to decide what small group of students they’re going to be living with, and based on very incredible small amount of data, and based on relatively random, randomized way of students ending up in proximity to each other. And that, when you think of Crossmen because there’s, or any of these other places in the quad or other dorms that don’t have, don’t have a program it and a unifying vision, that there’s just very little reason why someone on the first floor west end of the building ever interacts with someone on the third floor on the east and of the building. That it’s just luck, it’s random, and that, when you talk to people and these things, even intra-floor interactions are really quite small because they don’t have anything in common, otherwise, except I live in this building together. And so, here we have the classes mix people up, there’s all sorts of things that mix people up and I think that makes a huge difference

Jack

Okay. Um, what, uh, “what do you expect students to learn, in terms of their living here and being part of the community?” I think you got at this with the example of the MechE student and those things, but if there’s anything else.

C.2.9 Time: 43:37

Scot

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Right, no I think that, I mean, I think a couple things though, I think that would be, like, very clear hopes, uh, is that I hope they all learn, I hope every student learns: that they can’t, they can’t pull off things on their own as well as they pull them off in community; that they can’t learn the material on their own as well as they do studying with other people; that knowledge, success, research, all those things take place best within the context of community. I would hope too that, with that they’d, they’d move away from, I mean that, there’d be a very clear community sense that: “this is a place where I have to prove myself, but I get to live out good things.” Um, that, I really hope that one of the main things students would leave this community from would be a sense of personal direction and ownership that isn’t always on the line, isn’t always motivated by a fear of being exposed as an impersonator or an imposter or something like that. Um, I think that, I would hope that part of the, one of the goals of the community too is that students would learn to own their impact of who they are. That, they really, they really believe, they really understand that how they behave impacts others and there’s better choices they can make. And, not just in the sense of, you know like, drinking or nondrinking and all that sorts of stuff, but listening, hearing, seeing, helping, encouraging not, you know, conversations that are headed down one direction get a negative, cynical, bitter, angry, unfair, whatever, tired, fatigued direction get turned towards something positive, something honest, something engaged, again not in a Pollyanna way but in just, in really: “how I behave impacts others.” I think owning that impact is a big thing.

Jack

Um, what about in terms of student success as the typical student, in terms of classes and all those, uh, measurements.
Yep. I mean, I think, I think that part of the wager, of EHP anyways, is that, uh, students come here with a certain type of drive, who end up in EHP, with a certain type of drive and so we, unlike a lot of other programs, we don’t, we don’t put emphasis on GPA, we don’t, we are not constantly harping about: “hey you have to maintain this GPA to stay.” Um, we’re, we’re really hoping and wanting that students succeed because they want to and so it’s sustainable success because we are not putting guilt on them, we’re not shaming them, we’re not where there needs to be this external source for them. I mean, our students have done very, very well. Uh, as I mentioned in past, there’s a study done over 25,000 credit hours – where we’re doing another study and we’ll find out if this is still true – but, this is to three years ago, we’re comparing students in EHP who was and who are part of the community here with students who came in, uh, with the exact same high school, statistically identical high school records. That students in our community have a GPA of .31 higher. And, that was before they had a special classes, I mean, so it couldn’t be attributed to: “oh, you took Calc, Calc 3 with Norris with only 25 students in it, as opposed to 110.” Um, and I think it’s purely a function of the community and the values of the community and-and coming together as a group. Um, and so we, I mean, we walk a thin line here, or a difficult line, in that we have students who just do incredibly, wonderful things. And, how do we promote that, how to communicate that without making that become, the students saying, as a first-year student: “wow, I want to be the one who gets recognized that way three years from now” and does it just the sake of that.
Scot

Because, I think that would be the tendency for a lot of the students.

Jack

Mhmm.

Scot

So, but I mean, I think, I really think we want students, I mean, I really want to have a culture that promotes excellence but it’s rooted somehow in something different than comparative performance.

Jack

Mhmm. Um, so, uh, you talked a little bit about what or how you might measure, uh, these ideals affecting student performance as students. Um, if there’s any other ways that you measure that, that’d be awesome to hear about, uh, but how, how might you measure success in terms of the other things that you’re hoping for? So it’s, what kind of data you collect to measure success there.

Scot
Right, yeah, I mean, I think that’s always been very difficult, and I think that, uh, I mean, I think in some things we look at is number returning students. Um, we look at, because again, that’s such a counter-cultural phenomenon here. And so, that says something as students, you know, the line in the sand thing, as students choose to come back, that says something. Um, I think behavior matters too. That-that, and again, given that, given that every other dorms on-campus, every other residence hall on-campus is significantly higher behavioral problems, including in dorms that include the students who come in with the same high school preparation as our students do. That, I think, that’s indicative of something good that’s happening here. Um, that it’s something about the intentionality of our community. Um, and so, I think that those can be compared. I’m very, very, very much looking forward to the full implementation of the E-portfolio and, because it’s a backdoor way to gain all sorts of information. And so we have, you know, Sam that’s writing a data mining program that, you know, it would be, uh, it will just be good to know what percentage of students do internships what percentage of students are doing research. We have a vague sense of that, but that would be really good to know. And be able to easily see because it’s part of the resume, and it’s available to everyone. Um, I think it will be very interesting to see the impact of the e-portfolio on our community were students get to promote the good things they’re doing in a way that students can look at those if they want to, they don’t have to look at it, there’s no public shouting of this, but there’s a, I mean, there is, there’s no shouting of it, but there’s really of self-presentation of-of what good things students have been doing. And, it will be interesting to see the impact of that on the community. But, I’m very much looking forward though to just having it as a, as a tool to collect data of things that we don’t do or haven’t been able to do, partly because they seem intrusive. I mean, I think it would be possible, I mean I think we, I wish we, back to this thing, I wish what we would have done, we would have had a requirement for – I mean this would have been so easy, it’s so stupid that we didn’t do it – but I wish we had would have had a requirement: “hey,
everyone who’s graduating needs to give us a resume, or a CV, or whatever you want call it.” That we just then have this piece of paper that shows their internships, their... all that sort of stuff.

Jack

Right.

Scot

We could have done that. And we’re foolish for not to have done, uh, but that would’ve been a very easy thing to do.

C.2.10 Time: 52:26

Jack

Um, I’m just in previous talks, so I am bringing this up because it here it: what about program attendance within the year and things that people attend versus how other dorms might have?

Scot

Right, I mean, it seems to me, by, I mean, all indications, I mean, I mentioned this with Open Mic Night and the other one, is that, that all Res-Life people and all that, uh, that we just do a phenomenal job
here. That, you know, the other, when you talk to other RAs on-campus who put together, they have to pull off X number of programs per year, that, you know, they’re lucky to have 8 students show up, or 3 students show up, or 12 student show up. And, we have a whole bunch of programs where we regularly have 50 to 80 to 100 to more. Um, I think we try and pick our programs very carefully and we try not to overload our students, we try to make them very appealing, uh, and whatnot. But, I think we have, back to this, I said earlier this sense of we have a lot of participation energy here and I think it really works well. So, already, you know, we’re four days away from the final RSVP to go and see Enders game, were already above 200 students who have committed to that. Um, and, I think those types of events just, you know, we probably had 140 people at our first Open Mic Night, it was spilling out everywhere and whatnot. Um, some of those things get momentum of their own, but I think we have incredible participation. We have, like, 75 students at the first research panel night. Um, and, I just think, you have 40, 38-40 students RSVP to the Pumpkin Bumpkin Bash. We have 30-40 students who play hoops every Friday night’s. Uh, I think we have an incredible amount of participation, just across the board

Jack

Right. So, do you think that these things are indicators of those types of thoughts being engendered in the students?

Scot

Yes. Yeah.
Yeah, I mean, the tricky thing is trying to draw causal lines.

Right.

I mean, I think we can, we can point to all sorts of data that are symptoms of success. That I mean, and relative of other dorms and other RAPs on-campus, are wildly successful. I mean a difficult question then is, qualitative fashion, is: “why?”

Right. Is it specifically these ideals, is it specifically these things that we’re doing?
Right. Yeah, and what structures support that? I mean, uh, because it’s tricky and all that, and I don’t mean this in any type of arrogant sense or whatever, but I think it’s the type of dynamic system where whatever, however, whatever causal lines come back to me, I think, if I were to leave tomorrow, I don’t think Andrews or EHP would survive, in its current, in anything that resembles its current form.

Jack

Mhmm.

Scot

And so, but it’s the system that requires a lot of energy being input every year to keep going, that I bring in recasting the vision and these sort of things. Um, but it’s not so, but on the other hand, it’s not solely a model, or solely a functioning thing, so I’m a necessary but insufficient cause for all the success. I mean, beyond a shadow of a doubt, that the hard work, that the Integration Model, that 1000 interactions that students have that they initiate, that they make this work. That have, that students have owned things. I think, and again, I think that’s somehow... I mean the-the problem is, I mean again, is that part of a study like this, part of a goal, part of a hope for university is that this would be replicable.

Jack

Right.
And so, the question is: “what things are portable? What does it take?” And, I think what’s so tricky about that is, from my perspective, is that-that the simulacrum of what we do is so easy to create. And it just doesn’t work. Um, and so, there’s these these extra types of ingredients where we’re constantly, everything we do keeps supporting a small handful of values. Um, that, and then, incredible student ownership of these things, I think, makes all the difference the world. And, I think that, I mean, one of the things that is true that I count on and I think of some of the great leaders in the program, I think of yourself, for example, Lauren Schmeisser, Kyla Maletski, Jenny Sorli, now, Thomas Brunsgard, I mean, there’s a whole list of you know 40-50 just exceptional people. And, I think most of them arrived, whether they knew it or not, I think, deeply desiring something bigger than themselves, deeply desiring community, deeply desiring friends, deeply desiring the type of space or the type of values, and again, not perfectly fit and all of that, but there’s been a whole bunch of people who came here really wanting this. And so, I think, part of the success of Andrews is that all these values all these things we are trying to do, and these structures, and the approach we’re trying to do somehow fit with pre-existing desires for students to have this. I mean, they bring all sorts of energy of: “I’m in college.” But they’re not bringing energy, you know, most of them aren’t bringing energy: “wow, I’m in college, now I can party,” you know, whatever, I mean the energy that one sees elsewhere. I mean, so, there’s a harnessing of something, an asking a something, that students desperately want to experience. And, I think we’d close up shop very quickly if whatever we were doing didn’t tap into that. That the idea of: “I’m in an honors program” and all that just can only go so far.
Um, awesome.

Alright.

If, if you can think of anything else you’d like to say or if I have any more questions, I’ll be in contact with you.

That’d be fantastic

Cool, thanks Scot.

Yup.
Jack

Uh...then stop, uh....
C.3  Michael Dubson – October 9, 2013

Interviewer:  Jack Olsen (Jack)

Interviewee:  Michael Dubson (Mike)

Topic:  CU Boulder’s Physics 1 for Physical Science Majors MOOC

C.3.1  Time: 0:00

Jack

So, it’s recording. Um, would you like to say your name?

Mike

Yeah, my name is Mike Dubson. It is, uh, Wednesday October 9th. I am the Associate Chair for Undergraduate Studies in the Department of Physics. I am a senior instructor.

Jack

Alright, awesome. So, my first question:

Mike

Uh-huh, yes...
Jack

How did you decide to start this MOOC?

Mike

Um, it was, uh, Noah Finkelstein who talked me into it.

Jack

Okay.

Mike

So the.... So, there’s been a great deal of interest in the press and among educators about MOOCs. And, um, Noah and I agreed that there was no evidence either that MOOCs were effective or that they were ineffective. And, eh...we agreed that it was time to inject some data into the discussion. So, uh, we saw an opportunity to do a clean test by teaching the MOOC in series with a brick and mortar course that we’ve – that we, we try to make the two courses – the online course and the brick and mortar course – as similar as possible so we can compare student outcomes, um, in a re...in a, um, in a valid way. And, uh, so I knew it was going to be a heck of a lot of work. And, I knew that, um...that uh, there...you know, I went into it with great trepidation. But, uh, I think the main reason I went into it was because – is because I’ve taught this course before.
Mike

...several times now. And, I’m getting tired of teaching this course and I wanted to try something very different.

Jack

Okay.

Mike

You know, give me, personally, a new experience having to do with this course.

Jack

Okay.

Mike

And so my own, uh, need to, um, have a new teaching experiencemeshed well with the need of the field to have some data.
Jack

Alright. Um, can you describe for me – I need to change that auto-lock....

Mike

Yeah, sure.

Jack

Um, what have you done, in time order, to the best of your memory –

Mike

Uh-huh...

Jack

- to make this possible? And then with hours...timeframes and those kind of things...and that’s....

Mike

Yeah, well, uh, most of my time in August was –
Jack

This last August?

Mike

Yeah, this last August, was, uh – I devoted pretty much most of August to, um, getting the – getting the logistics ready for this course.

Jack

Mhmm.

Mike

So, much of that time was spent making sure that the recording hardware, and the recording and editing procedures were, um, worked out.

Jack

Okay.

Mike
I knew that once the course started, I would have zero time to fix any issues. So, everything had to be planned and tested before the course started.

Jack

Okay.

Mike

So, that involved, um, testing video hardware, testing the audio hardware, um, under battlefield conditions, namely actually recording a lecture in the lecture hall.

Jack

Mhmm.

Mike

And it also – and so, then it involved, uh, getting the, um, video editing software: Camtasia, making sure I knew enough about Camtasia, uh, that I could, um, do the editing myself. And then identifying and hiring a staff to do the rather time-consuming work behind the scenes. So, we ended up hiring three people. I’ve got an undergraduate who does the editing.
I’ve got another undergraduate – well, I’ve got another staff-person, uh, who does the, um, creation of the resources for the Coursera website.

And then I’ve got a third person, uh, a visiting faculty member, who’s just doing checking – testing of our homeworks, exams and other materials we’ve posted on the web.

And, he’s monitoring the discussion boards.
C.3.2 Time: 4:57

Mike

So, in August, I spent a lot of time – we – there were, there were lots of technical issues with the video recording equipment, in the room. We have permanently mounted – we have a permanent video camera in the back of the room and there were lots of problems with it. Um, it wasn’t in the right location.

Jack

Mhmm.

Mike

So, we had to physically change the location of the mounting. And you might think that would be easy, but it turned out I had to interact with...I think I’ve had to interact with a total of six people from OIT for that one camera.
Mike

The problem with OIT is they compartmentalize their jobs very thoroughly. There’s one person sort of in charge and everything has – every decision has to be run by him.

Jack

Okay.

Mike

There’s another person in charge of physically moving the camera. There’s another person in charge of physically moving the projectors hanging from the ceiling; in the end, we had to move the projector because it was in the way of the camera. There’s another person who’s in charge of the software for the camera.

Jack

Wow.
There’s another person in charge of...the server that records the video stream from the camera. So, I think I listed six people, and I had to interact with them all. You know, there – that was sort of annoying: there wasn’t a single point of contact.

They all do their job, but, oh boy, it was so time-consuming because I would contact a person and then they would say I’ll get to it tomorrow. And so, you know, everything had to be done serially, rather than in parallel.
So, it was a good thing I started in August because it took weeks to sort out all of the video and audio recording issues.

Jack

Okay.

Mike

Um...the one nice thing is because I had taught this course several times before, the content was completely fixed. I didn’t have to create the course. The course existed in the sense that the lectures, the homeworks, the exams, the concept tests in the lectures – those were all set.

Jack

Okay.

Mike

All we had to do was translate them into the format so that they’re up on the Coursera site.

Jack

So it’s the same homeworks, the same lectures, the same –
Mike

Same homeworks, same lectures, same exams.

Jack

Everything, alright.

Mike

With, with small changes.

Jack

Okay.

Mike

We – we had to get rid of a couple of homework problems because of – for technical reasons, not for pedagogical reasons.
Okay.

Mike

There were issues mounting some of the homework problems on the Coursera site.

Jack

...Um...is there anything else as – after the course had started? So, this was all pre-course starting –

Mike

Yeah, right. Right. After the course started, you know, things went remarkably smoothly. Um, we had, we had – uh, I have a good staff and I had – I had thought of most of the problems beforehand. And, um, you know, the only thing a, uh, there have been some good surprises. I’m surprised how very well the discussion boards are working.

Jack

Mhmm.

Mike
Um, we don’t have to intervene in the discussion boards hardly at all. Maybe, uh, once or twice a week, we’ll put in a comment on the discussion board. But, they’re working just exactly like they’re supposed to. Namely, students ask a question and someone else jumps in to answer. And the answers are good and valid, so we don’t have to intercede. And, no one’s abusing the discussion boards. And, when someone does get close to abusing it, other people jump in. So, there was one particular example where there was a discussion going on about ‘how do you get the answer’ and one of the students finally wrote in and said: “Well, so what’s the answer?” And, about three, uh, people jumped on him and said: “Well, that’s not the correct etiquette on a discussion board. We don’t pass answers around. We talk about strategies for solving problems.” So, I was afraid the discussion boards would require careful monitoring. But, they’re – they worked pretty well on their own; they don’t require much monitoring at all.

C.3.3 Time: 9:20

Jack

Cool, so they self-monitor.

Mike

They self-monitor, right. We’ve had minor problems with mounting the homework problems. Um, most of the homework problems involve a simple string match. Either, um, either the answer is a number

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with units or the answer is simply a string of, um, you know, label each question ‘true’ or ‘false’ so, you know, you’re going to need a string like ‘ttft.’

Jack

Right.

Mike

Well, there were two problems. It turns out, um, the Coursera scripting language is – is not intelligent about handling units.

Jack

Hmm.

Mike

So, we had to, um, Ed Johnsen, the guy who handles the website, had to do some – a little bit of programming. And even then – so basically we had to – we have to tell the students: “Make sure you always use SI units.”

Jack
Mike

So, if the answer’s a length, they have to use units of meters. If they use units of centimeters, the system will croak, or-or will say it’s wrong because it’s expecting the answer in meters. Our, our built-in homework system, er, that we use at CU, is called CAPA and CAPA is completely intelligent about units: it knows all the units, and all the conversions. So, if the answer is a length and the student puts in inches, CAPA will accept it.

Jack

Hmm.

Mike

If it’s the correct answer, because it can convert to meters without any problem. Um, the other problem we had with the homework system is – so, initially I was very excited to see that...the Coursera homework system...allows students to, um, enter a, uh, algebraic expression as the answer. So, instead of giving them numbers and having them work out a number, I could just give them symbols and have them work out a formula for the answer. Well, it turns out that the, um, the formula generator in the Coursera system has-has some quirks. And so, it doesn’t always work the way students expect it to and so it’s caused some confusion. So, we’ve sort of backed off. Initially, I was planning to give them lots of questions with symbolic answers.
Mike

And we’ve had to back off from that.

Mike

Um, so, it’s going pretty smoothly now. It, uh...uh, we now – we’ve settled into a routine. Um, I give three lectures. Because it’s such a big course, I have to give the same lecture three times. So, that gives us three opportunities to get a good recording of a lecture. So, we always record the 8 o’clock and 9 o’clock lectures. And if both of those are good, we don’t bother to record the 11am. But, there have been a couple of times where there were issues with both the 8 and 9 lectures, so we went ahead and recorded the 11. And then I pick one of them and, um, an undergrad, named, uh, Jesse Whitford, does the first editing pass.
Mike

He usually cuts, um, you know, we have to cut out all of the student discussion that can’t be picked up by the microphone.

Jack

Right.

C.3.4 Time: 12:56

Mike

We cut out all the...short segments where I’m simply writing on the board without saying anything. We’re trying to make the videos as short as possible by snipping out all of the dead time.

Jack

Gotchya.

Mike
If I cough or repeat myself, Jesse is good at snipping that out. So, he manages to, uh, take a fifty minute lecture and edit it down to, uh, thirty to thirty-five minutes. That takes him at least two hours. Then he hands it off to me, we actually have a, we share things through a dropbox.

Jack
Okay.

Mike
Um, account. He hands it off to me and then I do a second pass and by that time it’s down to about thirty-five minutes. And he’s done most of the cutting so I’m doing higher level cuts: cuts where I say something wrong. I’ll cut that out.

Jack
Okay.

Mike
Uh, or, I, um, repeat myself in a way that isn’t, uh, pedagogically useful.
Okay.

Mike

Um, if it’s at all, if there’s any question as to whether or not it should be cut out, Jesse leaves that in. And, so I usually manage to cut just a few more minutes out: maybe three to five minutes. So, we try to, we try to get the lecture down to about thirty minutes and mostly that’s what we’re doing.

Jack

Okay.

Mike

And then, I hand the lecture, then I upload the lecture to the Coursera site. But then we have to insert the interactive –

Jack

Right.

Mike

- concept tests. And, um, the inter – the concept tests were coded by Ed Johnsen in August.
Sorry, all of them. Yeah, yeah. So I had a complete list. So that’s one of the things I did in August, I prepared a complete list in August of all the concept tests, with the answers and, um, you know, set up a, I set up a spreadsheet showing the number of the lecture, the planned day of the lecture and the concept tests that will be in that lecture, in order. And, um, Ed coded them up and stuck them all into a, he-he loaded into the Coursera dummy videos that he, uh, that he stuck the, um, concept tests in. So, when I upload a video to Coursera, it’s uploaded into a spot where the concept tests are already injected into the video, they’re just not in the right place. So, then I write to Ed and say alright we’re ready for the q-points. Q-points are the points in a lecture where concept tests are going to appear to the, to the audience. The, I mean the, interactive concept tests where the student watching the video actually has to select an answer.
And, um, so then Ed has to watch the video in order to know exactly where in the video the concept test has to be inserted.

Mike

So, you know, all told, it takes about four person hours to process a video and this happens three times a week.

Mike

And then, um, oh, the-guy who’s doing the checking. So, the guy who is doing the checking and, um, the monitoring of the discussion boards, he’s probably working, um, at least two or three hours a day.

Jack

Okay.
Um, and, uh, Ed, of course, Ed and me, were working pretty much full time for about three weeks in August. So, compared to other MOOCs, this MOOC is actually remarkably cheap. We’ve, we’ve spent little money or resources on it. Mostly we’re using existing infrastructure.

Um, you know, we-we’re getting Ed, we’re getting technical advice and technical assistance from OIT about the hardware in the room and the software drivers, the-the video streaming and what-not. And they’re all just doing that as part of their regular job.
So, I know that compared to say, uh, MIT’s edX, you know, they spend many tens of thousands of dollars on each online course and, um, we don’t. Nothing like that.

Jack

Right.

Mike

You know, we’re doing it all on the cheap.

Jack

Cool. Um....

Mike

I’m not sure I answered the original question, but proceed, please.

Jack

Yeah, it’s just, are there anything else you can think of that you did to make it possible?
Well, so, well, my, the main innovation that we’re doing here is that almost everyone else who creates a MOOC, um, designs it for an online audience from the beginning.

But, my course is just, uh, my course is different in that it’s really not designed for the MOOC audience. It’s designed for the brick and mortar audience.

And, we’ve simply adapted, edited the brick and mortar course slightly, and put it online.
Mike

And, the reason for that is, um, well I think that’s a more sustainable model of how MOOCs can work. You know, universities’ require faculty to teach their brick and mortar courses.

Jack

Right.

Mike

If they’re going to develop other courses for MOOCs, then they’re not available to teach the brick and mortar course. But, if they can make the MOOC course nearly the same as the brick and mortar course, then I think it become feasible for them to do the MOOC on top of the brick and mortar course. Just feasible, I’m not sure it is in fact possible, um, you know, this was a lot of extra work for me and I don’t think I ever want to do it again.

Jack

Right.

Both
*Chuckling*

Mike

You know, it-it, if I were to run a MOOC again, I would hope I would have, well, I might try creating a dedicated MOOC rather than throwing my MOOC on top of a brick and mortar course.

C.3.5 Time: 20:05

Jack

Okay. Um, so, in some sense, preparing for the MOOC was having the course already.

Mike

Yeah, that’s right. That’s right, so fortunately because we had the pedagogy down solid, all the time spent on the MOOC was just dealing with the technical aspects: –

Jack

Right.

Mike
- recording, editing, maintaining the Coursera website, uh, translating our homeworks, exams, all of our documents into the Coursera scripting language, and then just, um, dealing with the Coursera staff and, um, website issues.

Jack

Alright.

Mike

I think that’s, um, not at all the norm. I think the norm is most people have to spend an, uh, most people who create MOOCs have to spend an enormous amount of time creating the materials and then on top of that they’ve got the technical issues to deal with.

Jack

Right, right.

Mike

For me, all the materials were done.

Jack
Which is a little bit of a boon.

Mike

Yeah, yeah it is.

Jack

Um, so, the next two questions kind of come together in that, uh: What did you learn? And then: What would you do differently in putting this together?

Mike

Yeah. Okay, so, we are still learning. So, I’ve learned that it’s, it’s feasible. We can do it. Um, and um, now the questions is: Do we want to do it?

Jack

Right.

Mike

...is the question. Um, I’m, I myself am feeling a little burnt out. I mean, part of the...maybe it’s because I’m not spending as much time, maybe it’s because I don’t have much time to spend with the MOOC
because I have a brick and mortar course, but I-I just don’t feel connected with the MOOC students like I feel connected to my own brick and mortar students. You know, I occasionally, I-i-I, I myself check the discussion forums regularly to see what’s going on. And, uh, almost always I’m pleased by what I see.

Mike

Um, and I don’t need to intercede. And, I don’t want to intercede unless I have to.

Jack

Mhmm.

Mike

So, I’m just sort of distanced from the students.

Jack

Right.
Mike

I see that they’re, they’re functioning. Um, so two aspects are, have surprised me. I’ve learn, so I did expect a lot more students.

Jack

Right.

Mike

Uh, I got 14,000 at the moment and that sounds like a lot, but it’s actually kind of on the low side. There is another Colorado course, a graduate level, um, electrical engineering course, and it’s got 30,000 students. Okay.

Jack

Mhmm.

Mike

A graduate level, electrical engineering course has twice as many students as my freshman, introductory physics course. I would have thought that the lower the level of the course, the larger the fan base –
Mike

- you know, the larger the possible clientele. And, there are – I think there are a couple of reasons why I have a lower than expected turn out. Um, I just recently found out that, um, edX, the MIT MOOC site is running a physics 1 course at the same time as us.

Mike

And, um, so a lot of students who, who might have taken my course are taking the MIT course because, you know, MIT has bigger name recognition than Colorado. So, if you had a choice between doing MIT and doing Colorado, I think I would do MIT. So, I don’t know the numbers for the enrollment for the MIT course, but I’m pretty sure their existence is draining our clientele.

Jack

Right.
Mike

The other thing is that I’ve gotten a few comments, I’ve read a few comments on the discussion boards to the effect that some of the students, perhaps many of the students, are already feeling a sort of MOOC fatigue. There’s a, you know, there’s a segment of Earth’s population, a relatively small segment of Earth’s population that these MOOCs are aimed at.

Jack

Mhmm.

Mike

Namely, students who are interested in learning for learning’s sake.

Jack

Right.

Mike

You know, they aren’t getting a degree, they aren’t getting a, they’re getting a piece of paper which so far is worthless, it has no meaning.
Mike

Um, but there, you know, students are willing to spend enormous effort for the sake of learning. Well, you know, there aren’t many student who either have the inclination or the luxury to, um, devote a lot of time to learning.

Jack

Right.

Mike

You know, most-most people have full time jobs and they’re exhausted and um.... So they’re sort of a, sort of a niche, you know, I think of MOOCs as a bit of a niche market. You know, they-they’re not aimed at everyone like television is.

Jack

Right.
Mike

They’re aimed at people who have a genuine interest in scholarly edification.

Jack

Yeah.

Mike

And, um, I think after, even though MOOCs have only been popular for a couple of years, I think we’re already starting to saturate the market.

Jack

Mhmm.

Mike

And this brings me back to the comments I heard from the students on the discussion board. One of the students said: “Yeah, this is the fourth MOOC I’ve done in the last two years and I’m not sure I’ll have the energy to make it through this one, although I’d like to.”
Both

*Laughter*

Mike

You know, so even though MOOCs have only been around a couple of years, for most of the people who are aware of MOOCs and taking advantage of MOOCs, it’s already old news.

Jack

Mhmm.

Mike

You know, it’s no longer, maybe to administrators it’s the big new thing. But, I think to a lot of students it’s, eh, it’s been around a couple years already.

Jack

Already done 13.
Make

Already done 13, you know, now I’m going to pick and choose real carefully.

Jack

Right.

Mike

So, I, so, I-I think those two effects were already exhausting the market, and I’m getting stiffer competition from MIT. I think, that accounts for my lower-than-expected, uh, enrollment. I was hoping for 50,000.

Jack

Right.

Mike

And, I got 15,000. So, maybe I should be happy, but I’m pretty sure –

Jack

That’s a big difference.
Mike

Well, I’m pretty sure that in the end, we’re going to have fewer students getting the MOOC certificate than are enrolled in my brick and mortar course. And, you know, one of the, one of the arguments that’s always advanced to promote MOOCs is that: “yeah, but you get a much wider audience.” Well, in the end, I think of going to wind up with an audience smaller than my brick and mortar audience. So, uh, now, now, a lot of people would disagree with that. Even though only a few hundred are going to end up with certificates, there are several thousand who have done some of the course. And, so, from the administration’s point of view, they would say: “yeah, so you had, even though, even though only a few hundred got certificates, we had several thousand students who became aware of the first rate educational experience they can get it they come Colorado.”

Jack

Right.

Mike

That’s, that’s one of the administration’s prime motive. They want to, they see MOOCs as free advertising for CU.

Jack
Right.

Mike

Get our name out there, get our product out there, uh, did people seeing how good we are so that they’ll apply here. Anyway, uh –

Jack

There was a second surprising thing you said also.

Mike

Oh, uh, yeah I may have forgotten. Let’s see, the first one was... Oh, so, so, the second surprising thing has to do with these, uh, these lurkers I just alluded to. You’ve got people who are serious about the course from beginning to end, who are going to get their certificates. Who-who are planning to get their certificates. But, they make up, if you’re lucky, 5% of the audience. 95% are lurkers. And, I’m having a better appreciation of the impact, the positive impact that MOOCs have on lurkers because I myself am a lurker. Um, so in order to just learn more about the Coursera MOOC framework and logistics, I just signed up, I-I just went to the Coursera course, look through all the courses, and there's three or four hundred of them, and I signed up for a couple that looked interesting. And, in particular, I signed up for a physics 1 course taught in French, uh, at a Swiss University.
Mike

And, so, first of all, I was interested in it for several reasons. I wanted to see what the competition was like. I wanted to see what the standards were like. Um, I also wanted to improve my French. And, it’s been very educational. I’m a lurker. I hardly do any of the homeworks, I’ll look at the homeworks, and I’ll pick a problem if it looks interesting. Um, but, usually, mostly I don’t do all the homework’s. I watch all the lectures, and I love those. And, uh, oh gosh, there’s zero competition from them. The way they teach that course is so different, it’s hard to believe they are both physics 1 courses. The Swiss have a very formal, mathematical attitude towards physics. In the US, or at least the way I teach it, it’s ideas first and then mathematics to express the ideas.

Jack

Right.

Mike

To the Swiss, it’s 90% math. It’s just formalism. If you’re lucky, they’ll give you a physical interpretation, but they spend almost no time worrying about sense making of the equations. It’s just: “we’re going to manipulate these equations. It’s a math problem.” And, you know, it’s just such a very different attitude
than ours, very formal. I’m sure I’ll, well, that’s another discussion. Anyways, so, but as a student I’m just extremely impressed and grateful for the existence of this free product.

Jack

Right.

Mike

It’s an amazing, Coursera is an amazing thing to a person who is interested in self-improvement. Three or four hundred courses from all topics and, and there high quality. And, uh, you know, it’s just, it’s just like, uh, have, suddenly having free access to a super library. And, uh, it’s given me, you know being on the students’ side, it’s given me a deeper appreciation of the product than being on the creator side. Because, I just thrown out there and don’t quite know what impact I’m having on people’s lives. But, when I’m on the other side having it come to me, I-I-I appreciate the impact. Even if I, even if the professor has no direct feedback for me, there is a strong positive impact.

C.3.7 Time: 32:36

Jack

And, you’re learning French.
Mike

I’m learning French. I’m also, I am enjoying, uh, reviewing, well seeing this course taught with a totally different take. It’s not the way I teach it, but it is instructive. Um, and, well it also keeps me, uh, you know, one of the things I’ve learned from looking at the other courses is that, uh, one of the concerns that I’ve heard expressed about MOOCs, and Coursera, MOOCs in general, and Coursera in particular, is that there’s no quality control. Once the MOOC starts, the University has total control, total creative control. Coursera just has to step back and let it happen. Well I-I have discovered what I already knew, namely, that’s really not a problem. Um, first of all, there’s, there’s no way to exert quality control over University faculty. There is no mechanism to do that.

Jack

Mhmm.

Mike

You know, the whole, the way the system is set up is that the faculty has total control. That’s the only way it works. And so, to suggest that we change that is, uh, crazy. But, the other thing is that there’s no need to worry. The production standards of Coursera courses are uniformly high. And, now that I’m doing it, I-I think the reason is obvious. One of the primary goals of putting up a MOOC course is advertising for your institution. You want to show that your institution creates a, produces a first-rate educational product. Well, you’re going to tack, you’re going to, you’re going to, you know, if that’s
what your goals, you’re going to try our damnedest that it actually be a first-rate educational product and it compares well with the other MOOCs that are on Coursera.

Jack

Right.

Mike

So, uh, you know, I-I am acutely aware that I’m representing CU to the world. And boy, I want this product to go well.

Jack

Yeah.

Mike

Because, uh, if it’s a disaster, you know, and it could be, you know, it could easily be a disaster because it takes a lot of work to make sure everything is coordinated.

Jack

Right. Interesting.
So, on the one hand, I am fatigued, you know, I’m distressed that I don’t have a lot of direct contact with the students. On the other hand, I-I-I understand the value, uh, as a, as a service to the world. Now, of course, administrators don’t want to hear that it’s a service to the world. They want hear, is there a way to turn this into a revenue stream? And, you can be an indirect revenue stream, like, if we get, I’m sure the administration be just fine, enormously pleased, if there was some evidence that putting out MOOC gives enough, uh, advertising to CU, that we get a better applicant pool. I think that would satisfy the administration. Um, I think though, still in the back of their minds, there’s, they can’t stop they can’t help but be motivated by greed on some level. That, there, uh, hoping, uh, that the MOOCs will turn out to be a, turn into a revenue stream. I don’t see a mechanism for them turning into any kind of revenue stream that would be big enough to actually pay for them, pay for the enormous investment of faculty time and university resources into mounting these.

C.3.8 Time: 36:24

Right. Alright, uh, so, just any other things that you’ve learned? Or would do differently?

Mike
Let me think. Let me think, if I were to do it again when I do anything differently. No, we-we, you know, we had enough advice from people who have done MOOCs that there were no surprises. You know, everything went pretty smoothly. My-my primary fear was a technical failure, that the camera might just stop working one day. That hasn’t happened, and if it does, the OIT has a backup that they’re ready to put in within a day. Um, yeah, let me think a minute here.

Jack

So, just a, something you mentioned.

Mike

Yeah.

Jack

Uh, you got advice from other people who had run MOOCs.

Mike

Uh, yeah, uh, we had a postdoc, Danny Caviero, who was a postdoc until the summer, and he’s now a faculty member in the physics department at Michigan State University. He was involved in the creation and running of a physics 1 MOOC from Georgia Tech over the summer.
Jack

I think I read one of those papers.

Mike

Yeah, so, so, we-we talked a lot with him about what was involved in mounting the MOOC.

Jack

Okay, would you say that having that experience told she was useful?

Mike

Oh, very useful. And, and not only talking to him, but just seeing all the other MOOCs, uh, helped in, uh, deciding, deciding how to fashion this one. Um...

Jack

Hmm, okay.

Mike

Let’s see, I’m trying to think what else. So, you know, I’m halfway through this experiment. We just, just this morning reported lecture number 18 out of 36. So, halfway through the bulk of the work. But, I still
have a strong sense of what the future of MOOCs is. You know, I don’t, I don’t see him I don’t see how it fits into the curriculum on campus. I don’t see a long-term, I don’t see any long-term plan that results in a good cost-benefit ratio for University. Advertising is good but it’s nebulous, it’s hard to put a, it’s hard to put a value on. And, uh, you know, if someone asked me if they should run a MOOC, I’ll go: “only if you are dying to.”

Jack

Okay.

Mike

Because, you know, it’s an enormous amount of work and, you know, the payback is nebulous at best. You’re, you’re, you’re, you have no way of, you know, most of the students who have, who you impact, you’ll get no feedback from. So, you can hope you the positive impact but you don’t really know. And, it’s enormous amount of work. And, one-one other thing, uh, you know, when I went into this, lots of people, other faculty said: “oh, this is great because once you have it all recorded and all the homework set up and all everything, you just run again whenever you want with no work at all.” Well, that’s nonsense. You know, you know even though he got the videos in the homeworks in the can, mounting and running this course is still a lot of work. Uh, first of all, for sure, you have to change the homeworks and exams slightly. Because, you know, with 11,000 people out there, you-you just can’t repeat the same thing. Also you-you-you know, it’s like, you know, when you have, when you’re, in you’re servicing tens of thousands you can’t take that duty lightly. You’ve got to monitor the discussion boards. You’ve got to, uh, maintain the website very carefully. It’s, it’s several hours a day minimum even after
you’ve got all the materials prepared. So the idea that they’ll just run themselves after you’ve recorded them is nonsense. So, I myself am unsure whether I’m ever going to run this course again, even though I’ve got all materials and running at a second time would be, you know, running it a second time would be one fifth the amount of work as running it the first time. But, it’s still one fifth and I’m not getting any, you know, I’m not sure what my motivation is to run it again.

Jack

Hmm, alright.

Mike

Now, if someone else wants to run it, fine. But, I can’t, you know I can’t imagine what their motivation would be. Um, you know, an important component of teaching is-pride and arrogance that you do a better job. You know, I would be totally uninterested in mounting someone else’s lectures. Um, I want to do this because this is my product and I feel that my product is good compared to others. Um, why, why would I, why would I bother to mount Steve Pollock’s course, unless someone was paying me to do it. And then, I would do it unenthusiastically.

Jack

Right.
Mike

So, just to reiterate, even though we’re halfway through the process, I still don’t see, I don’t have a clear idea of what the future of MOOCs is and how they fit in with the University environment. I see no danger or – I’m a skeptical as ever that moves will revolutionize the University teaching experience. I just don’t, I just don’t see it, uh, you know, the arguments always made that: “yeah, but, you’re giving, surely this has to disturb the equilibrium because you’re, you’re giving away your product for free.” Eh, that’s just, in my opinion, nonsense. Uh, we were already giving away for free because it was all in the libraries. And, and the only people who say that you’re giving away for free, are people who believe wrongly that education means delivering content. It doesn’t mean that all, it means, it means, education is a social activity. You bring the person the campus, it’s the living on campus and interacting with the other humans going through the same learning experience. It’s the day-to-day personal contact with your professors and your students that changes your life. Just reading a book, or just watching a video on a screen is not a life changing experience you can have.

Jack

Right.

C.3.9  Time: 43:40

Mike
So, there’s no danger that MOOCs will make universities obsolete, anymore than libraries make universities obsolete. I think MOOCs will, MOOCs will be seen as an educational tool and they’ll somehow eventually reach a steady-state, where the steady-state is much less interesting to the press than the, then it is now.

Jack

Okay.

Mike

So, uh, I don’t see it as a revolution. It’s just going to be another tool in the toolbox of educators.

Jack

Alright.

Mike

Oh, and I, and I-I-I, so just everyone I talk to about this, I do list, and maybe I’ve told you this before, I list the educational revolutions. This is like the, the 10th one. The first educational, sorry, these are things that, uh, were advertised to be the cause of a revolution in education. Some of them works, most of them didn’t. Printing. Printing worked. That revolutionized education. The blackboard, was invented around 1800, that really did, uh....
Does the whiteboard fall into that, or?

Eh, no, the whiteboard, uh, is not, no. The whiteboard didn’t have the same impact of the blackboard. Then, uh, the internal combustion engine. Uh, the internal combustion engine and buses, uh, eliminated the one-room schoolhouse in the United States and most of the world. So, once there were cars and buses, uh –

I wouldn’t guess that, but....

– schools, schools were now centralized rather than scattered. And, and that improved the educational experience enormously. Okay, and then there were a whole, so all three of those have revolutionized education.
Actual, yeah. But, then there were a whole bunch that were advertised that didn’t. So, radio was going to revolutionize education, it didn’t. Television was going to revolutionize education, it didn’t. Computers, it didn’t. Personal computers, well again, it had an impact, but it certainly didn’t revolutionize it. The Internet, again it had an impact, but it didn’t revolutionize it. We’re still, you know, we’re still, even though the Internet is a wonderful tool, has a change the basic way we do business. Students gather, in a room, meet face-to-face with a professor, there’s an interaction for 50 minutes, then they scatter, and they, and repeat. Three times a week. You know, that basic recipe wasn’t touched by the Internet. And, and now, now we’re up to MOOCs. And, it’s just the, so, we had three real revolutions and one, two, three, four, five, and now the sixth, sort of, fake revolutions.

Right, cool. Um, so, so we’ve kind of touched on these.

Sure.
I just wanted to ask them explicitly.

Mike

Sure.

C.3.10 Time: 47:04

Jack

So, we know how we prepared the lectures and the homework, the book and the exams. Those are all the same as the brick-and-mortar course, right?

Mike

Uh-huh. Okay, yeah.

Jack

Um, and then, in terms of preventing fraud and cheating?
We make no effort. I don’t feel too, I’m not too worried about that because, uh, we, the, uh, the rules for taking the exams for the MOOC students are the same as the rules for the brick-and-mortar students. Namely, they are allowed to prepare a formula sheet on which they can write absolutely anything they want. So, if they are worried about forgetting something, they just put on their formula sheet. And, the nature of the questions I’m going to ask on my exam are such that they’d be pretty hard to find the solutions Googling. So, I, I’m just not too worried about cheating. And, and if there is cheating, uh, who cares? Because they’re getting a worthless piece of paper.

Jack

Right.

Mike

So, the only, the only thing they get out of this is education. And, if they cheat, they’re cheating only themselves. They are not cheating me.

Jack

That’s fair.

Mike

So, uh, I just don’t care whether they cheat.
Jack

Alright, uh, and, and then this question is –

Mike

Sure.

Jack

“How is this the same, or different, from preparing an in person class? But, I think you’ve talked about that already.”

Mike

Yeah, well, yeah that-that, well the prep is similar. Um, the, it’s the, the prep similar. It’s the, it’s the performance which is different. In the in-person class, I’m getting continuous feedback from the audience which makes it interesting. You know, after a, I guess the difference between, uh, live theater and television. Uh, you know, once the actor it’s film, it’s in reruns for decades. And, does he care? Well, he gets residuals, I guess he cares. But, otherwise, you know, it’s just out of sight out of mind. You know, no interaction with the audience. Um, trying to think if I had any other wise things to say. Yeah, so just, bottom line, I’m more skeptical than ever that MOOCs are going to have any serious impact on our educational system.
Mike

And, uh, I strongly suspect that the excitement, both in the press and from the administration, will--will die down considerably in the next couple of years as it becomes clear that there’s no big revenue stream to be had.

Jack

Right. Okay. Um, so, uh, “what do you expect to learn from your MOOC?”

Mike

Well, uh, well, uh, there’s what I hope they’ll learn and there’s what I expect they’ll learn. I hope they’ll learn some physics. But, I hope they’ll learn physics in the way it should be taught, namely, every lecture I’m trying to hit upon, sort of, central themes. Learning physics, or learning anything, does not mean memorizing a bunch of formulas. It means understanding a structure, a coherent structure, where everything fits together. And, being able to apply that structure to a few broad strategies. And, if you think, if you think solving the problem means finding the formula that gives the solution to the problem, I failed totally. You know, uh, solving a problem means first asking yourself: “okay, what law of physics
helps me this problem?” And, I want to go all the way back to a law of physics, not to a special case
formula. You know: “does conservation energy help me solve this problem? Does F-net = MA help me
solve this problem? Conservation of momentum?” There’s only a handful of possible strategies for
checking any physics problem. And, if I can train the students that they have to go back to the
fundamentals, rather than back to a formula for the answer, then-then I’ve succeeded. Um, so, that’s
what I hope they are learning. I know from experience, that a small fraction will get that because, uh,
you know, even good students are deeply suspicious, sometimes, of my message that memorizing is not
learning. Because, for a lot of good students, memorizing has been learning for their whole lives. It’s
been a successful strategy, it’s gotten them A’s, right up to this damn course where suddenly,
memorization gets them nothing.

Jack

Right.

Mike

You know, they are allowed to bring a formula sheet, they’re allowed to look at their formula sheet and
the answer is not on it when they look at the exam. And, you know, they-they actually have to have
internalized the ideas so thoroughly that they can, uh, produce a strategy on the spot, rather than a
memorized answer.

Jack
And, uh, that’s—that’s, sort of, that’s a, sort of, jump in conceptual maturity and expectations that. Some students do it well and other students just crash and burn. Right, so, so most of them are, some most of them, even in my brick-and-mortar, a lot of the students aren’t getting what I hope they are getting. Um, so, in the MOOC, I know it’s the same. They are not, a lot of them are not getting that. And then, but, but again, one of the others getting? Well, they’re getting exposure, not only to CU, but they’re getting exposure to, what I think, is good pedagogy. Even if they didn’t totally internalized message, at least they heard the message, repeatedly, from me that this is what learning looks like. Learning means, learning is not delivery of content, learning means interacting with the professor and the student taking responsibility for figuring out things in real time during the lecture. And, continuously monitoring their own thinking to-to check whether or not things make sense. And, oh, well I’m starting to repeat myself. So, so even, okay, once again, even if they, even if they don’t quite believe it, I still want them to hear the message that teaching should not be a professor talking for 50 minutes while the students just record it.
Teaching has to involve the student trying the difficult stuff themselves. And, monitoring their own education and taking responsibility for their own education and not expecting it to just be delivered in a book or three videos or through lecture notes. Learning is hard and messy. That’s what Valerie Otero keeps repeating, and I totally agree: learning is hard and messy. If you ever find learning was easy, that means, you weren’t really learning, you already knew it. If you take a course, and you go: “oh man, that was a great course. And I, and I hardly had to work at all.” No, that means you already knew it. We were just reminding you of stuff you already knew. And, reminding people of stuff they already know, gives everybody a good feeling. Learning new stuff is always tough.

Right. Um, so, kind of getting at something that I’ve been thinking of with respect to this, and, uh, something you mentioned in terms of yourself being a lurker –

Yeah, right.

– and, not necessarily learning from the French/Swedish course –
Mike

Uh-huh.

Jack

– and that, you would like students to have exposure to good pedagogy –

Mike

Right.

C.3.11 Time: 55:29

Jack

– uh, do you think there’s any value in other demographics besides the standard student body taking your MOOC and seeing these things?

Mike

Well, by other demographics, I-I, uh, do you mean, like, the international?
Jack

I mean, like, teachers. Or...

Mike

Oh, you know, I hadn’t thought about teachers.

Jack

Like, high school teachers.

Mike

Yeah, you know, I hadn’t thought about them. I was thinking about international students who, you know, if you think education is too traditional in the US, you should try Saudi Arabia or France. You know, you know, these ideas of interactive engagement are, uh, or barely taking hold in the US. But, in a lot of countries, they’re not even on anyone’s radar. You know, in, uh, in Japan it’s rote, it’s rote. You know, students sit there, shut up, and listen. And so, so I hope, I was hoping that the message, that this was a way to get the message overseas so that, so that if the students ever come here, to the US, they’ll be prepared to realize the rules are different. It’s not about memorizing. It’s about something else. But, it hadn’t occurred to me that teachers might also be getting a wake-up call through this.

Jack
Yeah, I read that in some literature and just had some discussions with other people about that.

Mike

Mhmm. Yeah, well, I hope that some, you know, high school teachers are so overworked. And, their jobs are so stressful. Uh, I’d be pleasantly surprised if, uh, if many high school science teachers have the luxury of having the time to take a 12 week MOOC and, uh, get a certificate. But, like me, maybe they’ll- they’ll get their toe in and take out –

Jack

Just a lurker.

Mike

Right, just a lurker. Getting, getting out of it exactly what they want. And, they don’t need the whole certificate. They, they just one the opportunity to, uh, look at the resources, uh, and pick and choose what looks interesting to them.

Jack

Right. And, I’ve kind of seen it in, I’ve come around to seeing it as a, almost as an exposure of the great PER work that has been done.
Mike

Yeah, yeah. Although, you know, you know, you know, there’s a bit of a, an irony there. You know, the part of the classroom that makes it really effective, we’re editing out of the videos. You know? We can’t hear the student discussion, so, we have to snip it out. Well, the student discussion is when the learning is happening, not, not in between the concept tests when I’m writing stuff on the board and setting up the, setting up the, uh, in fact, if anything, you know, I have to admit, this semester, because I know I’m preparing these videos that are more passive than the brick-and-mortar experience, I am spending a little more time at the board than normal. I, used to be, I would say things then not bother to write them on the board. But, but I’m being careful to write them on the board, every important point on the board now. If it’s worth saying, then I’m going to write on the board. Because, first of all, I know it won’t increase the length of the video. Because, if I say it and then writing on the board, the part where I’m actually writing it snipped out and it all just suddenly appears on the board.

Jack

The powers of technology.

Mike

So, uh, so, if anything, the fact that I know that I’m being videoed, has made me slightly more traditional and less interactive. Ironic.

Jack
Mike

Ironic. Ironic, but, you know, I just know that, if there’s a great class discussion going on, I now know it’s all lost on the Coursera folks. Because, there’s no way to pick it up.

Jack

Hmm, interesting.

Mike

Yeah.

Jack

Uh, so, uh, “what are the strengths and weaknesses of the MOOC?” I mean, we’ve kind of touched on them a lot, but, I feel like I should ask it.
Yeah, yeah, well, before I taught this MOOC, I would have said that the, uh, the strength, and now it’s just the potential strength, and not the real strength, is the ability to reach a worldwide audience and gather greater numbers than you can ever do on campus. Well, I’m, uh, from my experience, the greater numbers argument is losing force.

Jack

Mhmm, right.

Mike

You know, the number of students who get the full educational experience is comparable to or smaller than what I’m doing in the brick-and-mortar class. The, so now, so now I’m not sure what the strength of the MOOC is. Um....

Jack

It’s free.

Mike

It’s free, yeah. Yeah, yeah. That’s the, thank you, that is the strength. You know, from my point of view, as a lurker, I would be totally uninterested in Coursera if there was the slightest charge. If they charged me a dollar to take a course, my interest would drop to zero. Because, I-I, there’s 300 courses. And, I
I want to take a, I want to take a serious look at most of them. I don’t want to pay 300 bucks for just a look.

Jack

Right.

Mike

So, so, it’s got to stay free. It’s got to stay completely free, otherwise the whole point is lost, in my opinion. So, so that’s, that’s, uh, that’s a real strength that won’t go away. The weakness, well, you know, I don’t think there are weaknesses unless you make a false comparison. If you compare the MOOC experience with the educational experience on campus, then you say the MOOCs are weak. Well, I would say, why are you comparing them? Why are you making that comparison? It’s such a different thing. You know, I—I think it’s crazy to think the MOOCs will replace the University experience. It’s just a different thing. It’s like saying, uh, bicycles will replace food. What?

Both

*Laughter*

Mike
They are both important, but they serve totally different needs. What’s, you know, MOOCs and the University experience, I just, kind of, see as related but so different it’s crazy to think that MOOCs will replace University. It’s just crazy in my view.

Jack

Okay.

Mike

Yeah, so, so, so, seen from that point of view, once you free your mind of the notion that MOOCs are somehow competing with higher education, then MOOCs are just a new thing. And, you know, they bring, you know, and from the, from the students point of view there are no disadvantages: “it’s free, I can take it or leave it.” You know, what’s the disadvantage of a book in the library? None. What’s the disadvantage of this educational experience that is available to me, if I want it? None. So, I see no weaknesses of MOOCs from the student side. Of course, from the instructor side there’s possibly a strong disadvantage. Namely, it takes an enormous effort to put up a MOOC. And, the payback is nebulous and uncertain.

Jack

Right. Uh, so “how will you be collecting, uh, or what kind of data might you be collecting?”
Mike

Oh yeah, as much as we can. We’re just collecting data, sort of, shotgun. We’re just collecting all the data we can think of. So, so, you know, we’re giving, a total of six surveys. Uh, we have a pre-/post-test. And, we have an attitude survey that we, again, that we give at the beginning and, the students don’t know this yet, we’re going to give the same attitude survey at the end and see their attitudes changed. Uh, then we have a demographic survey, uh, that we gave at the beginning. And, uh, at the ends, we’re going to have a, sort of, a satisfaction survey, which we have an even designed by serving. We’ve only got, you know, we better get on it because, you know, we only got about six weeks left before that surveys got a be in the can and ready to be coded. Um, and then, then, in addition, the Coursera servers are great in that they record everything. We know exactly, and we’ve yet to mine any of this data, we know exactly how many students are looking at the lectures for how long, we know exactly how they’re doing on each of the concept tests, we know how many times their logging in for each homework and we know what answers they’re putting in. Will have full, so, so we basically, every time they touch the keyboard that gets recorded. And, so... 

Jack

Or, a mouse?

Mike
Or a mouse, right. And, every time they click that gets recorded. And, uh, Coursera, you know, is providing all that data to us. And, how much of that data we want to look at, at the end? You know, we haven’t decided yet.

Jack

Okay. Uh, just to clarify, the pre-/post-test is the FMCE?

Mike

Yeah, the FMCE, right.

Jack

The attitude survey is the CLASS?

Mike

The CLASS, right. Mhmm.

Jack

And then....
So, regarding got one very interesting result from the FMCE pre-test. The distribution of scores on the FMCE is very similar for the MOOC audience and for the brick and mortar audience, very similar. The MOOC audience is, uh, slightly better, slightly better background. There’s a, sort of, a, you know, the FMCE scores are almost bimodal. There’s a, there is a small bump of high scorers. And then, there’s a large bump of low scorers. And, uh, you know, at first glance the distributions look the same for the FMCE crowd as for the brick-and-mortar crowd. Except, when you look closely, the bump for the high scorers is a little bigger for the FMCE group. So, so that wasn’t too surprising. The FMCE group, I had expected them to be, you know, since they’re all self-selected, I expected them to be may be slightly better than our freshman. Because, they’re, they are usually older than 18 and they’re highly motivated. But, it turns out, at least for those who took the survey, it’s a small effect. The distribution is pretty much the same. So that, that –

That is interesting.

That makes me feel good about doing a comparison. I mean, if the populations were totally different, what was, what would be the point of the comparison. You know? But, the populations are similar in background knowledge then, then the comparison becomes meaningful. You know, how much are they, how much are the two groups learning?
Jack

Cool.

Mike

Okay.

Jack

Uh, and then, uh, there’s just one final question.

Mike

Sure

C.3.13 Time: 1:07:11

Jack

Which is, uh, “how do you expect the MOOC to compare to the brick-and-mortar course?” Just speculation.
Mike

Yeah, I’m trying to keep an open mind. And try to keep an open mind. I will be pleasantly surprised, I will be pleasantly surprised if the learning gains in the MOOC are competitive with the learning gains from the brick-and-mortar course. I expect them to be lower.

Jack

The MOOC doesn’t have the tutorials? Or…?

Mike

The move doesn’t have the tutorials, uh –

Jack

Or, much peer interaction really.

Mike

Yeah, you know, for those who are taking advantage of the peer interaction, the peer interaction is excellent. But, I can just tell by the numbers on the forums, you know, a typical, you know, a thread
that’s really successful as got, maybe, 10 posts. You know, 10 out of, uh, 14,000 students. You know, so, maybe lots of people are reading them, but not many people are actually using them to interact.

Jack

Right.

Mike

So, I would say, for the vast majority of students, there’s very little human interaction. It’s just all coming to them recorded, you know, they’re just reading stuff that other people wrote or other people recorded. So, that plus the extremely low stakes. You know, for-for all of the brick-and-mortar students, this is high-stakes, very high-stakes. You know, the highest stakes game they’ve ever played in their lives. Not only is there tens of thousands of dollars, tens of thousands of dollars of tuition money riding on it, but they, their, their futures riding on it. And, if they, if they failed this physics 1 course, they’re going to have to change majors. You know, they’re all engineers. And so, uh, they’re, they’re more motivated to do this, to do well in this than almost anything, then any other course they’ve ever taken in their life. You know, while the online audience is motivated solely by altruism, you know, a desire to self-improve.

Jack

Mhmm.
Mike

I think motivations, you know, are so wildly different between the two groups I’d be amazed if the MOOC people learn as much.

Jack

Okay, great. Thank you.

Mike

You bet. You bet. Nice talking to you.

Jack

And, I’m going to go ahead and turn this off.

Mike

Yeah, and it helped me, sort of, cement my thinking, to –
Alright, uh, it should be recording now. So if you’d like to give your...an interview for yourse –

uh...introduction to yourself and, uh, acknowledge that I am recording you and interviewing you and

you consent to that.

Uh, yes. So, this is Noah Finkelstein. I am a professor in the Physics Department and one of the

Directors for the Center for STEM Learning here and one of the, uh, I also serve on both the campus

Technology Task Force, uh, for, uh, campus, particularly focusing on MOOCs, and then the system-wide

task force on, uh, technology in, uh, academic service, except that’s not what it’s called, but it’s a

system-wide task force – um, the one that Mike Lightner is co-Chair of on the one-hand, and, uh, on the

former committee and, uh, sorry, on the latter committee, that system-wide committee, Lightner is

Chair of that. And, Kuskin is the Chair of the local committee, but I’m certain on both of those.
Noah

And yes, I consent to the interview.

Jack

Awesome. So, how and, uh, why did you decide to start the physics MOOC here at CU Boulder?

Noah

Yeah, that’s um...great question, I mean honestly, just to put my biases on the table here, I’m – I’m someone – I’m rather critical of, uh, sort of the potential and the major fad that’s going on in the development of MOOCs. And, uh, so I have a variety of concerns about them that I’ll happily enumerate. Um, so...but, uh, these were moving fast and furious and so rather than simply complain about it, I decided to get involved. And, so, uh, since these task forces were instantiated, developed, uh, I’ve been saying need to have a study of student learning is environments. So, there are many different, uh, at least five different goals for why you have a MOOC, uh, that I keep asking people answer. So is this MOOC designed to, you know, address the financial challenges either for students of the University? That’s one goal. So the cost in, lowering the cost of education and increasing revenue to the University is
one possible, uh, goal. Another possible goal is to increase access to students who wouldn’t otherwise engage. A third goal is, uh, to improve learning opportunities for students. That is a goal that, uh, I pointed out. Those first two goals I have been driving in the world of MOOCs. Uh, this third goal of increasing student learning is unheard of and there are no data out there, as far as I’m aware, on demonstration of improve learning in these environments. That, sort of, lead standard of this is the online courses offered from Carnegie Mellon that show that students can perform just as well as a traditionally taught lecture-based course. The non-interactive courses in statistics is a Bowman report on this, students will do just as well in less time in an online facilitated course that is interactive taught by the open learning initiative there. That’s not a MOOC and so my fear was that what we be able to do with these environments is instantiates this low bar of student learning that happens in a traditional lecture classes and force that online and prevent the highly interactive, the flipped classroom, the student centered and engaged work in MOOCs. So, I’m really interested in this area, this third area. Um, for the record, I guess the fourth area has been getting a lot of attention and in there’s drive behind that: that’s public relations and press. So CU was like all the other big fellas in this, where our task force was assembled shortly after, uh, in the wake of big University of Virginia scandal where the, uh, Board of Regents fired the president for not getting online fast enough. She was since reinstated. Um, and then the fifth area is as a research enterprise that these, uh, serve as tremendous data sets for looking not only at: “is this a research-able enterprise, do students learn in these environments?” that’s a question, but also, uh, “how is it that people engage?” And so you have vast volumes of data that, uh, we don’t have smaller classrooms. Uh, so you can get tens of thousands of students reporting on a, uh, a particular learning progression or series of questions or individual questions, say “how is it that students think on this?” and now, all of a sudden, you have instead of, uh, 50 data points, or two data points from interviewer, 50 data points from small class, or 100, or 1000 from our largest class, you can have
hundred thousand if we have, you know, this over time at different institutions. So, uh, those are the five different broad goals that exist. I think that it’s 1, 2, and 4 (the financial model, the access and the PR) that seem to be driving things, and nobody was really talking about learning or as research. And, in fact, it’s those goals 3 and 5 the really motivated my engagement in this. So I argued from the get go that we are in a position to take some of our world-leading, uh, lecture-based interactive classroom work and put some of that online and see what would happen in practice, enough for us to engage in. And so on that caught some wind and I was asked if I would run one and I said I would not, I said I would produce one and immediately said the person to run the MOOC, teach the MOOC, is the US professor of the year from 2006 or ’07, Mike Dubson, and, uh, sorry, US physics teacher of the year, um, should be, uh, running this class. And so, uh, we got him on board and we assembled a team of people to run this. And, I consider myself the producer of this MOOC and Mike the director and star along with Ed Johnsen as a director there.

C.4.2 Time: 5:57

Okay, um, so “what have you done, to the best of your memory, in time order – trying to get those dates and stuff also – to put this together? To produce it, as you say.”
Right, uh, well I can lookup online, uh, I can also do this asynchronously, if it doesn’t show up very quickly, um....

Jack

That’s okay.

Noah

That I was asked if I would run a MOOC, uh, and I, this spring at some point, um, and I’ll have to see if it shows up quickly or not....

Jack

This last spring?

Noah

Yes, so this last spring. Coursera...uh... okay, so there was a note that one out, uh, from Mike Lightner in February 12, 2013: “as you may know our campus is signing on with Coursera. We’re approaching this with an experimentalist mindset. The Provost wants to be careful of the selection of courses to be offered. In discussions that, uh, you, uh, with campus leadership each of you was identified as exemplars in teaching, research and individuals of interest. So my thinking, and subject to your approval, was Mike Klinkowski [who is not running a MOOC], John Falconer [who is not running a MOOC], um, and me in
intro-physics.” So I wrote back, uh, agreed to participate provided we could do this is a research study.

So this came from both Michael Grant and Mike Lightner, and I’ll forward this to you.

Noah

Um, so anyway, that showed up and, uh, I have a whole bunch of emails archived on this that I can zip and send you if you remind, let me know, uh, that we want to do that.

Noah

So, uh, and sort of preceded that, sort of my idea and interest, but that was the formal invitation that showed up. So it existed, maybe, as early as December when we were starting to think about that, uh, because of my work, uh, on this committee. And then, uh, I wrote back and it’s pretty clear immediately that I said: “yes, how much money is involved, uh, in all of this?” and they said: “well, we have zero set aside for you to do this.” I said: “well, we’re not going to be able to run this for zero. Thank you, but no.” And then they wrote back – and this is my recollection, we can look back at the email threads – and said
“Alright, well give us a sense of how much.” And I wrote back and I said: “we will need two half-time, a
half-time postdoc and a half-time RA, or basically two half-time positions for this.” And basically, we
were assured one and some level of course buyout for Mike Dubson on this. The department has kicked
in the course buyout, but that might also be out of the Dean’s office. Um, so subsequently we’ve had,
and only very recently in the last two months, to be – actually get money to show up for this.

Jack

Okay.

C.4.3 Time: 9:02

Noah

So we, uh, built this on the promise of getting some kind of money. I also worked with, uh, Deb Keyek-
Franssen, uh, who was here academic technology but moved up to the central administration to run, uh,
this. And, she had $20,000 that was allocated and for, then she just deleted up between the four
MOOC’s, and that can maybe three months or four months ago. So, I immediately started assembling a
team for us to think about what to do. The idea here for this MOOC was: that we would take the
classroom capture in the lecture-based environment that were in, use those videotapes, chop them up,
drop concept test on top of them, breakup that make them interactive. The hope was that we could
really build those, uh, the clicker questions, so it would stop the lecture, uh, the lecture should go for
seven or 10 minutes when Mike and introduce a live the question in the main lecture, then the Coursera
course would stop and pause and ask the students to answer question. And, I was really hoping to enact the Peer Instruction, model which is, you answer individually and then the computer, based on what you said, would come back with an intelligent response saying: “hey, but what about this?” Challenging you, or thinking about something else, you know: “your neighbor says this, how do you think about it?” And, having students type something, and vote again, and then come back.

Jack

Okay.

Noah

Coursera has not allowed us to do that. Um, so our interaction is left to only that first stage. Um, and, uh, we worked in the spring a fair amount closely in planning with, uh, the Georgia Tech physics MOOCs folks. So, one of the folks, Mike Schatz, is running a MOOC, uh, was launching it in the summer, uh, on Coursera. And, they had all kinds of problems and challenges that helped us negotiate our challenges. Um, and Danny Caveiro was very involved in that. And so, Danny, and so, we got to, uh, build on their strengths and successes. So, the idea then was that we would simply import, it was a question about where do we run the homework. Um, we were thinking about running our own CAPA server because the homework system on Coursera was argued to be worse than our 1980s-based, uh, UNIX CAPA system, uh: less dynamic, provide less feedback. Which tells you, uh, the argument is that it was, it’s improved significantly since then but it’s still limited in capacity. So, this whole area about, and honestly wanted to write, I somewhere have discussion thread Mike Schatz about writing a popular piece, uh: The Promise Versus Practice of Online MOOCs. So, we say that they, that you can tailor, uh, education for individuals
and give responsive education, but not the way I wanted to with the Peer Instruction, you know: “hey, you guessed a. What about b?” Even putting our concept test, overlay them was a challenge.

Jack

Right.

Noah

Um, the homework system is not designed to be dynamic and is not to be, uh, designed to be integrated and had real problems. Um, the idea that units had to be input separately from homework, uh, numerical answers to be graded. The whole point is a really good job, did a really good job of making it bulletproof, so it could run out to 100,000 students without error, but in order to do that made it extremely limited and less functional than our current technology systems, that are quite old, whether those are the clicker systems or the, uh...

Jack

CAPA?

Noah

– CAPA that we’re working on. Thank you. So, uh, anyway, so, we hired Ed Johnsen almost immediately, uh, or pretty quickly. I can find the start date on his job and that was to help us mount all the
homeworks. He did that very rapidly. So, ultimately, after some negotiations with CAPA and looking into the, uh, negotiations with Coursera and looking into our own CAPA system and talking with our own IT services, we, uh, opted to go with CAPA, offering more limited homework opportunities, but using their system because otherwise we had to provide all kinds of data and hooks and back from our CAPA to fit in with the Coursera modules that we didn’t want to do necessarily. And, we, uh, weren’t confident that we’d be able to scale our CAPA server to run the scale that was potentially required, uh, of that environment. So, we did, uh, the spring was more or less set up and planning. Both getting funding internally for this, hiring Ed, making sure that we could move and port the, uh, homeworks and – maybe that was late spring or even early summer as we started running on this. Mike spent a full summer month, for which we got money for him to do the planning and organization for this, to figure things out. Um, he spent a very significant amount of time in making sure that the camera was appropriate. In fact, we bought a new camera, we remounted it and we moved it and we tailored it and we had to figure out what view the camera would capture in situ. Who would be doing this? We hired people to do that, uh, to capture this in person. But also, this was spent in planning for that. Simultaneously we planned this research study over the summer. Um, which was designed to measure student learning and try and figure out: what could we capture? We created a demographic survey that was built both on what Coursera had and the Georgia Tech survey and some of the, uh, survey from, uh, MIT there at edX, stuff that Dave Prichard had been involved in, and added a question or two about the nature community on the one hand you’re involved in an question of question or two about the native community on the one hand, that you’re involved with, and then a question of, uh, and then a question or two about Grit, uh, that Kate Goodman is interested in, uh, examining and looking at. And so, we, uh, had a series of meetings about creating those instruments: figuring out what we’re going to run, how we’re going to run them. And then, uh, there was a fair amount of ramp up, but then, uh, I’m-we ended up then
testing: how to capture the videos, how do we condense them down chop the splice them. That’s what Jesse does. Um, Ed Johnsen is now the guy who’s actually capturing the video, uh, three days a week, uh, two different lectures making sure that, or three different lectures if needs be, making sure that we have good video with all of this. We addressed the issues of work. Where do we archive store and the videos as we’re processing them. So, a fair amount of production work went into making sure that we had all the components of this assembled. Um, that said it’s all been done on a shoestring. We are not producing new content. All of the content was given to us for free, in the sense that it’s coming from the course that’s already running. It’s, uh, this course breaks all the Coursera rules, you might’ve heard that from Mike, which is the lectures are not, you know, 7 minutes maximum, there 35 minutes maximum or whatever. We have, uh, we don’t have a five-week course or a seven-week course, we’re having a 12 week course with all this. It’s designed to be as much like an in-person course, as possible. And so, Mike is expected to do, the whole point is, Mike is not paid to run this course. Um, so, uh, we can’t expect him to create new videos to go online with this.

Jack

Right.

Noah

As were participating. So, that’s a little bit of the history of it. The idea was to capitalize on the tremendous amount of infrastructure that we have. We already have measures of learning: we’re using the Force-Motion Concept Evaluation, we’re using common exam questions, common homework questions with a live class to be able to do comparisons in that. So, the measures of student content
mastery, the measures of students’ attitudes and beliefs using the CLASS. Um, those were all on rails that we can simply import and run, it’s sort of a natural idea. Even so, it’s been quite expensive and time-consuming and a huge amount of voluntary effort to move all of these efforts, uh, from a-the existing in-person platform to an online platform here. Every bit has to be both identified, renegotiated and replaced, uh, or rebuilt. So, even given the tremendous amount of infrastructure, uh, we’re doing this on an incredible shoestring budget, which is that of a TA or RA, uh, with a potential that will have funds to support somebody to do further analysis in the future.

Jack

Right. Um, so, you mention a lot of, uh, what Mike or Ed or Jesse might do, but, uh, what specifically have you done to facilitate managing those? Or...?

Noah

Right. So, the big picture, I think I mean, producing is probably right. Um, I got the team together. I agree, I agreed to run the MOOC in consultation with Mike. Um, I found the people to work on the project: Ed and then Jesse, uh, with this, with Mike. I got the money in on this project. I consult with folks on, and so basically we have, we had a variety of formal meetings about what should the content of the MOOC be and how do we cover it. And, that was a structured and series of group meetings that I would contribute to and participate in. And then, a series of formal meetings about what are the assessments that we are going to run. And so, you are privy to some of those but also with Mike and with Kate and with Ed Johnsen to figure out: what is it that we study, how is it that we decide, that we decide to use these particular measures, what are we going to be looking for. I took the lead on
assembling the, uh, both the, uh, de-the background survey, the demographic survey that we have, uh, and, uh, moved the, uh, insured that we moved the CLASS and FMCE over appropriately, uh, in that way. And then, have been recently consulting on how is that we do the post-testing. One of the shifts we have underway now is – given one of the problems with the Georgia Tech MOOC, which had 19,000 students in it but had 180 students take the post-test at the end – is this idea of attrition. Is that, uh, you know, 10%, or in the Georgia Tech case 1%, of the students are there at the end, participating in the ways that we’re asking of them. How can we get reasonable data sets? So, uh, we moved up our post-test on FMCE simply deceived we can get, uh, higher numbers and our hope now is to get four or five hundred students taking these, uh, surveys rather than 200. So, not as good as the 14,000 students who are enrolled in the course, uh, but still, if we can get a fraction class that’ll be, uh, that’ll be great.

Jack

Um, yeah so, if there’s anything else that you’ve done that you want to mention...?

Noah

No, I think, that’s sort of the bulk of it in terms this course that I’ve thought about this. And then, that-there, there’s a variety of ancillary work that I’ve done on this. So, I think a lot about the nature MOOCs, in general. I’ve thought about this, I’ve certainly been working with you on your project here that’s related. Um, and then, uh, but particularly the campus committees. In fact, arguably, I guess, I’m chairing the campus subcommittee on assessment of MOOCs, not that we’ve figured out what to do and that committee hasn’t been meeting, partly because the overall committee is chaired by Kuskin who’s running a MOOC and I can only imagine is totally busy running his MOOC, maybe mention that. So,
anyway. So, these other things are all feeding into, like: what does this mean for our class? We negotiated, I mean, other things I did. Yes. I weighed in, very significantly, on whether or not we offer signature service for this. Do, do students get certificates? Do they say University of Colorado on them? Do they pay for participation in this? And, our campus has not, uh, been in a position to figure out: where does the money go?

Jack

Right.

Noah

Uh, in what way does this count for any kind of credit? Everyone the University brand associated with it? What are the rules about new people creating MOOCs? So, all those things, I’ve been weighing in on, but our campus hasn’t had the opportunity to address, uh, more fully. And so, those impact our local MOOC.

C.4.4 Time: 21:20

Jack

Okay. Um, so, “what have you learned, uh, over the course of making this MOOC? Uh, slash, what would you do differently?”
Noah

Yeah, so, I mean, one thing I was thrilled about was the promise of MOOCs. So, this goes back to this idea of the promise versus practice. So, I learned that, uh, you know, there’s this whole idea of running calibrated peer review. Um, there, that people talked about this. This is a way of saying that MOOCs are better than simply having a distributed book or mail-correspondence course because they allow students to form communities. Um, but, and so, our thought was then to have more augmented rating opportunities for students, uh, but, the tools that existed on Coursera are not yet refined in ways that other online tools are. So, they did not import the calibrated peer review system from, uh, UCLA into their CPR system, Calibrated Peer Review, you system on, uh, Coursera. So, while they say they have a homework system, the homework system isn’t as good as CAPA. While they have a CPR, it’s not as good as the one on CAPA. Um, these are, I’ve found generally that the people producing this MOOC, uh, on the Coursera side, know a lot about technology and don’t have a very deep sense on the theory of education or are uninformed about the more progressive approaches to education. As a result of that, they say: “okay, well what do you need for a homework system? You need to have multiple-choice, you need to have X, Y, or Z.” So, they build those in, but they’re the most limited forms and they’re the early stages of what has been done in education technology.

Jack

Right.
Noah

Will that catch up? Maybe. Does it offer the opportunity for personalized attention, uh, in this MOOC? Yes and no. You can certainly ask a question on our discussion boards and that happens and there’s some good discussion. Oh, I also brought in Dave Lieberman, uh, on this and put him on this project. Um, that’s another thing. And, he monitors our discussion boards. He also vets the content of the physics to make sure things are supportive and engaged. So that’s the project he’s working. Um, it seems to be going well. He knows a lot about this, in fact, he knows the daily practice much better than I do, about what’s happening in the MOOC. But, anyways, so, I found that you can get personalized service in this, but not in the ways that I can imagine or there are other models by which students get personalized feedback. It is not an intelligent system. It is nowhere near the, you know, avatar or, uh, I don’t know if you know diamond age, but there’s that illustrated primer in there that adapts immediately to the student learning.

Jack

Mhmm.

Noah

Um, it’s not adaptive to students and so you can’t get intelligent feedback. If I press a, that’ll give me the same feature as b or c or d, I can’t have tailored feedback to students. It, there’s no natural language processing on it. There’s, in fact, uh, we had to hack the system in a variety of ways, Ed Johnsen was great about this, to not allow students to skip things like our concept tests.
So, it’s set up with certain forms of use in mind that differ from ours. And, we had to either forgo ours or adapt to theirs to that end. And so, that way I found it much more limited in terms of the, uh, of the practice much more limited than the promise of what dynamic feedback could be offered in these environments.
around the world, mostly the US and, I think, India. Um, I think, you know, we’ll see, uh, right. What would I do differently next time? I think actually, by and large, we did it pretty well. And, next time, we would build on what we did this time.

Jack

Right.

Noah

Um, and I, uh, I would try and make it more interactive next time and, either through our own and or through Coursera, push on them to offer those opportunities that currently exist.

Jack

Okay. Um, is there any sense of if you have, uh, access to a bigger budget that you would use that? Or...

Noah

Yeah. Or if I had more time and a bigger budget, yes I think would have used that in, uh, ways. I mean, yes, I’m still hoping that access a bigger budget so that we can follow-up and do a detailed analysis of what happened in spring. That we collect enough data so that we can do analysis, uh, in this environment. I, it would be great if that were, if this course were a teaching assignment rather than as a sideline project for both me and Mike Dubson. Neither of us is getting paid for this. A bigger budget, I
don’t know, if I weren’t teaching another course, and this were the course that I were teaching, I could spend time thinking about how to modify it, update it, and adapt it. So, that said, it’s not clear why I would be teaching a course for students who are not CU students.

Jack

Right.

Noah

Or, why I would be teaching a course where it seems like the drop/fail/withdrawal rate is between 90 and 99%. Um, so, I mean, they just have different kinds of modalities and purposes then what’s going on here. So, I suspect they do tremendous good, I just, I don’t think they do the same kinds of things by any measure – well, we’ll see – of the in-person classes.

Jack

Right. Okay. Um, any other things that you found that you learned, in doing this?

Noah

Um, yeah, wow. So, uh, well, it’s a, uh, I-I think I would run experiment a little bit differently in the future. Um, I think we would have done more prep in advance and more, that would just take more infrastructure.
Um, the institution hasn’t committed funds really to make this a real experiment. Mike Lightner has, in fact, changed his language. He calls it an experience rather than an experiment. The original language was to establish an experiment, but an experiment has known metrics and measures and we invest money in running experiments. He says: “alright, well then were just at this stage where we’re going to back up little and say: what is it that we’ve learned from having participated in this landscape?” I think that’s actually kind of nice. It’s, uh, I’ve also learned these things move really fast and furious and, uh, both pace of the course is very quick to get things up and running. But, also the, uh, sort of, national attention to these MOOCs has, you know, gone through the roof. I mean, so it, two years ago nobody would’ve known what Coursera was, I mean, it didn’t exist. And, and now, they’ve got millions of users there and hundreds of courses and 60, I think, institutions signed on. They’ve done an incredible job in scaling up really rapidly. The question is, is a flash in the pan? Does this displace other things? So, it is moving really rapidly, while our understanding about the nature of the system moves very, very slowly.
Noah

And so, I think, what we need to do is spend more time catching up, understanding what is it that we are doing rather than simply doing it. And, it’s going to take time and money, pacing, political will. And so, that’s where we’re at.

Jack

Okay. “What are the strengths and weaknesses of the MOOC versus the in-class course that you see?”

Noah

Right, so I think I sent you this, uh, list of affordances and constraints from some, one, a talk, but, uh, it’s so, you know, I challenge you to figure out, just from the audio, what face I’m making right now... Which is to say a limitation of the MOOC is that it’s limited bandwidth. And, uh, so, by way of analogy, you’re only getting audio on this, although you’re sitting here. But, uh, so, it’s limited bandwidth. You then the amount of information and, uh, so, I think, the video is decently high quality, that we have. And, you know, the computer still asks questions, but with the number of modes and ways that people engage is limited, just by senses alone. You don’t get the smell. You don’t really get the audio. Um, you get Mike’s audio in our MOOC, but you don’t get the audio in the classroom, which maybe that’s good, maybe it’s too distracting. On the other hand, you don’t get to turn and talk to people, uh, in this other way. It’s on-demand and so it’s asynchronous. It’s on-demand, you can rewind it and replay it. It’s really hard to replay someone in person. In fact, it’s a little rude to say: “what did you just say? Could you say that again?” In a class. People do, but it’s fairly high threshold. Um, and certainly you can’t go back to that an
hour later. Although, again, this idea that we have streaming on our campus is helping with some of that. Um, students do rewatch videos, so I don’t know if that counts as part of the in-person class. Um, the most notable thing that’s missing is tutorials are missing. Right, in the online class. We couldn’t figure out a way to do that. Um, it would just be way more costly to do anything even approximate to that. Um, but an-and those, at their heart, are designed to be collaborative. We don’t know mechanisms for doing that online.

C.4.5 Time: 31:18

Jack

It sounded like the Peer Interaction was missing as well.

Noah

Right, so there’s no turn to your neighbor and discuss in lecture and there’s no tutorial section where that happens. Um, so, it’s very much one person interacting with the material and medium and maybe Mike Dubson and maybe CAPA, uh, and then, one person interacting maybe with the discussion boards. Although, can check and see what fraction of the class uses the discussion boards. Um, and so, there’ll be some and I know there are subgroups of students who form in that environment. But, uh, I guess, one point about this is while higher education is voluntary, it’s a different form of voluntary than the MOOC. So, uh, the MOOC is entirely voluntary, at all levels. And, I can take off my headset, I can participate, I can not participate. So, that’s good and bad. The in-person class is not entirely voluntary.
So, if it’s voluntary to sign-on for class, but once you have, then it’s not voluntary, I mean, your forms of participation. I mean, they are, but you get negative consequences, poor grades, if you don’t.

Jack

Right.

Noah

So, you have to go and participate in lectures through Peer Interaction. So, everybody has to do it rather than opting in to it. It’s the default action for people. Whereas online the default action is not interaction with other humans. And, when you do, it’s a limited form of interaction with other humans.

Jack

Would you say that a weakness of the MOOC?

Noah

I think it’s a weakness. I think education is about working with other people. I think that it is, it’s a, education is expressly about socialization and therefore requires other people. And, the more limited bandwidth, the more limited interaction that we have with other people. Let’s say with a book, uh, I still consider that interaction with other people, just far more limited. Um, in that way, the more expert you have to be as a learner. I think the MOOCs are good for people who already have, uh, skills and know
how to learn and engagement. We can bear that out in our own class. But, nationally normatively
people who are participating in MOOCs already have bachelor degrees, they’ve already been through
systems where they’ve been acculturated and know about the processes of learning and internalizing
these social norms and practices. So, they can self-regulate and, and engage and know what, what the
normative practices are for learning. Um, so, I think there’s a sense in which, uh, students don’t know to
take advantage or how to take advantage of a MOOC appropriately, or regulate themselves and force
them to do something that may sound unpleasantly, like, do a homework set –

Jack

Right.

Noah

– um, if there is no real consequence in their actions. So, it, for those students who will, anyways, so, I
think we are more inclusive of students, ironically, I think we are more inclusive of students in-person,
than we are online. In the sense that, uh, those students who aren’t highly or deeply motivated, we help
with their motivation, we enforce motivation for them to participate than those people who are more
online. That said, our classes, our in-person classes are not offered to older students or students who
have to take the class in, at night, or people who can’t take the class at 9, 11, or noon. That just doesn’t
exist or is not an opportunity for those students. The, uh, our class is not offered in India. Our, uh, class
costs a lot of money. So, uh, I think those are some of the differences there. I think the failure modes are
interesting to consider. Coursera has done a tremendous amount of job of making sure that their
servers running and continue running, but our, you know, our D2L course management system went
down for week last spring and for all the courses that were reliant on that, had to shut down. There was no backup mode. I suppose that happened here in-person, in our classes, with the floods, but it’s much harder to shut down a campus infrastructure than an electronic infrastructure.

Jack

Right.

Noah

And so, this happens once in 100 years that CU, uh, I guess, actually a couple times every 10 years, we’ve got shut down for snow and the rest of it, but that’s for a day and not for a week. Data aren’t lost, in that way.

Jack

Right.

No

Now, I am also curious about how brittle these systems are, the technologies are that we use in our systems. Um, so that’s sort of a beginning thought about the nature of differences in these systems. Um, I think that, uh, they each have benefits, uh, and ultimately my goal will be to blend those two, take the benefits of each of those.
Jack

Right. Okay. Um, “what do you expect students to get out of the course, to learn out of the MOOC?"

Noah

Yeah, that’s an interesting question. I think for the students to succeed in the end, I think that they will probably do pretty well. I guess, by reports, uh, students did well on the midterm, uh, in the Coursera course. Now, it’s not clear whether or not students were cheating, and that’s a whole another area. And, cheating still happens in-person, uh, but easier to do in the MOOC unless you go through the biometrics and all the rest of the work that’s going on. And, people are jumping over and doing back flips to try and figure out how we validate this is a human on the other end and they’re not using, you know, Google in order to answer homework problems and exam problems. But, I also expected that those people who are more self-motivated, that tends to stick with it just because they want to learn and to participate rather than get certified or have already prepaid and are committed and these other forms of motivation, I think that, uh, those students may well do, perform better in the class. I wouldn’t be surprised if they don’t learn any more, maybe they learn less, uh, I suspect that many of those students already know more coming in. So, we'll see on pre-/post-measures have students are performing.

Jack

Mhmm
Noah

Um, it will be interesting to look at, for those, you know, 400 students who took the midterm recently, the first midterm, and those students who, uh, and they didn’t, uh, 300 of them got B or better, something like that, apparently, uh, to see how will they get on FMCE pre-test. That will be an interesting question to examine. Um, I expect, but for matched students in this environment, it depends on how they match, I don’t expect them to learn as many of the concepts. Um, we give them fewer opportunities to practice. It’s not as interactive. Um, we do know that for traditional lecture versus interactive classroom students, students don’t learn as much. So, I’d expect this to seem more like, uh, the, uh, traditional lecture than the interactive lectures, even though we’re trying to make the online interactive.

Jack

Right.

Noah

Um, I don’t expect students’ attitudes and beliefs to shift as much, the CLASS. And, if this is like traditional CLASS scores, I mean, in general they get worse. So, maybe that’s good news, uh, in that way. Um, I, so, it will be interesting, you know, to see what is it that students learn. They certainly don’t learn to talk and justify, uh, their beliefs about physics and how they know the argumentation underpins the
answer making in physics. They don’t have the opportunity to do that as much online as they do in the in-person class. We’re not measure either, you know, in either environment this, uh, form of argumentation sentencing making, which I think is critically important. I don’t expect them to form as much of a community, uh, in this as the in-person class. Again, we’re not going to be measuring that.

Jack

Right

Noah

Um, so, it’ll be interesting to see what shows up on the things that we do measure.

Jack

Um, okay. What about, uh, other, uh, demographics of students? Uh, so other studies on MOOCs have seen that, for instance, high school teachers are, uh, sometimes take these MOOCs. Uh, Mike Dubson said that he took a, uh, French/Swedish MOOC on physics, and so he wasn’t learning physics and it. What types of things do you think other demographics, like that, might learn from participating lightly or heavily in the MOOC?

Noah
Right. I think, one thing is that what’s really nice about these is that it opens up this classroom that might be of value to the whole suites of people who wouldn’t be college students, and shouldn’t be college students, or already are college students, or already done with this. I mean, but, the point of this, that who are not in, who are not in the University of Colorado, who have not selected themselves. Will this class be of use in any way to other people. And, I think hugely so. I think that, for the students who don’t even finish the MOOC, the 90%, does that mean that it’s a failure? Absolutely not. I think they’ve, uh, had an opportunity to see and learn from Mike. I think they’ve learned something in this environment. I think they’ve got a sense of: what does it mean to be doing physics. What does it look like to be in a college classroom here in the States or here at CU.” So, I think that they, uh, I think there are huge benefits and opportunities for people to learn. Um, and, I think it’s, well, I don’t think were capturing that, but these are ways for people to engage and participate. I can also imagine that there is a, uh, high school teacher who says: “oh, you know what, I’m teaching, uh, physics, you know, I’m teaching rotational motion next week. Um, let me go see how Mike Dubson covers it. And so, a, I can brush up on my own content mastery, and maybe I don’t have enough because I was certified to teach science, you know, even though I have a biology degree. And, here I am teaching physics for the first time and I want to brush up on that physics knowledge that I have. And, wait a sec, Mike can give me some great tips about how to teach this because I can watch him about the nature of his practice and he’s a master educator. And so, it’s tremendously valuable to apprentice with him, to work with him mediated by this.” So, I think that it could work them through nontraditional ways to, uh, support people to, I don’t know, right, maybe people come to learn English or physicists find, who don’t know English so well, and they get to learn some English by listening to Mike and working through that in this way. Maybe the teachers get to have to brush up on their knowledge. Maybe get to look at how other people engage in that. I think those are really, you know, these are are valuable and under that sense I
would consider this more like a really good resource, like, a high-quality dictionary in that sense, or encyclopedia, you know, rich and, you know, 21st-century, uh, in that way. But, that is distinct from a course on learning and doing physics. So, it becomes a tremendous resource for people in other ways to learn lots of useful stuff, but you’d never want to learn English by reading a dictionary or master a subject by reading in the encyclopedia. It becomes a reference and they resource for people in ways. So, I think that these other demographics can benefit tremendously. And, I think that it’s definite worth continuing and exploring. I think, one other sideline that I have about this is that, I do have some concerns that on this information is, uh, proprietary. Now, the format is, I mean, Coursera is a for-profit company. Right, so it’s got a bottom line. And, in the modern American mean they are beholden to their shareholders so their job is to maximize profit. Now, they might be in it for improving education as well, but their bottom line is as corporations, as for-profit companies is to, uh, make money which may, in fact, be at odds somehow. The reason I bring up is, that underlies a bunch of the decisions that they make about the platforms and resources they create and provide that it may be distinct and may be at odds with what Mike and I have. Furthermore I’ve run across this personally several times with all of the course materials that were on, uh, blackboard and whatever the precursor was for blackboard that we had, uh, CUConnect or something else, and now Desire2Learn, all of those file formats I’ve put a tremendous amount of effort into these file formats that are then proprietary and then we move on from Coursera to elsewhere, we might own the copyright on all this information, but it’s archived and totally inaccessible to us to port and make accessible otherwise. And so, I am curious about where the open source versus closed source movement goes in this Coursera world.

Jack
Right. Um, I see we’re near our end, uh, I have a last question about what the data you would collect would be.

Noah

Please, yeah.

Jack

Uh...

Noah

Well, you a bunch of the data that I suggest we collect. Why don’t you bring that over here? So-so, certainly measures of student learning: how is it that students are engaging in this? Will be a really interesting, uh, bit to collect. So, in addition to pre-/post-test measures: CLASS, FMCE, demographic information. Um, you’ll want to be looking at: how are students performing on the homeworks? How many tries are they getting on the homework compared to the CAPA? How, what are their and performances? Do they do as well on the exams? We have common exam questions. So, that looks good at it. And then, the question is: who’s it who participates for how long? I mean, I would start with that first level of tranches that, uh, you know, but different groups that, uh, of participants that, that, uh, Prichard outlined in his work.
Noah

Um, and so, uh, I think that this is a good opportunity to, you know, collect data on how are different groups of students in these ways participating. What is it that they’re doing? Um, and then, uh, ultimately it also be interesting to ask the participants in this: what did you perceive happen? How do you think about the nature of the systems? Um, and then, we can continue chatting about what other data to collect in that way.

Jack

Okay, great. Thank you very much.

Noah

It was a real pleasure.

Jack

I’ll go ahead and turn this off
Noah

Great.
So this is now recording. I’m gonna put it halfway so it picks up sound well.

Sure thing.

And...How did you decide to start the MOOC?

Alright, well uh...of course the decision wasn’t mine. Uh, I can kind of speak for what I believe is why CU joined.
Ed

Uh, I think they saw an opportunity that was being taken advantage of by a lot of other great universities. And, uh, they jumped on board to reap some of the benefits such as exposure as well as to use as a platform to help spread the great education that's offered here at CU.

Jack

Okay cool. Uh, and, what have you done in time order since you heard about CU wanting to do this to make this MOOC possible?

Ed

Well, uh, I spent the first week or so of my assignment learning the Coursera platform. Uh...

Jack

Okay.

Ed
Mostly it was just, you know, trial by fire. Just, you know, jump right in and start trying to create what I needed to create. Uh, they had a pretty good helpful set of instructions. They had, uh you know, a great staff to help me understand anything that I wasn’t able to figure out on my own. Uh, I would say for the most part that it was pretty easy to figure out –

Jack

Okay.

Ed

– from scratch. So –

Jack

And you were able to correspond with the Coursera representatives or that’s –

Ed

Yes, I’m nodding.

Jack

*Laughter*
Ed

Sweet. Yeah, uh so, it was initially just making sure I had a basic understanding of the platform. Then it was, you know, uploading content.

Jack

Mhmm.

Ed

Uh, then a little bit of, you know, support to my professor as he also was learning the platform. And uh...

Jack

Who is the professor?

Ed

I’m sorry, Mike Dubson.

Jack
And uh, yeah then, you know, a little bit of, uh like, just testing to look for errors in what I thought I understood, errors in the platform, and that sort of stuff.

Do you mean errors in what you had tried to build in terms of the course as people would encounter it and click through things? Those kind of errors?

Yeah, whether uh, whether-whether it was an error like a typo or an error in somehow content that I’d entered didn’t agree well with the Coursera platform and so it either wouldn’t look right–
Ed

Uh, yeah I’d really spent the first or, you know, after that first week, spent the next probably two or three weeks just uploading content. Uh, so this was lecture content; these were concept tests for the lectures, uh eh, homeworks – homework assignment, and uh, a little bit of reading material for the most part.

Jack

Were most of this content already made and you just had to put them on the platform?

Ed

Absolutely true.

Jack

Okay. Cool.
Ed

Yeah, Mike had already written the homeworks and, uh, all the concept tests, uh, these are items that he reuses and updates over the years.

Jack

Right.

Ed

Uh, the homeworks were on a system called CAPA.

Jack

Okay.

Ed

So, Mike accessed the CAPA system, downloaded subsets of those questions, put ‘em in documents for me, told me which ones he wanted and then I put those up. The, uh, the concept tests were in Word Format.

Jack
Okay

Ed

So that was pretty easy to just copy onto the Coursera platform.

Jack

Well good.

Both

*Laughter*

Jack

Um, and, uh, am I right that the concept tests occur mid-lecture?

Ed

Absolutely, yeah. Yup, there will be, uh, usually four to seven concept tests happening every five to ten minutes throughout a lecture.
Okay. How do you incorporate that in the videos?

Ed

Uh, so it’s, like, really the way that Mike has gone about this whole thing is just awesome. It has really lent itself well to, uh you know, taking existing content and putting it into the MOOC. So, during the live lecture, um, Mike nominally asks concept tests in class.

C.5.2 Time: 5:07

Jack

Mhmm.

Ed

And so, when we come to that section in the video, we simply utilizes, uh, Coursera’s platform to then add an interactive question to that video at that moment.

Jack

Okay.
So, very easy to incorporate from lecture straight up to the MOOC.

Awesome. Uh, what else?

Uh, so we’re still talking about, like, what I was doing to get prepared? Or, I’m sorry, what do you mean “What else?”?

Yeah, sorry. Uh, what else have you done in making the MOOC possible? That could also include as the MOOC has begun, what you’ve done basically since the start to now-ish.

Uh, we, uh, were lucky enough to have some volunteers and, uh, other workers help us to edit our-our content. So this was just making sure again that grammar was correct, that the, uh, the content of the questions is physically correct, that the answers, uh, are all accepted as intended. So, some of the
homework questions that we put up accept ranges of answers and, uh, we’ve defined those ranges using, like, regular expressions –

Jack

Mhmm.

Ed

- just a subset of a coding language in this case PHP.

Jack

Okay.

Ed

And uh, you know, it’s-it’s fairly easy to make a mistake when you’re coding up these regular expressions that function as the auto-grader.

Jack

Mhmm.
Ed

So, people helped us ensure that the auto-grader is functioning as intended.

Jack

Okay.

Ed

Mmmmm...what else –

Jack

You said there were volunteers that helped with that? Do you have an estimate of about how many people –

Ed

Ahh, it’s really, it’s –

Jack

Were they student volunteers or was it just people nearby kind of thing?
Ed

Uh, let’s see. We had, uh, a graduate student from the University of Washington.

Jack

Okay.

Ed

A graduate student in physics, in fact with a PER – Physics Education Research – focus.

Jack

Okay, cool.

Ed

Uh, he offered to help us review some homeworks. Uh, we then have a couple of local students from the ATLAS building or the, uh uh...

Jack
Mhmm.

Ed

They’re, uh, so they’re focused on education and technology in general and they have been assistive in checking more of the grammatical stuff and making sure that if a particular concept test is shown in the video, that this same concept test ends up in the interactive thing that we ask our MOOC students.

Jack

Okay.

Ed

Uh, the vast majority of the original editing was performed, you know, by Mike, by myself and then by this UW student. And now we also have, uh, Professor David Leiberman out here from the semi-University of New York. Uh, he’s now doing the majority of the content editing and verification.

Jack

Okay.

Ed
So, –

Jack

Is that looking out further into the semester, as in you have the first few weeks figured out well and you’re just trying to make sure it’s all good as you go?

Ed

Yeah, for sure, for sure. Uh, like in the first three weeks I got pretty much all of the homework assignments and the interactive parts of the clicker questions uploaded.

Jack

Mhmm.

Ed

Mmm, I found that, you know, the first, almost my whole first week of uploading, I made a lot of mistakes.

Jack

Okay.
Ed

And there was a lot of grammatical things, forgetting to explain which was the right answer to the computer program –

Jack

Okay.

Ed

Uh, and so there was a lot of extra editing needed initially, uh, what I’m finding now that we’re not needing as much time from our editors. Yeah, you know, once I got familiar with it, I was just making fewer mistakes. Uh, I’ve been doing about twenty hours a week total work. And, I would bet that our editors, through the bad parts, through my, you know, high-mistake-rate-entries were probably doing...ten to fifteen hours a week –

Jack

Okay.

Ed
- like combined.

Jack

So the three students, the, well the PER student and the couple of local students?

Ed

Mhmm, yeah.

Jack

Okay.

Ed

I’d say they were doing ten to fifteen hours for the really messy content per week and I think now we’re probably down to about five hours a week –

Jack

Okay.
Ed
- total needed just to make sure.

Jack
And, would you say that’s mostly just having gained familiarity with the system, essentially?

C.5.3 Time: 10:00

Ed
I would.

Jack
Cool. Uh, you said, uh, the first week you spent learning Coursera and then the next few weeks, etc.

Uh, I never really asked, when did this all start for you, approximately?

Ed
Uh...I think it was the middle of June.
This last June?

Yes, sorry, June 2013.

Cool. June 2013. Excellent. Uh, and so we are...first couple of weeks of putting it in and so August comes and it’s just more it putting on and editing?

Yeah, mostly still just putting in the content and, uh, verifying the content and then, uh, we started looking into finding out what all we could do with the platform. Uh, we were looking at desires Mike had for enhanced features or altered features. Uh, in particular, one of the features that we came across was related to feedback during concept tests.
Ed

So, Coursera’s platform nominally, uh, tells a student whether their concept test submission was correct or incorrect, instantly. You know, they say: “I think the answer is B” and Coursera says “Nope. Try again.”

Jack

Okay.

Ed

So, what I did is figured out how it was that Coursera was communicating that feedback and blocked it with some usersigned script, some Java script –

Jack

Okay

Ed

- that I inserted into some questions. So –

Jack
‘cause we –

Ed

- we changed –

Jack

I’m sorry, uh, you did not want the students to have the automatic update of whether or not correct.

Ed

Exactly. So, uh, the purpose there, uh, as Mike explained it to me, was to, in part, ensure that students had an extra reason to go ahead and keep watching the video after each concept test.

Jack

Right.

Ed

Because Mike always provides an explanation and the correct answer after each concept question is given.
Ed

And also to reduce the likelihood that students would just game these concept tests. You know, just: “Is it A? No. B? No. C? Okay, I learned.”

Jack

Right.

Ed

So, we and, and, uh, and then we tested those out, uh, the little Java script solution on several different platforms, you know: iPads, Windows ‘95, old computers, new computers and it seemed to be working. So, we charged ahead with it.

Jack

Excellent. Uh, are there any other things you found and wanted to explore on Curesra-Coursera?
Uh, yeah, let’s see... one of the features that they offered inherent in their, uh, assessment systems was something you’d call, like, an algebraic answer or a symbolic answer or, like, an equation answer.

Jack

Mhmm.

Ed

So, instead of a student writing an answer of 48 Newtons, they would write essentially the equation and variables that would have led to that value of 48.

Jack

Okay.

Ed

So, you know, they’d enter something like $g \times \sin \theta$ divided by the square root of two –

Jack

Okay.
Ed

- as the answer. Uh, we tested this algebraic answer recognition software in a lot of different cases and felt it was going to be good. Uh *chuckle*, our first algebraic, er, actually second algebraic response question caused a great deal of trouble and, uh, I failed miserably to sufficiently test it. And –

Jack

For the students?

Ed

- yeah.

Jack

Ah.

Ed

Yeah, uh, so they entered, like, just a text-based formula as their response. And they’re provided with a little preview button that turns that response in to, like, a pretty looking formula.
Ed

So that they can tell if it’s what they expected or not.

Jack

Okay.

Ed

Uh, I found that the preview function behaves in a slightly unexpected way.

Jack

Mhmm.

Ed

So, depending on how you define a particular formula, its equivalent forms will be previewed differently by Coursera. So, you know, one over x is equivalent to x to the negative one.
Ed

But, for some reason sometimes Coursera would define that as one over x or sometimes it would be like, ah, this-this isn’t a, uh, perfect example anyway, but, uh, you know, x over x squared. It would just look weird. It would be equivalent, but since it wasn’t what the students were expecting, they got frustrated and felt that, you know, they were going to get marked down –

C.5.4 Time: 15:03

Ed

- because it didn’t match what they expected it to match. Now additionally, the, uh, algebraic auto-grader was in fact having trouble interpreting these different equivalent forms of an equation, which is what it was supposed to do.
Ed

So, not only was it a little frustrating for students in that the preview wasn’t working, but for the first couple of days of the release of this question, those who charged ahead and submitted anyway, even though they didn’t like their preview, were, in fact, misgraded.

Jack
Okay.

Ed

Right, so then, you know, I went through and added additional forms of equivalent equations so that this thing that was supposed to recognize all the equivalents, did a better job of doing what it was supposed to do initially.
Ed

Uh, at this time it does seem like it was a very specific type of formula that the previewer and auto-grader was struggling with.

Jack

‘kay.

Ed

It seems to involve, uh, if there’s a square root in the denominator of an equation that itself contains a fraction –

Jack

Mhmm.

Ed

- it freaks out.

Jack
Ed

So, uh, you know, I’ve looked through the remaining homeworks and have removed all algebraic questions that have that format.

Jack

Okay.

Ed

And we are still going to determine – actually today – whether or not we’ll ever use another algebraic question. *Sigh*

Jack

So, the general consensus might be to just avoid it?

Ed
Yeah...and that was...man, Mike was not, uh, not really wanting to try this algebra thing, and I, you know, and I kind of convinced him otherwise because I’d tested it, what I thought was, so exhaustively. So...I’ll probably get reamed for that today!

Jack

*Chuckle* Well...it’s good to explore the site, I think. Uh, what other things did you explore and find? ...good or bad.

Ed

Uh, you know, I mean like this first release: the main focus was just on getting out a barebones, uh, you know, offering. Even though there was the desire to change the feedback feature during in-video clicker questions, for the most part the remainder of this initial offering was intended to just be barebones like: here’s some multiple choice questions, here’s a lecture videos, here’s your exams, and we’ll look into special features later.

Jack

Mhmm.

Ed
Uh, you know, I mean, I, I just kind of played around with everything I could find that Coursera offered. And, I was interested in seeing if – excuse me – programing assignments, which are of course normally for computer students, could somehow be hacked to work for us. I haven’t figured out a good way to do that yet. Uh, you know, we’re looking at options for utilizing, uh, external assessment and, uh, forum structures, um, so that you use Piazza for the forum and it’s somehow sending information to Coursera and back and forth. Uh, we didn’t look at too many special features this first time around.

Jack

Okay. Just focusing on the barebones?

Ed

Yessir.

Jack

And, so these algebraic answers were potentially above and beyond the barebones? Or were they...?

Ed

It’s above and beyond the barebones for the course, but it wasn’t above and beyond what was inherent in the structure of Coursera.
Mmm, so yeah that’s sort of a fifty-fifty answer to that.

Okay.... Fair enough. Uh, and was there – was there anything else that you’ve put into making this happen? That you can think of....

Not really.

You know, I was given all of the stuff I needed to upload and uploaded it and tested it.
Jack

Alright.

Ed

It was pretty straight-forward for me.

Jack

Uuh, I think I’ve seen forum posts from you on the website, to the students.

Ed

Yeah.

Jack

So, do you monitor those and...?
Sure, yeah. Yeah. Uh, we didn’t really have a set policy for how we wanted to deal with what was happening on the forum. I mean, in general, it was going to be a hands-off approach.

Jack

Mhmm.

Ed

Uh, you know, the purpose there was to avoid becoming overwhelmed by comments and, uh, also just to avoid causing trouble. *Laugh* You never know how you’re going to miss-state something and offend somebody.

Jack

Mhmm.

Ed

Uh, I seem to have charged ahead anyway. Hmmm, mostly what I’ve been looking for is, like, technical glitches. Any reports of problems there so I could fix that as quickly as possible. Uh, it’s been re – I think the forums have been really helpful for students to get a lot, you know, a small handful of students are really helping everybody else.
Jack

Oh good.

Ed

And that’s been satisfying. I don’t spend more than about a couple hours a week –

Jack

Okay.

Ed

- uh, looking through and responding to the forums. That’s tops.

Jack

So, when you said ‘charged ahead anyways’ that meant spend some time on it, but not a whole lot of time.

Ed

Yeah, I try to do, I mean, mostly even just responding is, I guess, what I meant by ‘charged ahead.’
Ed

I mean I could have just made these fixes and not responded on the forum, but for whatever reason I choose to respond, so.

Jack

So when you found a technical error or something that you fixed, you would update the students about it.

Ed

Generally, yeah.

Jack

Okay. Excellent, uh, so, what have you learned through this process of making the MOOC?
Um, you know I had a, I had a lot of preconceptions about, uh, the Coursera platform. I’d heard a good deal of complaints about it. I found it to be pretty easy to work with. So, that’s not like a real deep lesson, but I learned it wasn’t so bad.

Jack
Okay.

Ed
Uh, man there just, there haven’t been a whole lot of stumbling blocks and I, I really think that, for me, that really solidified the idea that if you’re going to jump into a completely new realm like this, it’s a good idea not to jump in too deep.

Jack
Mhmm...okay.

Ed
So, you know, I’ve learned that barebones is a great way to start.

Jack
Ed

Because, even with quasi-barebones, you know, we’ve hit some, some trouble. Uh....

Jack

Uh, along with this question, if you wanted to answer towards what you would do differently? So, what have you learned? Also, what would you do differently? Because, they go hand in hand.

Ed

Hmmm, really not much. I mean, I certainly would not try to jump in deeper.

Jack

Okay.

Ed

...next time. Uh.... You know, I guess it wasn’t too big of a surprise, but I suppose you could say that I learned that there are people out there that are really willing to dedicate their own time to help a free product like this be better for themselves and for other people. Uh....
Jack

Volunteer time?

Ed

Yeah, just like students talking on the forums, you know.

Jack

Okay.

Ed

It was kind of neat that that guy from UW, Brian – I’m terrible with names, sorry I’m going to look that up.

Jack

Is this the UW Grad student?

Ed
Yeah. *Mumble* …Stephanik: S-T-E-P-H-A-N-I-K. That was awesome that he was willing to dedicate and donate some time. And Mike, I mean, he’s not getting paid any extra to do this thing. You know, people just like making education better.

Yeah.

You know, like, it just went so well. I didn’t – there weren’t a whole lot of lessons for me.

Okay. Uh, do you have any advice that you would give somebody trying to start a similar course elsewhere? Or, of course, in a separate subject matter maybe, but….

Yeah, start easy.
Ed

Start easy, you know, uh, ideally if you already have a course that you’re familiar teaching and if you already have a lot of content for that, that’s a great way to get into this world. You know, having to start from scratch, developing a course, developing all the content, and learning this platform and doing it all on time, it’s going to be a struggle.

Jack

Mhmm.

Ed

So, you know, step in, if you’re already in some ways 90% done, that’s the way to do it.

Jack

Okay.

Ed
Hm.

Any other advice that you give or lessons that you can think of?

Ed

Uh, you know, you really got to focus on making sure that it’s easy for professor and supporting staff, like myself, to communicate clearly. So, you know, Mike put together a spreadsheet that had, you know, each week, each day, each lecture, each concept tests he wanted in that lecture. Uh, you know, really clearly laid out a spreadsheet again for, you know, the homework assignments.

Jack

Mhmm.

Ed

And, shared these things, in this case, on a dropbox so that when he makes a change, it changes what I have. Just utilizing your collaboration tools, definitely key. Uh.... What else helped here. Hmm, you know, you’re going to want somebody like me: a, ah, code monkey who is really familiar with user interfaces for learning management systems, uh, and is capable of making, like, small Java Script changes, uh and solutions.
And, and just if, you know, I believe it has been helpful to me to understand some of the PHP and MYSQL and just some of the coding languages that is used on the back end by learning management software, so that I could tell how best I could make changes and to kind of understand how the system itself could fail and what I could do to avoid that.

Mhmm. What are all the coding languages that you feel you’ve needed to know for this?

Uh, a little bit of HTML, uh, and CSS. Those two, used together, basically just allow you to define the visual layout of a question.
Ed

You know, for the most part, you can just type words and click a button to add an image into these questions, but, you know, if you need to do anything more complicated like entering a table, you know, where you have nice little rows and columns that line up or if you need an image to be on the left or right of each question, you know just some real simple HTML and CSS will get you there. Uh, if you want to make any changes to the functionality, uh, my personal belief is that Java Script is the easiest way to go. So, you know, if you want to do any upgrading, you’ve got to have some Java Script. Uh, a large portion of the way, or, uh, the, the stored content that gets developed, when you’re using the interface is stored in an XML language.

Jack

Mhmm.

Ed

Uh, and there are various interfaces that allow you to interact directly with an XML version of your quiz. So, general familiarity with that language.

Jack

Mhmm.
Ed

Uh, and then, uh, yeah again PHP and MYSQL, just so you, you know, you can kind of understand how this stuff is being stored with Coursera. Uh, that’s about all you need.

Jack

Okay.

Ed

Oh, nope, I’m sorry. You’re going to want to know, uh, MathJax.

Jack

MathJax? Is that with an ‘x’?

Ed

It is. And that’s, uh, it’s just a web version of LaTeX.

Jack
Okay, gotchya.

Ed

So that, of course, lets you define pretty equations.

Jack

What are the strengths and weaknesses of using a MOOC?

Ed

I mean strengths: you can certainly reach a lot of people. Uh, weaknesses: if you’re using somebody else’s platform, as we’re, as we are, you have very little control over general layout and general experience for a student. You know, I mean, that’s certainly a double-edged sword there. I mean, it’s nice not to have to spend the time developing stuff or to have to really fix anything that goes wrong. But, you know, you’re just, you end up being very limited in what you can do via the platform. Hmm, we really haven’t had a whole lot of complaints from people about not having a live professor somewhere that they can just go talk to.

Jack

Mhmm.
Ed

The forums have really helped.

Jack

There have not been complaints?

Ed

Very few.

Jack

Okay.

Ed

I mean, like, one student mentioned that they wished they could sit down and talk with Mike, but I’m sure everybody would like to talk to him.

Jack

*Chuckle*
Ed

But, for the most part, they’re getting their answers and feedback on the forums.

Jack

Were you expecting there to be more desire for the in-person interaction?

Ed

No, I guess that’s just sort of the largest different, you know, between a MOOC and a regular old brick and mortar class. You just don’t have a live teacher. Um, let’s see. I, you know…. Other benefits, you know like, the-the, you can reach a broader audience.

Jack

Mhmm.

Ed

Like, uh, you know, there are people who are looking at this MOOC simply to learn about teaching methods. You know, to learn how better to use clickers in a classroom. And, it’s pretty rare, you know, that you’re going to be able to just get a bunch of teachers to just show up to a physics classroom.
Ed

You know, so uh, they’d be taking up seats, you know, giving up prime time that they would actually need to be at work, but this reaches them on their own time.

Jack

Right.

Ed

Uh....

Jack

Do they mention that at all on the forums, or how do you know this? Or, is this a guess, or...?
Uh, that’s based on demographics surveys, based on, uh, comments I’ve seen on other courses’ forums, as well as, like, just reports that have been put out by other universities that have used MOOCs so far.

Jack

Right.

Ed

They’ve mentioned frequently that teachers use these things and learn from them. Uh, I can’t recall a specific comment in our forum yet about that. But, there are a lot of teachers in our demographic survey, according to our demographics survey. What was this question again?

Jack

Uh, this was: What are the strengths and weaknesses of using a MOOC? So, pros, cons.

Ed

Uh, obviously, you can just get to a lot of people. You know, you can reach out. Uh, you can’t, you can’t really edit yourself live. You know, in a classroom, you make a mistake. Like, it happened. There’s no undoing that.
With the MOOC, you just edit that part out of the video. You know?

Right.

Uh, so a strength is that you can present a more quote ‘perfect’ product.

Okay.

You know, while it certainly doesn’t have all of the benefits of a brick and mortar institution, it can at least be really well polished.
Ed

Umm, weaknesses... weaknesses... Uh, yeah, I mean it’s just, it’s really hard to tell what sort of impact you’re having because you have such a diverse population.

Jack

Mhmm.

Ed

You know, so when analyzing results or data, it’s just harder to draw conclusions about what performance on any one item, uh, really means.

Jack

Mhmm.
You know, at CU, pretty much anyone who takes the course is just trying to learn physics.

Jack
Right.

Ed
Whether they want to or not, or need to, but up there, a lot of people already knew it. I mean, you just don’t get a lot of grad students coming into a physics 1 class and taking it again.

Jack
Mhmm.

Ed
You know, and so, I think it’s going to be kind of hard to parse out any meaning from assessment data.

Jack
Okay.
Ed

I mean, I think there will be some neat stuff in there.

Jack

Uh, well, that kind of goes along with the next question, which is: What do you expect students to learn in the MOOC? So, especially these other demographics, I guess. You don’t have to speculate on what you think they’re learning, but....

Ed

Right, mhmm.

C.5.6 Time: 34:53

Ed

It’s going to be tough. Yeah, no, alright, so, I mean, I think we really do have some, some kids, you know, that, uh, one to eventually to test out of physics, you know, or take some of these different international tests to get credit for having completed somehow a physics course. And, I think a lot of them will, you know, achieve nominal learning goals of the course. Uh, you know, learning physics-based content, you know, I mean, how to use equations and how to learn, uh, every, you know, everything you’d hope students would learn, I guess. Uh, and the speculation piece, uh, I really do think there will
be teachers out there who learn a little bit about how best to use clicker questions, just by watching Mike. Uh, but also just learned that clicker questions, uh, clicker questions work. You know, I mean, it’s not super clear in the video how much time students are spending talking and this then the other thing, but I think it’s clear from the video that students are always interacting and that, it’s, you’re not going to lose control of the classroom just because you let them talk. And, uh, yeah.

Jack

Do you try and highlight these other things that can be learned in any way? Or, is it mainly just a proof of concept? Showing by doing it.

Ed

Uh, yeah, I guess it would be a proof of concept. I mean, it, it was not an explicit goal at the outset. At least, not one that was shared with me. Uh, I am not clear, I don’t believe we have any plan to do, like, a survey that asks only the teachers of our audience, like: “did you learn anything about using clicker questions?” So, we’ll probably never really have any proof of that one.

Jack

Okay.

Ed
You know.

Jack

Do you think there should be? Or, that there should be a better way to differentiate between students who want to actually learn the physics and potentially pass out of a college level physics course versus grad students retaking it for whatever motivation they have to retake it, etc.?

Ed

Uh, I, no, I generally feel that online learning platforms that, you know, facilitate, differentiated learning are superior to those that don’t. Um, I think that, you know, this course format lends itself well to a fairly good range of learners with various goals. Uh, without the ability to clearly and easily differentiate between the students and the different groups and the different motivations, uh, the number of different, you know, like, surveys we’d have to have everybody answer so that we could really dive and these other, uh, potential goals, like helping people to understand how to use clicker questions, I think it would just be overwhelming.

Jack

Right.

Ed
So, uh, you know, most people just happen the right in and share their experience or if it gets talked about in the forums, I don’t expect that will be doing anything to track secondary impacts.

Jack

Okay.

Ed

And, uh, the learning piece, you know, I mean, we’re just going to, we’re just going to look at our data and do our best to connect the demographic survey data to, you know, longitudinal apparent growth through the class and try to draw some conclusions. I, but, you know, I cannot say for sure what will be able to prove yet, or not.

Jack

“Were there any other things that you expect students to learn?”

Ed

I think students, uh, you know, are going to pick up just some, uh, general web learning kind of things. Uh, one problem students have had has been with interpreting information on graphs. When the image of graphs – excuse me – provided weren’t clear enough or big enough and, uh, in the forums, you know, other students are posting lots of different solutions. You know, software they can use to enhance the
image. Suggesting that they print it out. And they, uh, share an idea about just zooming in on your browser. Uh, I think some students are probably going to end up getting inspired to learn more about that MathJax thing.

Jack

Okay.

Ed

Like, especially in the forums, when you see another student who can write pretty math. I expect that will inspire somebody to try it out. Uh, you know, I really don’t know how we could show that somebody didn’t know MathJax before the class and did afterwards. You can maybe make some assumptions, if you see a particular person posting without MathJax earlier in the semester and then with it later. But, that’s no guarantee.

Jack

Is the commenting function of Coursera in MathJax? So, you would type out whatever the code version of the equation is in it would work? Or…?

Ed
I mean they offer, they offer a couple of different pieces. So, MathJax is, uh, essentially it’s a JavaScript library and set of functions that, when a page loads, it reads the content of that page and convert certain symbols into pretty looking, uh, formulas. So, you could have just about any old regular forum structure and any data input structure and as long as the webpages running on, also has this MathJax JavaScript function going in the background, it’ll crank that out. So, it’s not necessarily, like, and inherent structure of the forum. But, they do also have, like, a math editor within their forum thing. So, even if you don’t know MathJax, you can, kind of, create pretty formulas too.

Jack

Okay. I was curious because I really know any of that.

Ed

It’s all good. Yeah, uh, I’m not sure if those very elucidating. But, uh, what else might they learn? I know man, you know. We can mostly just test the content knowledge.

Jack

So, the main goal would be physics content, obviously, because of the physics course. Sort of, doing well on the FMCE. And, you haven’t mentioned that, but I assumed.

Ed

433
No, you’re totally, you’re spot on right there. We do a pre-test FMCE. We did a CLASS pre-test for attitudes about science. So, I guess, will be able to see if we had any impact, we may be able to see if it had any impact, like, on the pre-/post- on the CLASS and on the FMCE.

Jack

So, the specific data that you intend to collect to measure student success will be these, those tests pre-/post-? Uh, what else?

Ed

Uh, just also, you know, all the assessment data throughout the semester. That’s pretty much it. The pre-/post-tests and that during tests.

Jack

Like homeworks?

Ed

Yeah, homeworks.

Jack
Do you measure clicker question responses? Or no?

Ed

Uh, it’s not something that’s factored into the grade on the Coursera platform. Uh, it is a data stream that we have access to for off-line analysis and we just really need to look at how that that date is being formed and if it’s informative before I can say for sure whether or not will be included. But, it’s definitely, you know, a promising data stream.

Jack

Okay.

Ed

I mean if they answer anything, we might as well look at it.

Jack

Okay, so just to recap, your data will be pre-/post-FMCE and CLASS?

Ed

Uh-huh.
And, the FMCE will measure physics content knowledge. And, the CLASS will measure, uh, what?

Attitudes about science.

Okay. And then, you have the homeworks that you have administered on, uh, the, the weekly or biweekly or whatever basis.

It is weekly.

Weekly? And then, the exams. I exams are there?
There will be a total of three: 2 midterms and a final. And, the only other piece we’ve got is a demographics survey, but it’s that’s, of course, that’s just pre-. Because those things won’t change significantly over the course of the semester, although I guess that’s possible.

Jack

That is possible. And then, the clicker questions, which are stored, but you might not, you don’t know what you would do with them. And then, I heard Coursera monitors all student actions across their entire time interacting with the website. Like a click –

Ed

Yeah, I’ve been trying to get clickstream data. And, so far, I haven’t gotten my hands on it. And, additionally, that is going to be an enormous and confusing data set. Uh, yes, it absolutely is something that we’re going to look at and see if we can’t find something useful in there. But, uh, you know, I don’t know yet what student usage patterns may tell us about how their learning or anything with that.

C.5.7 Time: 45:31

Jack

Okay.
Ed

But, with the assessment data, I think there’s some pretty straightforward methods for making
determinations from it.

Jack

Cool. Uh, were there any other ways that you will measure student success or learning outcomes?

Ed

Uh, you know, as far as all of the research questions that are going to be asked and answered, that will
largely be determined by somebody other than me. You know, I have a little bit of knowledge about
educational research, but I mostly a code monkey.

Jack

Okay. Just asking. Uh, well, I guess along with the, these homeworks, exams, the FMCE and CLASS, well
probably not the CLASS as much, but is there any way that you are monitoring or attempting to weed
out any kind of cheating or fraud of any sort?

Ed

Uh, let’s see. So, Prof. Lieberman, uh, has taken on the charge of ensuring that just straight up answers
aren’t posted in our forums. So, he would delete those if they showed up. Uh, it’s been kind of neat, the
forum has self-regulated. Very rarely have any just, you know: “here’s my answer” posts been made and they were quickly ridiculed by other forum posters. Uh, you know, or if not’s ridiculed, rectified. You know, they say: “hey, please don’t do that. We’re glad to help you.”

Jack

And that’s by the student community themselves? Not by Prof. Lieberman or you or anybody?

Ed

Right.

Jack

Okay.

Ed

Um, we, uh, have not made any direct effort to scour the web for, you know, these answers being posted on Facebook or, you know, anywhere else. So, no we haven’t done anything with the cheating piece.

Jack
Okay. Fair enough, or the fraud piece of people who aren’t who they say they are working on the course.

Ed

There’s nothing we can do about that. I mean, the accounts are all built through the Coursera and, uh, it would just be way too much effort to try and validate user ID at this time.

Jack

Okay. And, so, these last two questions cut of come together as, uh, and I’ll just, they are two different phrasings basically. “How would this be the same or different from preparing an in person class? And so, how do you expect the MOOC to compare to the traditional counterpart?” So, one piece is, I don’t know if you’ve made a traditional class before or the off-line campus class, ever put things in that before. So, that would be how is this the same or different than preparing an in person class? And then, just, how do they compare in your eyes, overall?

Ed

Okay. Uh, sort of, maybe, an annoying answer, uh, I don’t, I don’t think there’s almost any difference at all. Uh, especially because your traditional brick-and-mortar courses already nominally include an online component. Like, here at CU, we’ve got D2L. So, you know, Mike has to make his homeworks, he has to make his clicker questions, he has to prepare his lectures. He does all that stuff, like, physically, and he does it in person, but then also has to put it up on D2L. So, this is just, you know, doubling the, uh,
efforts required for that, the online component of what’s pretty normal in classrooms. Uh, it took about, I mean, you can say, like, if you blended all of these, all the efforts of everybody together, I think it’s taken about, like, about one full-time employee extra to put this, you know, otherwise brick-and-mortar and D2L-based course into a MOOC. What was the second part of this question?

Jack

Uh, I’m sorry. I asked these together, I should just ask them apart. So, how was this the same or different from preparing an in person class? We’ll just focus on that.

Ed

Uh, let’s see, so, the filming piece was different. I mean, you know, we certainly don’t need to film an in-person class. Uh, so, that change the technological requirements for the classroom. Uh, Mike has slightly altered how he behaves in the classroom. So, you can tell, that, every now and again, he’s just aware of the fact that he is being filmed and he will stand in a certain way or go through the lecture in a certain way knowing that it played better on the video. So, that was a slight change. But again, because we were working with an existing class and just putting it on, online, there was very little additional or new effort required.

Jack

Okay.
Ed

I wish I had something more exciting for you there, but –

Jack

No, it’s an exciting answer either way. Um, and then, the second piece was, uh, just, overall, how do you expect these two classes to be different. Or, how do you expect the MOOC to compare to its traditional counterpart?

Ed

Well, I mean, okay, so generally, I expect the MOOC is going to have a much broader audience. Uh, I mean, we’ve already seen the early on, the expected behavior, where most of the students who signed up for this class had no intention of ever completing the class.

Jack

Okay.

Ed

It was just an interest. So, you know, 90% of the students that started are gone.
Ed

It’s very different from the brick-and-mortar. Uh, if we then start comparing the students who are sticking around our MOOC to the brick-and-mortar students. Uh, I think the MOOC students are going to perform just a little bit better, overall. Which I, you know, shouldn’t be too big of a surprise considering that there is now a population of, you know, people who are already physics teachers and people who already have physics degrees taking this as a refresher or for general interest.

Jack

When you say “they perform better” do you mean they will just score overall higher?

Ed

Yeah, that’s all I mean.

Jack

Uh, I guess the question I’m trying to ask there is: learning gains would be doing better or...?
Ed

Well, their learning gains are going to be ruined by the, you know, same action that would overall raise classes average score. I think, we’re really going to have to be careful about how we separate out these populations, and who we try to find learning gains for.

Jack

Okay.

Ed

Um, you know, we had, we had a higher percentage of people who took the FMCE in our MOOC who scored high than who took the FMCE in the brick-and-mortar course this year. And so, you know, that section will have a smaller potential gain. Yeah, I-I just am speculating. I don’t know.

Jack

You don’t have to speculate, that’s fine. Um, so, are there any ways that you expect the MOOC to compare to its brick-and-mortar, traditional counterpart? Or, I guess just its on-campus counterpart, it’s not exactly a traditional class.

Ed
Right. I don’t know, man, I don’t know. I think, there will be random people out there in the world who make new friends because of this MOOC whether they are just online friends or if they become friends and some of the meet ups that people put together.

Jack

What are the meet ups?

Ed

Oh, well, just like, uh, I mean there are official things called meet ups. But, I guess, in this case, uh, I just mean like, every now and again you’ll get a student who is like: “hey, I’m, uh, I’m in Australia. Here’s my ZIP Code. Do you want to gather and, you know, study?” And, in some cases, like, I believe it’s bringing people together.

Jack

Interesting

Ed

You know, there are very few, there’s a small percentage of the people in any one physics classroom they are going to become friends with, but it happens. So, you know, I mean, there are some similarities there. Uh, it’s going to be, like, the students experience that’s different. I don’t know, man. I don’t know.
Okay. Uh, and then, I don’t have any other questions. So, thank you.

Ed

Sure.

Jack

Uh, I do have a general curiosity about to the, uh, data analyzing because I’m going to try and do some of that. Uh, so, I know if, if you’re involved with much of that or anything like the Excel sheet of pre-test for FMCE or anything like that.

Ed

I have access to it. But, I haven’t really done much with it.

Jack

Okay.

Ed
I'm glad to provide you with whatever copies you need.

Jack

Okay, thank you.

Ed

Sure.

Jack

And, I think that’s, that’s basically it. And, I’ll turn this thing off.
Okay, so it is recording and...my first question is: How did you decide to start the MOOC?

So, um, my – I was – schwoo. My name is William Kuskin and I am Chair of the Department of English and I’ve done online teaching...not my whole career, but for ten years, at least. Um and, I decided to start the MOOC because, um, Mike Lightner, who is the Chair of Computer Science and Electrical Engineering? – I might have that wrong, but something like that – uh, asked me to do it. That’s basically why. And, I suspect he asked me to do it because I came up for promotion last year and my dossier had a lot of my online teaching, um, materials printed out and in the dossier. And, I think it was kind of shuttling around Old Main, uh, Regents Hall as people were looking at it, you know, evaluating my promotion. And Lightner probably said, ‘Well, we want a Humanities person to do a MOOC as well as a physics person and an engineering person. Um, so, let’s pick Kuskin because he seems to have done something like it before.’
Will

And it’s interesting because, um, I have taught this course on comic books – it’s one of my most successful courses – for probably six-seven years now. Um, and I have it pretty much down. And, three years ago I converted it into an online course: recording my PowerPoints and building the course so that the homepage looked like a comic book cover.

Will

So, when you enter the homepage, you are faced with this comic book cover and you could navigate around the fields and the fields would take you to different activities of the course. And then every week, a new set of PowerPoint lectures would roll out: some of them videos, most of them PowerPoint lectures with my voice over, um, leading the students through the PowerPoints. And, for two years, that course, um, had amazing reviews from the FCQ, uh, in FCQs: 6 boom. Um, and I found that I could be more difficult in grading and still receive these great FCQs, which–which surprised me because I believe there is some kind of correlation there, though you might know what that correlation is better than I.
This year, I noticed that my instructor score was still very high, but my overall score was a little lower. And, I was surprised about that, but also perhaps – perhaps even an online course gets stale. In any case, I decided I would use that as the format for my MOOC. And, um, I’m gonna tell you right now that the MOOC is the least pleasant, indeed most unpleasant course I’ve ever taught in my life.

Jack

Okay.

Will

Um, that said...it surprises – th-that surprises me, because the online course I find quite pleasant to teach. And, um, the MOOC is essentially...it’s a little more, um, it’s a little more hot-rodded than the online course. By which I mean: we’ve constructed some extra features, I’ve redone all the videos so they’re really current, and I’ve spent a lot of time on it so they’re really tight, our production values are higher; so I consider it a hot-rodded version of the online course. So, I have to question why it is so unpleasant to teach.

Jack

Mhmm.

Will
And, um, and also I would say the my MOOC, I think, has the most of all the MOOCs in terms of enrollment, has close to 32,000 students. And, I was looking at it just earlier this week and 17,000 of those students are participating regularly and it may be more now because as we approach the weekend, more students keep going. So, I would say we have two-thirds participation. Now, it’s not quite there, but we’re only in the third week; I assume it’s going to drop off.

Jack  
Mhmm.

Will  
But, those are fine numbers by MOOC standards. So, I’m trying desperately to say that though I’m not enjoying it the product is still good. But, one has to ask why – why one doesn’t enjoy it?

Jack  
Yeah.

Will  
And, the basic answer – and my answer is still evolving – but, the basic answer is, um, even less than my online course, there is very little human interaction.
Will

Um, when I interact with the discussion forums, I am really interacting with a mob.

Jack

‘kay.

Will

You know, a mob. And, though I do get about...eh, let’s say 5-10 e-mail a day from individuals in my university account, and I answer them, it’s hardly like getting to know someone. And one of the delights of the online course is, in fact, I got to know them very well. Um, w-we didn’t...we had a discussion forum, I didn’t monitor that – my TA monitored that – but, every week I mandated that we e-mail each other, really, twice a week.

Jack

O-okay.

Will

Okay.
Will

And, I graded their papers and gave them each individual comments every week. So, I got to know them. I knew how they were progressing in their work. As much as they were willing to share about their personal stuff in their journals, I got to know them. One example. I was riding my motorcycle home down Arapahoe, minding my own business, and a motorcycle comes veering over to me as if, as if Battle of Britain!

Jack

*Chuckle*

Will

And the kid flips up his helmet, and it’s one of the kids I recognize from his little...

Jack

Oh, from the picture?

C.6.2  Time: 5:29

Will
...picture! So, there’s an example: he somehow recognized me, came zipping over, ah, eh, it’s jeh....

Online, as you well know, I’m sure, online relationships can be as intimate and sometimes more revealing than regular, professional relationships.

Jack

Mhmm.

Will

So, th-the online course version I did – the low rent version – um, that in fact inspired a lot of connection.

Jack

Uh-huh.

Will

In some ways, more connection than my lecture because there the students weren’t mandated to communicate with me. Does that make sense?

Jack
Will

The MOOC is a different species. The MOOC involves thousands of people reacting to my lectures, um, many of them have no sense of how a humanities course runs or or what, um, what an interpretation is. They’re reacting to it in part intellectually, in part they’re commenting on the, um, entertainment value as if it were a show.

Jack

Right.

Will

One person wrote me and referred to the course entirely as a show which was fine because the MOOC presses the boundary of what is – what is a show. You know? Also, I have to say – and this is something that I’ve been thinking about is – the MOOC.... Though, I have been very charmed and delighted by some of the students who have written me and told me how important it is to get feedback on their writing –

Jack

Mhmm.
Will

- The MOOC does blur the question of value. Um, I have 34 lectures, roughly. Each lecture takes me about 6 hours to produce.

Jack

Right.

Will

Some more, some less, but I would say 6.5 hours is the average. That’s a lot of hours. That’s a lot of hours. And that’s a lot of my time. And, I think that that is opaque to anyone watching the MOOC. I have to be honest, some of the lectures took me 15 hours to get through. And, um, that’s in part my own perfectionism when faced with a recording device.

Jack

Right.

Will
In part, it’s, you know, it’s just takes time to write a lecture, record it to any standard, edit it, transfer it.

So, you know...some schools have a team of people working on each MOOC...we’ve done it in a kind of catch and catch way. All this is to say that the question of value strikes me as very worth thinking through to a larger degree. How much...How – I am putting as much work as I put into anything, into this. Is that the best use of my time for the university?

Jack

Right.

Will

And, I’m not saying it’s not. I’m just saying the question of value remains to be sorted out, to my view.

Jack

Right.

Will

Because, look, of course I want to teach people. That’s why I’m in it. This has – I have 30,000 people on the line. That’s great. However, if I have 30,000 people who, you know, have it on their – are playing it on their phone and have no relationship to, you know, it’s background noise. Then, that’s not really value.
Jack

Right.

Will

It’s not.

Jack

Right.

Will

If I have 10,000 people or 5,000 or, even, 2,000 people who are actually paying attention, well that
would...so it remains to be seen. It remains to be seen. And, I guess I’ll have a better sense of it, the
answer to that question, when we get to the end and we see what’s there.

Jack

Right...okay. Um, just a, uh, question that I have from what you’ve been saying. How big, about, is your
online course?
Will

Small: 22.

Jack

22? Oh.

Will

Maybe 28?

Jack

Wow, okay.

Will

Yeah, no. Small.

Jack

Very small.
Will

So, that’s why it can be intimate. That’s why I can spend a couple hours each night dealing with their e-mailing, responding to them in a thoughtful way.

Jack

Okay.

Will

And, this may be, as far as I can understand, the Coursera project evolves out of the sciences. Um, and not necessarily out of the more philosophical sciences at that, but out of the technological sciences. And, the – I mean, you’re a scientist – but, I would say that the sciences are more recipe-based than the humanities.

Jack

Mhmm.

Will

The humanities flourish on open-ended discourse.
The sciences, even the more philosophical, they are formula driven, in many of their classrooms and the humanities are not formula driven.

Some courses, the philosophy of logic, might be, but, by and large, the study of comic books isn’t formula driven.
And that may be – it may be a real difference here. You know, Coursera has spent a lot of money and time in its algorithms for computing technical formulas. I don’t think it’s spent a comparable amount of time in its sense of grading essays, in its structure for, uh, discussion forums. Maybe it has. I don’t know! I don’t know.

Okay. Um....

All I know is unpleasant.

*Laughter*

Alright, um. Well, so, you said there were a lot of, uh, hours you put into making lectures, and I’d like to get at, uh, what have you done, kind of, in a time-order to put this MOOC together: going into it, starting, and making these lectures from when Michael Lightner approached you –
Will

So, um, initially when Michael Lightner pushed me, um, we spent some time on discussing copyright.

And, I guess, I'm really starting at the beginning.

Jack

Yeah.

Will

Because my course obviously shows copyrighted material. And –

Jack

W-what time was the beginning?

Will

I guess he contacted me in April?

Jack
April. Of this year, 2013?

Will

Yeah.

Jack

Okay...sorry.

Will

And May and June. I was Chair of the Department – I’m on sabbatical now – so I was Chair of the Department – and Chair of the Department is a full-time job – so, we held some meetings on copyright. And, eventually, the university lawyers decided that we should try and pursue Fair Use. Because I was only getting sections of the comics and as long as they’re embedded in my PowerPoints, it’s arguable that I’m transforming them into some educational tool as opposed to just showing them.

Jack

Mhmm.

Will
So, we went with that. I really – then, uh, July I took a brief vacation. When I returned from July, I really got to work on it. And, I guess, before July, actually, I – every week, a new comic book page, um, is revealed to the students. And, the comic book pages are original comic book story that I wrote and laid out and a professional artist draws.

Jack

Oh, cool.

Will

And, um, the story, in a kind of science fiction mode, narrates me being inducted into the MOOC process, boarding a spaceship that then crashes into a university on an unknown planet, destroys their higher education system – because it’s a disruptive technology.

Jack

Uh-huh.

Will

And, I then discover that they’re all reduced, without the humanities, to pure savagery. And, I explain to them why the humanities are important.
Will

And, at the end of the comic, it’s revealed that the whole thing is, um, a construction of the course. It’s kind of a...the end of the comic kind of fades away. It’s kind of cool.

Jack

Okay.

Will

So, um, I wrote and drew that before I went on vacation. That took me a solid amount of time. Um, I then sent it to a real artist to redraw.

Jack

Okay.

Will

And he’s done a great, great job with it. Um, I’ll just...yikes...show you here....
I’m actually signed up for the course.

So I could probably check it out.

Well then you can just check it out.

Yeah.
I mean, because the course, even the course cover – I have system 7 and I do not like system 7. I guess I’m in a cantankerous mood of late.... Um....

Jack

Is that the new iOS?

Will

Yeah. Don’t get it if you haven’t.

Jack

Don’t.

Will

So, here’s the cover. And, on the actual page –

Jack

Yeah, I’ve seen that!
- these are all hot links and they take you to various places.

Okay, interesting.

Um, and then...here’s, uh, the beginning of the comic. Has me inducted by, uh, provost Moore and Michael Grant.

Huh.

And here’s, uh, you know, they’re taking me in and it’s a world of computer screens. We’re in Old Main and we go up the spiral staircase and there’s all the spaceships. You get the sense. So, that took a while and he’s working madly on it now because each page takes him quite a while.
I can imagine.

Will

So, uh, luckily he made a quick move and he’s caught up a week. So, that’s good. Um, then, there was a lot of figuring out, for me, how Coursera worked. That took me through the end of July. Uh, Coursera is a unique platform. I don’t know if you’ve spent much time on it, but, you know, just figuring out how to post a PDF takes time.

Jack

Right.

Will

Figuring out how to construct the surveys and the exams takes time. Um, their – their grading peer-to-peer essay grading thing is completely opaque. Their explanation is just not there.

Jack

Okay.
C.6.4 Time: 14:59

Will

So you have to call them at times. Um, so, in mid-August, I really started taping. And, the beginning of the taping – Tim Riggs has helped me do the video tapes. And, if you’ve looked at the early video tapes, the early videos, they’re very flashy and really nicely done. Um, we did that. Then, also some of the an – a lot of the, eh, video tapes are interviews so I’d schedule them, get those people there. Video tapes take a while: setting up the lighting. I mean, it’s all, all a lot of work. And Tim has done incredible work, at times up ‘til 2am when my harddisk crashed. I mean, he’s done great. Um, and then I settled into redoing all my PowerPoints. And, uh, when I did the online version, I could knock out three PowerPoint lectures a day. And, uh, that seemed grueling, but nevertheless, reasonable. Right, if you have thirty, you know, it’s ten days. Um, with this, the weight of 30,000 people has made-turned me into a perfectionist. And, even so, my product is far from perfect. I mean, I stutter, I misspeak, and those early lectures were taking me 10 hours a pop.

Jack

Ten hours per lecture? Right.

Will
And the lectures were short, like 15 minutes, but just, I couldn’t get it right. So, around lecture 10, I just bit the bullet and I started writing them all in advance. And that...I have mixed feelings. Now, I’m writing them all.

Jack

Mhmm.

Will

Writing each lecture takes about two hours, two and a half hours, and then, maybe – maybe a little longer. Now, I have a practice run through, which is about 40 minutes because I read it through and change it. And then I tape it, which is about 40 minutes. And then I edit it, which is about 40 minutes. Let’s say each one is an hour, so that’s 6.5 hours per, um, and then I give it to Tim who converts it into, uh, into the Coursera platform, which probably takes him hours, but he can queue it all up in his office.

Jack

Right.

Will

Um, but the tension here is, a good lecture is a spontaneous event.
It’s theater. A good lecture has a script, but the actors can go off-book and interact with the audience. So, it’s performance theater. A bad online course is a – do you remember, you’re probably too young, but in the ’70s and ’80s, the BBC – The British Broadcasting Service – taped all these Shakespeare performances and they were god-awful. Because they just set a camera in the middle of the audience and, you know, the actors came out and it just sucked. Because TV is not theater. It sucks. Theater is interactive. Even if you’re just sitting there, you are giving off human waves –

C.6.5 Time: 17:53

- that actors pick up on and are giving them back to you! So, so, bad online teaching is just, I think, straight – a straight attempt to record a live performance. Better online teaching, edits that
performance down. In my own views, the best online teaching is like a video game. It combines pre-recorded section of narrative with interactive moments. It should be like a really good Grand Theft Auto.

Jack

*Chuckle* M’kay.

Will

And, um, my course isn’t there yet. Were I to do it again, I would try and devise ways of making it more interactive.

Jack

Mhmm.

Will

It’s not there yet. But, suffice it to say, my mode of recording the videos is not there yet either. Because, I lose the spontaneity –

Jack
- when I write them out. But 15 hours for – I – more than, 15 hours for 20 to 30 minutes of video is unacceptable. I mean, it just, humanly, I couldn’t get through 32 videos, 30, you know, at that rate. So, now I’ve cut it down to 6 hours. And the better thing is, is that I know it’s 6 hours or 7 hours.

Right.

Jack

Right.

Will

Right? I know that it’s going to be 7 hours. So, so now – yesterday, I spent 6 hours writing to – or yesterday, I spent 3 hours writing one. This morning, I wrote one at 3 hours and drafted another that took me about an hour. I know I have to revise that one. And then Thursday, I’m just going to plow through recording all three of them. It’s hardly going to be spontaneous. I can be energetic on command. Does that make sense?

Jack

Yeah.
Will

So, what I’m suggesting is –

Jack

So, there’s a lot of prep work and writing....

Will

There’s prep work and there’s loss.

Jack

Right.

Will

There’s loss. The spontaneity is lost. I’ve made it into a more mechanical process in order to get through it all.

Jack

Right.
Will

In a weird way, if my – what the MOOC has taught me is that, as I imagine my little daughter going off to school, obviously I want her in a small seminar. If she took a good online course, I wouldn’t begrudge it. I would pay. But, I would say: “Honey, don’t take a MOOC. If they’re offering it for credit, don’t. Because it is not, it is too removed from the professor. It’s not that the information might not be there. It’s not that you can’t write him or ask him a question or write the discussion forum. But, the human element is too buffered.” That’s where I am right now and that’s why I’m finding it unpleasant.

Jack

Okay. Uh, who do you, uh – who else do you work with? Do you have a TA or do you...the Tim you mentioned?

Will

So, I work with Cory Pav...do you know his last name?

Jack

I, uh, no.

Will
Well, I’m always mispronouncing his last name. Um…I’m going to look up his last name here. Okay, so I work with Victoria Oliynyk, there she – her – is her name, and Cory, uh let me find Cory’s name…um I might not have his e-mail handy, but he, it’s P-A-V-I-V-I-C-H.

Jack

Okay.

Will

And then Tim Riggs, he does the video editing. They’re all in OIT and their time is all just pro bono.

Jack

Okay.

Will

And then I have two TAs working for me, five hours a piece. They’re gently monitoring the discussion groups. But, I – the most they worked was on proofreading some of the early materials.

Jack

Five hours a week for those?
Will

Yeah, each. But I wouldn’t – I don’t see – I mean, maybe they are working five hours a week, but I don’t see – between you and I, really they’re not doing anything.

Jack

Okay.

Will

They helped at one point to proofread a lot of the materials, but right now I would say they’re just looking at the discussion forums the way anyone might.

Jack

Right. So, there’s not too much of the human aspect in who you’re working with on the backside?

Will

Oh, Cory, Victoria, and I – I refer to them as Team Zero.

Jack
Okay.

Will

And we work together all the time.

Jack

Okay, so –

Will

And there’s a lot in that. I’d have to say Tim, eh, we’ve all become friends.

Jack

Alright.

Will

I didn’t really know – I knew Tim before – I didn’t really know Cory or Victoria. We’ve all become friends. However, you know, when I say 6.5 hours that’s just me sitting in my office by myself.
Will

So, so your point is, is, is – your point is fairly well made that it is collaborative. The teaching is collaborative, more so than any kind of classroom teaching. But, the content is not collaborative.

Jack

Right...okay.

Jack

Right. So, besides, uh, lecture videos, what other, uh, things do you have in terms of, uh, book or you have these PowerPoints you work on –

C.6.6 Time: 22:56

Will

So, there are videos. There are, there are videos of me carrying on....

Jack

Mhmm.
Will

...which the students love. There are PowerPoints which the – some students have complained about –

Jack

M’kay.

Will

The lion’s portion is PowerPoints. There are tests. There are papers. They have to make a comic book. They have – there’s what I call a comic shop collaborative.

Jack

‘kay.

Will

Where they’re supposed to go to a comic shop in real life, speak to the owner, and then come back and pin it to a map, a google map.
Will

There is, um, something else. Oh, there’s the comic book.

Jack

That they make? Or...?

Will

No. That is up –

Jack

Oh! The comic book you made.

Will

Right, the comic book. And, I see that as a low-key way of asking them to reflect on the process of education, and I think that the most successful education occurs through self-reflection. So, I see that as a low-key way of asking them to think about the disruptive nature of the MOOC, the civilizing nature of the Humanities, and such. Um, there’s some more stuff too. Oh yeah. There’s a, uh, references page which has developed, um, each – the references page is a guide to for the reading. Um, I think it’s
important because it’s long. Were you interested in learning more about the subject under discussion in the PowerPoint, you could turn to the references and you would learn something.

Jack

Okay.

Will

Then, there’s the discussion groups.

Jack

Discussion groups, okay. Um, and there’s this peer-to-peer grading system?

Will

That’s part of the essays.

Jack

Okay.
Will

And that has too, um, I’ve created a number of sample essays, three sample essays, a D, a C-, and an A. And there’re videos associated with the two essays, the comic shop collaborative, and the, um, comic project, –

Jack

Okay.

Will

- the videos associated with them where I discuss writing

Jack

Okay.

Will

I realize I have another meeting at 4:15 across campus, so....

Jack

Oh, I’m sorry. Are we...going on? Uh....
Will

We should...cut to the quick on some questions.

Jack

Yeah. So, you’ve gone into a lot of detail about what you’ve learned and what you would do differently.

Is there anything else that comes to your mind, in terms of those questions?

Will

Um....

Jack

Gone into them already, but....

Will

Yeah, I – we’ve touched on-on much of it. I think, were I to do it again, I would take my video game metaphor and run with it and develop yet more interactive activities. I am not sure what they would look like.
Will

I think the big question – so that’s one thing. That’s where my thinking is: that my metaphor is right. This course could only take that so far; it was getting off the blocks. I think the metaphor is right. It has to go in that direction. Um, the big question to me is value. And we can parse value in a couple of different ways. What is the value to the university, to give my services away? Indeed to give, there’re really me and then the three other people working on it.

Jack

Okay.

Will

That’s a lot of hours.

Jack

Mhmm.

Will

Jack

Yeah.
Will

What is the value to the university: public relations, pro-bono good for human nature...I don’t know, that’s one of the questions. Another question: what is the value for William Kuskin? Um....

Jack

Right.

Will

You know, I have taught this course. So, the value for me is in human interaction and in developing my own sense of technology in education. So, I’m telling you quite frankly, the human interaction has been nil. There’s a lot of discussion group, discussion group noise, but it’s not, it’s not sheparded. People feel like they can weigh in and say anything. That’s unpleasant. Um, the value for the students remains to be seen. Right?

Jack

Right.

Will
I mean, if in the end 17,000 students stay with the course and they all submit their essays, that would be a persuasive value. But in the end, if it’s, if it’s 1000 students, well that’s still many students. On the other hand, the...less than 17,000.

Both

*Laughter*

Jack

Right, right.

Will

So, for me right now, I’m...the value for the online course, to me, was clear. Clear. The value for the MOOC is different.

Jack

Okay. Uh, would you say that you had a perspective switch in what you thought the MOOC would have been?

Will
Yes. Yes. I thought it was going to be fun.

Both

*Laughter*

Jack

And it hasn’t been?

Will

It hasn’t been. It hasn’t been fun. In fact, I mean just yesterday, I input, I wrote and input the exam. Well, A) I usually don’t give multiple-choice exams – that’s really the kind of exam that Coursera wants – so that’s already unpleasant for me. But inputting an exam, for two hours, into a Coursera platform is absolutely unpleasant.

C.6.7  Time: 28:13

Jack

Mhmm.
Will

Even Victoria, who is good at this because she’s in OIT, remarked how unpleasant their system is.

Jack

I see.

Will

So, I mean, I don’t mean to be a whining little guy, but does that make sense?

Jack

Yeah.

Will

That, like, it’s just an unpleasant format. And, in my online course I don’t give an exam because multiple-choice exams are silly. But, in this format, I fell like Coursera really demands that you give some kind of multiple-choice exam, it’s what the students expect.

Jack

Right.
Will

So, I did it. It was unpleasant.

Both

*Laughter*

Jack

Fair enough. Uh, alright. Um, so these last two questions, uh, we’ve also gotten into: What are the strengths and weaknesses of using the MOOC? I think we’ve kind of gotten into that a lot. Um, and: What do you expect the students to learn in the MOOC? So, I guess, if there are the 17,000 or the 1,000 or the however many that end up writing the final essay –

Will

Right, right. So I have three goals.

Jack

Uh-huh.
Will

One goal is to teach them — well, four goals really. One goal is to teach them something about American comics history.

Jack

Mhmm.

Will

I would find it hard to believe they, that any student that sticks through it wouldn’t learn that.

Jack

Mhmm.

Will

You’d have to be a real dullard and not listen to the lectures because the lectures are all about comics’ history. A second goal is to teach them some analytics skills. I have some very clear explanations of the analytical skills that go into humanist analysis. I would expect they, they get some of that. Third goal is to improve their writing, grows off of the analytical skills, and with that, to improve their appreciation of comics. I sincerely believe that if they scratch the surface of the essays, even writing D essays, they will improve their appreciation of comics. Maybe even their writing. Third goal, and the thesis of the
course, is to convince them that art is generative. And, no matter how bleak the situation, it always gives us hope. And, uh, I introduced that idea in the beginning of the course and the course builds to it. Art is generative and, no matter how bleak the situation, it always gives us hope. And, I think it – weeks two, weeks three and four, maybe even five, they may lose sight of that and that’s by design, because if you just keep saying that, it just becomes meaningless.

Jack

Right.

Will

But by week – I introduce it in the beginning – and by week six, the course, the materials in the course should seem fairly hopeless like, there’s a new version of the Avengers. I don’t know if you read any comics.

Jack

Uh-huh, not much.

Will

The Avengers are Captain America and Iron Man and The Hulk and it’s very slick. It’s like the movie.
The movie is kind of based on it, um, but it’s just narcissism. It, it is about, it is, I think that the authors are clever enough that they made it about narcissism, suggesting a kind of irony to them, but most people who read it are just like: “Okay, the way to be is just big and strong and rich. And, that makes you a superhero.” And, it’s so gorgeous, it’s drawn absolute gorgeously. So, one would expect, I don’t know if you’re following, but –

But that would be a bleak world where our heros are just narcissist.
Will

And, in effect, it’s kind of the world we live in. I mean, Brad Pitt may be a great guy, but he’s a hero to many and he’s kind of a narcissist. His whole world is about him, right?

Jack

Mhmm.

Will

I mean, Jack Nickolson. So, so the course moves towards that and then, in the final week, comes back to the nature of art. And, I think that if someone sticks with it, I have found that comics have renewed much of my faith because they’re a really easy art form that you can do, you can appreciate. And I would say that the MOOC promises the same thing. There’s no entry fee for the MOOC and there’s very little entry fee for the comics.

Jack

It’s a bleak world, but if there’s some art....

Will

And maybe that is, someone has to make the MOOC and maybe it’s an unpleasant process, but maybe in the end, the MOOC does give hope too because, like comics, they’re for everyone.
Will

And maybe that is the value. And, and I’m, though I’m in a kind of grumpy point about it all, I’m not saying that I won’t do it again. I’m not saying that it was worthless. I’m just saying this is unpleasant.

Jack

Right.

Jack

Right, I’m trying to write a...somebody who might like to start a MOOC up...see what that perspective is

Will
Right, right. I think they should know –

Jack

- something they should know....

Will

- that it’s a hell of a lot of work and that one thing I love about teaching, the reason that teaching is a delight to me, is that it’s not work – it’s pleasant.

Jack

Mhmm.

Will

The MOOC makes it work –

Jack

Okay.
Will
- at least for the guy, you know –

Jack
Cranking away?

Will
- cranking away.

Jack
Okay. Um, and I know you have to go so I think we can maybe....

Will
Is it – are you – if you have more questions you can write me.

Jack
Okay, I’ll do that. Um, I’ve had a few more questions pop up, but –

499
Will

Shoot me, shoot quickly.

Jack

- I think this is the, the general idea. I’ve lost them as we were going through the process, is the problem.

Will

Alright, alright. Alright, if you have a few more questions, I’ll write you back.

Jack

Okay, great. Thank you very much.

Will

Sure. Nice to meet you.

Jack

Nice to meet you too.
Will

And good luck.

Jack

I’m turning this –
C.7  Michael Lightner — October 8, 2013

Interviewer: Jack Olsen (Jack)

Interviewee: Michael Lightner (Light)

Topic: CU Boulder’s MOOCs

C.7.1 Time: 0:00

Jack

So it’s on now, uh, I’ll be recording interview.

Light

Okay.

Jack

So, what is your understanding of why CU got involved in MOOCs and....

Light

Because we shamed them into it.

Both

*Laughter*
Light

So, um, more-more directly, um, the, there was a group of faculty including myself who were having some conversations with campus leadership – um, and there primarily Russ Moore but it had to do with the provost and others as well – about MOOCs, about things that were changing and so forth. There was no, um, there is no rush to want to get into this and, uh, it lay fallow for a while. Then, uh, the system put together, the-the president, Benson, put together a task force at the system-level to look at, uh, technology in support of education at University level and MOOCs were one of the questions that were part of that. Uh, early on, in conversations with the MOOC providers, a few things became clear – I mean these are not unknown we were learning time – uh, Udacity doesn’t work with universities, they work with people to create courses, and so there would not be institutional connection with Udacity. Um, edX at that time was really, uh, quite restrictive in who they allowed in and they wanted a lot of money and resources to be part of it. CU wanted to do some experiments but had no interest in putting in, you know, tens of millions of dollars of resources.

Jack

Okay.

Jack

Right.
Light

And so, that with Coursera. And Coursera was probably the most aggressive conversation town anyway.

Jack

Mhmm.

Light

Um, Daphne Kohler, one of the confounders of Coursera, came to the, uh, came to Denver and met with the president, one of the regents and the, uh, the leadership from the various campuses meaning the chancellors, provosts, and CFOs were there as well. The committee – and so there was interest. Um, the committees than – the committee, the task force then looked at this and are more conversations with Coursera and what became clear is that if CU was participate would be, have to be the Boulder campus because at that time Coursera was only taking AAU universities or the international equivalent of that.

Jack

Okay.

Light

Um, that committee then suggested that it would be fine with them, representing folks from across system, if Boulder wanted to go ahead and make their own agreement. So we began in
the...let me call it November-ish timeframe of 2012 to, uh, talk, uh, more directly with Coursera, and this is the Boulder campus, for generating a contract. And so that went around and around and around for several months and in whenever it was, January or February, we announced that we were going to be part of Coursera. And that was, the timing was driven by one of their big announcements of another group of universities joining.

Jack
Okay.

C.7.2  Time: 3:58

Light

So, uh, we wanted to be complete by the time they announced it and that sort of drove the schedule.

Jack
Okay.

Light

And, um, Boulder went into it with a clear – pardon me – a clear view that this was going to be, um, just experiment. And, uh, the Provost is an experimentalist and it was: “Okay, we’ll give it
a shot. We’ll do something small and controlled. We’ll see what we think about what the results are. And then, we’ll enlarge the conversation over time with the faculty and then we’ll make a decision about what we want to do.” So it was, uh, very much a controlled, uh, entry into this. Um, as an aside the, uh, Coursera worked, probably a few months after the Boulder contract, Coursera started working with university systems. And the idea was can, can they help university systems in terms of general education courses, maybe remedial courses. So for, um, through the system committee, I attended a couple of meetings of university systems that were talking about this. The, um, result was a contract between the CU system and Coursera, which allowed health sciences Denver and Colorado Springs to participate in Coursera. And what Coursera had was a separate entry page for those courses. So for their premier members there was in the main landing page, but there was an institutional page where you could see what was offered by, uh, uh, different campuses in any given system. So, um, that is currently in place. Boulder’s operating under its contract but the, uh, there is, there were I think maybe a total of three MOOCs being developed between the Springs and Denver.

Jack
Okay.

Light

Uh, and finally – and this is, you know, again away from Boulder, but we’ll come back to Boulder in a minute – the major LMS providers: campus blackboards, Desire2Learn, etc. are all offering their customers a mechanism or set of mechanisms to offer their own MOOCs.
through the LMS. And the health sciences is offering what they call the mini med school, uh, that’s been taught in person and then, I think, online as well, but I’m not positive about that, for a long time. They’re offering that through the campus so there’d be a separate MOOC offered but not through the traditional – traditional as in a couple of years of providers.

Jack

Okay. Uh, just to some clarifications. The initial conversations, that were ‘no rush’ do you know about what time you are having those or when Benson put together the task force?

Light

Um, so the task force was independent of the conversations with the Provost.

Jack

Right, right. That’s the two things I was wondering about.

Light

Those were...the last one I remember would be around May of 2012 and there were a couple before that, but I don’t know exactly when they were.

Jack

So the last conversation was going on around May of 2012, but they’d been going on for a little while before that.
C.7.3  Time: 8:00

Light

Yeah, you know, in an informal way.

Jack

...informally. And then, Benson put together this task force sometime a little bit after that in 2012 Summer or...?

Light

He – pardon me – he put it together over the summer and what happened is that Russ Moore set up a committee of folks here to try to get a sense of Boulder’s take on things and help communicate that to the system task force.

Jack

Okay.

Light
Mark Grant was the chair of that committee, he was also on the system task force. I was on that committee, but when I was asked co-chair the system task force, I left that committee so that there would be sort of clean lines, organizational lines.

Jack

Okay, perfect. Excellent. So, the next question, unless you have anything else to say on that? Uh, is “What kind of campus-campus infrastructure needs to, or needed to be in place in order to support these MOOCs?”

Light

Huh. So, and if anybody but you is-going to listen to this, apologies I’m eating an apple.

Both

*Laughter*

Light

Um, it’s a, it’s a complicated question... It’s a simple question whose answer is complicated, um, by a number of factors. So the first factor is, as we stated before, the campus wanted to get into this to, you know, have a taste, have and experience, a little experiment. It did not want to invest a lot of resources, create new administrative or, uh, staff structures in order, you know, to have dozens and dozens of MOOCs and so forth. So, uh, the-the assumption going in, is that there wasn’t going to be a lot of resources. So what Coursera wants is, uh, and you can have
this in a couple of different ways, but, you know, they’d like a staff point of contact and they’d like a, uh, faculty point of contact. Uh, or let me say this differently, a technical point of contact and then maybe and overall point of contact. Those two can be the same and often they are on campuses. Right now we have that broken into two people and I’m sort of the faculty point of contact and Corey Pavicich is, uh, from OIT, is the technical point of contact.

Jack

Okay.

Light

So, uh, we – by the way what is the context of this how is this, how are you using all of this?

Jack

Uh, so I’m doing a thesis on how to put together the physics MOOC.

Light

Okay.

Jack

It’s just kind of background.
This is background for that?

Jack

And what does it take to make these things. Pretty much.

C.7.4 Time: 11:31

Light

Um, so, when, uh, when we were getting ready to sign the contract, about a week before we were getting, uh, Boulder was getting ready to sign the contract with Coursera, I was in conversation with Daphne Koller and she said, well no with actually one of her staff and the staff person was saying: “well, how many courses are you going to have?” And I said: “well, you know, we haven’t really decided yet and, uh, you know, we’re working on that.” And she was a little taken aback and, and asked if I had talked to Daphne about that. I said: “no, nobody talked to me about anything.” And so within five minutes Daphne called me back and made it clear, you know, very nicely that: “you can’t join unless you bring something to the table. It’s great that you have your name, but, you know, unless there is something under the plate, you know, the cover that is your name, they are not going to announce us as partners.”

Jack

Right
Light

And so we had roughly a week to come up with between three and four courses.

Jack

That’s a short time.

Light

Short time. So, I got on the phone and I was talking, so I explain to Russ, and so he entered the conversation, Mike Grant entered the conversation. I contacted, uh, a couple people on my faculty who, uh, might be interested. And one of them, in the end, said yes and I promised that person, and again now this is resources, I promised that person a TA for the course and a course relief. No dollars just, just that. This person had been teaching on the the Kate system and felt that they could pretty easily adapt their material to the Coursera format. Um, I contacted Jim Martin, the chair of CS, and said: “do you have anyone?” and they identified Shriram, and that was how that course got going. And they agreed on whatever resources they’re doing. So, the University as a campus provided nothing for those two courses. Then, uh, in, we thought that the, uh, the reputation of the physics course, the work being done in STEM education and so forth pointed us to physics and to Noah and Mike as, uh, people who could do, you know, what would be a really good job and perhaps turn it into more of an experiment in their work than an experience. That’s, sort of, how it was coming down. Um, there was conversation and a request for certain resources. Um, my understanding, and I did not, I was
not involved in the final decision on all of the resources and so forth, but that they, primarily I think, Mike no, I’m not sure how that developed, felt that if they had a postdoc that they could devote to it or equivalent, uh, then they could go ahead and do this. And, uh, so, Russ scared up some fellowship money. So there were some fellowships that had, you know, maybe somebody had applied and then they got it, but they didn’t chose to come to CU, or what have you. So so he found some money for that. Mike Grant had, so that was on physics side. Mike Grant had suggested William Kuskin, who has graphic, comics and graphic novels MOOC, but had done that online, uh, the previous year. And, apparently that was very positive and so forth. So, we contacted William. William was was very interested and there were, I think there was of course, there was maybe a summer month’s salary. Uh, I think there was 5K devoted to copyright issues because comics stuff and I don’t know – uh, timeout.

Jack

I hope not… Because I didn’t double check for that. I apologize for the interruption.

Light

No problem.

Jack

I’m just going to make it not turn off. There we go. Sorry, you were talking about comic...

Light
Okay, so Kuskin got, I think, summer month’s, a 5K for, uh, copyright materials. It’s not clear to me that he got a TA.

Jack
Okay.

Light
The, so, those were the initial resources devoted. Um, so relatively small. Relatively small, but value-wise, you might say, maybe somewhere between 25 and 50K value.

Jack
Okay.

Light
Kind of value. And, a lot of that is funny money because, you know, we’re just shuffling schedules and TAs get reassign or what have you. Um, there is real time devoted by, uh, several people in OIT. Corey being one of them, Tim whose name I’m blanking being another, uh, and they had helpful all the faculty on the Coursera interface. Um, some issues of, you know, format conversions and-and so forth. So, it’s, it’s really being put together on a shoestring and one of the decision, and-and so, it’s being put together on a shoestring, that was the, that was known going in. None of the faculty expected anything other than what they got. They agreed to do this for these-these particular accommodations. Some, so, all of this was decided, uh, in early
February of 2013 with a plan to launch the, uh, courses unspecified. So, the courses were announced, the launch date was a TBD, and all of them eventually were: “okay, we’re going to launch in the fall.” So, all of them at this point are launched and running. At some point, and I don’t know when, but let’s say August of 2013, uh, Russ basically said: “okay, and now we’ve got a moratorium. We got these, these are running. All that’s good, wonderful. Um, but we’re not going to do any more for a year.” We don’t know what that means. We’ve been trying to understand – we in this case being William and myself – are trying to understand what that means and Russ has, uh, been too tied up to clarify it. Because, it could mean several things. One could be: “were only offering these 4 in the fall, and that’s it until next year.” It could be: “we are only offering these courses this year and if we, Coursera wants to run them again and the faculty are willing, we could do that in the spring.” It could mean: “we’re offer-developing and offering these four and we can develop and offer, we can, we can develop more during this academic year but none will be offered in this academic year event we would offer more in the fall.” Um, my assumption is that it’s: “if the courses want to be run again, next spring they can be run again. But this spring and, uh, hopefully it would be only the spring, would be used to analyze the, whatever reason results we have for the four MOOCs going on now. And, to have various groups look at those results and make a recommendation that we either do more, we let these run, or we, sort of, back out of the game.”

Jack

Okay
If we’re going to do more, then there is a clear acknowledgment on the part of the faculty teaching the MOOCs now, the OIT staff supporting them, uh, and other faculty committees that the University is going to have to put in some resources.

Jack

Right.

Light

What those resources and up looking like is not clear and we, I say that and some of the faculty involved say that, because if you look at a number of other institutions that are offering MOOCs through Coursera, uh, many of them take their initial MOOCs and run them somehow. You know, it could be, you know, done in an ad hoc method. It could be done in department, the University of Washington has done that through the departments doing what they do. Um, but often many of them revert to the continuing studies, continuing education, different names in different schools, uh, organization on campus. With Georgia Tech, for example, did all of their initial development through their center for the 21st Century University, but either now or very soon, they’re moving all of new development and support to their continuing studies, again I don’t know the exact name, but the equivalent of our continuing education. So, one of the arguments for doing that, and it’s true here as well, is there’s infrastructure already in place.
There’re instructional designers on staff. There’re media support people. They go online, uh, and on this campus through D2L, but, you know, they can go through a MOOC, it doesn’t really matter and they’ve got this expertise. And so, one line of thinking, not necessarily the case here, because we have no conclusions yet, but on other campuses is take advantage of the organization you’ve got that has initial resources and just build it up. Um, there has been no work done, let me say this differently. None of the courses that are being offered, uh, this term have a signature track associated with them. And so, therefore there is going to be no money coming into the University from that resource. That’s one of monetization channels with Coursera. So, we’re not bringing in any money and so we have no sense of how much money we could bring in to devote to, uh, additional resources on campus. Um, there is, there’s also, at this point, not a – and I think I’m repeating myself – but not a known number to associate with resources to make this sustainable. And there are two elements of sustainable. One is: the faculty can do it and not die. And, the other is: that there’s some sort of revenue coming in that-that we can identify and justify. That’s all open right now and so we don’t know what’s going to happen.

Jack

Okay, cool. Um, just a question about the four courses that are MOOCs right now. Are they, are all of them from classes that already existed? Because I know physics and you said the graphic novel one....
Yes, yup.

Jack

But, they all were classes that got tapped into for a MOOC. Um, awesome. So, what do you think that it takes for the faculty, then involved, to make a MOOC? Just, what’s your opinion?

Light

So, ask, ask that again in a different way.

Jack

Yeah, I will. Uh, so you tell or ask the faculty to do this MOOC and get them their requested resource and then they presumably set out to make the MOOC. What do you think it takes for them to then turn a MOOC into being, from their existing course?

C.7.6  Time: 25:46

Light

I think it varies dramatically based on how they ran their existing course. So, let’s take the course of my department, the power of electronics class. That’s been taught for a number of years on Kate, you know, in a distance setting. All of the slides are done, I mean, the curriculum is nailed, you know every lecture, what’s going on, the slides are ready, the math on them, you-
you-you basically got great math, great figures, all of its there. It turns out that we did not have high def recordings of those previous lectures. And so, the way the course is being run this time is Erickson is, and he’s teaching it on Kate, he goes and he gives lecture, you know, interacts with the students, does whatever. Then he has, he has some space here that he comes back to and he gives, you know he spends another hour to hour and a half giving a lecture again for Coursera. And, you know, and, of course, that gets broken up into chunks and so forth and he’s using Camtasia, he’s doing his own editing. Um, they generated, or the TA is helping, I don’t know how it’s working, they generate the assessment questions, the homework, and so forth. What we, what we don’t know of yet, and, uh, I have not talked to Shriram or Shalom about their experience but the-the efforts of supporting the forums in the courses is not really known. So, if we, if we look at, at Erickson’s class, power of electronics, you know, it’s taking him, you know, another couple of hours, so it’s taking him another six hours per week, maybe a little bit more, to take a regular class and to put it in a MOOC format. Now, it’s not the entire regular class which is too demanding. And so, then they’ve, they’ve already decided how their watering it down so that obviously took work.

Jack

Right.

Light

Um, but I don’t know the forum bit. In CS, Shriram and Shalom, they generated a lot of new material. For Williams course, a lot of it existed already and there was a lot of work in terms of
format conversion, you know, aspect ratios and so forth. But, he had done a lot of this before, but he still spending and awful lot of time because he’s recording lectures and instead of doing 15 weeks of CU he’s doing 7 weeks or 9 weeks, something like that. Um, and for the physics class, uh, I am not sure, my understanding, but I think that I could be wrong, and you probably know more about that, is, you know, they’re recording in line with the regular classes. And so, then it’s editing work and so forth. But, I haven’t talked to Mike and so I don’t really know. But again, I think the forum piece is the thing that is the unknown that we’re really learning about now. I mean, you can predict someone, uh, and there’s numbers from around Coursera universe of roughly a 2:1, ranging from a 10:1 to a 2:1 to go from, arbitrary numbers, a 15 minute piece could take you 30 minutes to do, could take you 150 minutes to do, depending on if you screw up the recording, you know, how much is you and you didn’t have the right prompts in front of you or something and so you stumbled. You want to do it again or you look at you go: “well, that looks like shit.” You adjust the lighting, you know, as everyone is doing this in, sort of, in a non-professional way.

Jack

Right

C.7.7 Time: 30:00

Light
But, 2:1 seems to be what folks come down to. So, it takes me 30 minutes for 15 minute segment. My guess is, is-more like 3 or 4:1, if you include the editing, assessment, creation, and so forth, uploading etc. Um, so, you know, that may be a number that you sort of....

Jack

Alright. And, and, we don’t know quite what inputs the forums require or if there needs to be input forums.

Light

Right, and the TAs, I think, are trying to be the-the main ones doing some moderating, if you will. But, it, the forum structure on Coursera is supposed to be such that, you know, popular questions or important questions rise up to the top and then faculty and/or TAs would, uh, address those and, you know, then that fans out to thousands of folks. I don’t know.

Jack

Okay, excellent. Um, so another opinion, uh, “what do you think students can get out of these MOOCs?”

Light

So, define student.

Jack
The folks enrolled in the MOOC.

Light

Ah, okay, so the, the first thing, which you probably followed is the roughly 70+ percent of the participants in any MOOC already have degrees of some kind. So, uh, my generic term these days is “learner.” Uh, because student, when you talk about universities, student get, gets mapped immediately to: “oh, the undergraduate students or the graduate students taking their graduate or undergraduate class.”

Jack

Right.

Light

Um, so, uh, what the learners get is access to, uh, in general, high-quality courses, uh, from, from very highly qualified faculty that are university level courses, that have, uh, sort of the depth and dimension of a University course, but they’ve been adopted to this online environment and, uh, some, hopefully reasonable, assessments have been put into that. That’s not a lot, but it’s something. The other thing that people get – and this is what I’ve heard from a number faculty, how it holds up over time, I don’t know, meaning faculty who are at the Universities doing MOOCs – um, is the forums. So, you all of a sudden have a community of, you know, 7000, 5000, 10,000, 100,000 people who are interested in this topic and are going through it at roughly the same pace. And so, you can be talking in the power electronics class to
folks who are managing power electronics, you know, organizations and they might be hiring.

You can be talking people who are doing the work. You might be talking to other students, uh, traditional, you know, university students.

Jack

Right.

Light

And, everybody’s interacting with both, you know: “what about this and that? You know, they said this, that, and the other thing and I didn’t quite get it.” And so, that the range of interaction that the community piece, the social piece is something, uh, that does not exist in any other setting, uh, meaning the scale of it in the scope, and-and the heterogeneity of all is really unique to this setting. That has been viewed by various people as exceptionally valuable. I’ve, I’ve read people who think it’s atrocious as well. Right, so, I think that certainly there is no uniform opinion on it, but there’s no uniform you but anything to do with courses and so forth. Um, so, in the end, I think it’s that community that you’re connecting with, that is really, really powerful. And, then the next piece is, sort of, a reasonably done pedagogy where you got smaller chunks of information, you’ve got some assessments, you can go back. It’s not deep like CMU’s OLI work, but it, you know, nonetheless, I think, it’s, it’s valuable too. And, it’s, it’s far beyond, uh, you know, a teaching company, TedX, TedEdU, and so forth. Um, so, and, I think, pedagogically much better than what you’d find in most of the courseware, uh, settings and-and certainly the MIT stuff, right? So, it’s like: “alright, I can listen Walter Lewin talk about
electromagnetics again.” You know, it’s wonderful to hear his lectures, but that’s not as good
as, uh, having smaller chunks and being more agile and how I go through material.

Jack

Yeah. Interesting.

Light

Oh, and of course, it’s free.

Both

*Laughter*

Jack

Yeah. Right. And all of it, all of this is free for the learners. Um, so “what do you think the
faculty who have made these MOOCs are getting from or learning from this?”

C.7.8  Time: 36:09

Light

Um, in-in, uh, so it’s the-the answer’s not uniform across the faculty. I think in physics, which is
what you’re more directly focused on, as they are able to do it, they are conducting a really
interesting experiment. Right so, completely in-person, partially person, totally not in person.

And so, trying to be able to do some parallel assessments and, uh, that’s really cool. So, I, you know, I don’t think that those guys are doing it because their egos need stroking by having, you know, thousands of people look at their course. I think there’s a fundamental goal of understanding learning better and learning science better and that’s what they’re attempting to get out of this. You know, the first time you might not get it out, but that-that’s the goal. And, I think that’s, you know, great. It’s very clear, well-defined. Um, I think the other folks participating, uh, for-for Ericsson it was: “you know, can I, I’m doing a distance course anyway. What would it be like to reach more people with a distance mechanism but this online venue?” And so, I think, for him it was: “what’s the experience like for me? And, what can I actually get away with in terms of pushing this group of God-knows-who-they-are as hard as I would, you know, a graduate class?” And, as I say, he-he’s dialed back a little bit in terms the difficulty, but, you know, it’s not, still a graduate class.

Jack
Right.

Light

And so, I think there was a great deal of curiosity about: one, how many people would even sign up; who would sign up; how many people would participate; etc. And, they’re at about a, the, 1 to 3 ratio now, you know, and I’m rounding numbers 30,000 signing up, 2000 participating, I think.
Um, for, and there was no other course like it. So, if we look at, at the physics course, there are other physics courses, but they’re probably not doing, they’re not involved in STEM education, physics education research and so forth. And so, that’s a different outcome, outcome here.

Power electronics, there are no other power electronics courses courses offered, you know, there are very few around the country, so you know, great. And it’s a great way to advertise. In the case of Shriram and Shalom, I think there is one other, I think it was a linear programming class, I don’t think it was an integer, integer and linear programming class, but again it was like: “okay, you know, can we get what we’re doing out there? Can a lot of people see? And, yes, they’ve already got a bachelors degree but what if they wanted to come back for a Masters or PhD? What if they are, you know, just trolling through this? Can we help advertise our program?” And, uh, in point of fact, that’s one of the arguments that we make at the campus-level and system-level. We have 93,000 people enrolled in the MOOC.
Well, shit, you know, that is a lot of folks who somehow paid enough attention to what University of Colorado was offering, that they’re willing to put in an email and email and, you know, checkbox. So, that’s great PR. Um, for William’s class, uh, she had already done this online. And, uh, he was interested in two things in particular, well three. One, he gets a kick out of the comics and gra-gra-graphic novel thing. There was nothing like it out there, so, like: “okay, why not?” So, one, I think it was really: “this would be really cool.” Uh, the-the second was, since he had done it online he was very very curious how it would scale were not. He wanted to move to a different online experience and make his own judgments. It’s going to be a-a qualitative kind of judgment, uh, and his own, as opposed to you as careful a piece of work as-as the physics could do. But, he wanted to see what, how do things scale. But, but, more importantly, I think, to him – uh, and there are examples of this in Coursera anyway, but he wanted to experience it – his course involves writing and involves actually creating their own comic. How can, how would that work online? How could you effectively do, you know: “here’s my rubrics and here’s my examples of an A, B, and a C paper and now use crowdsourcing for the grading.” How would that really work? Would the folks actually create, do the written work? So, he goes: “yeah, yeah, you scientists and engineers you just your math. You’re going to put up and equation, you know, that’s all straightforward. But if you’ve got to write, if you’ve got to evaluate the writing, that’s a different thing.” And, how can that be done?

Jack

Right.
And, you know, it may succeed or fail. But, that was one of the reasons was doing it. So, I-I
don’t want to pretend, uh, that there aren’t or might not be, sort of, you know: “I think this is
really cool. It would be a nice stroke for my ego to have 15,000 in my course.” Or, whatever.
But, in my conversations with folks that has never come up.

Jack
Right.

So, you know, they’re not – doing this suggests that these are not necessarily shy people, but
you know I-I see Erickson’s class and he’s going. Well, that’s what he does on Kate. That’s what
he does in the classroom. It’s, sort of, just him.

Jack
Right.

And, you know, Kuskin may be the same way, I’ve just not seeing him in a classroom. And, I’m
sure that it’s the same for Mike. And Shriram, from what I’ve seen, is fairly similar. So, it’s not a,
uh, grandstanding thing. And, you know, we’ll see what they think at the end.
Yeah, it just sounds like a general curiosity of what this is going to be.

Yeah, and very specific, and some, uh, different elements for each one. Right? Can you really do a hard graduate class in this kind of setting? Can writing really be, uh, done and evaluated effectively using crowdsourcing? You know, uh, can we do this experiment in learning, in physics? So, you know, if there are, you know, specific areas that they each point out that are different. But, you know, curiosity in general, sure.

And, my final question is just getting a little bit more in specifically in the physics MOOC. Um, so, there about 15,000 people in that course is –

Really? But it was more at seven.

It’s, I think, it’s mid-upper 14,000.
Oh great, so it must have just, well everything spikes when they actually start to offer it. And I didn’t check it. So that’s cool.

There was a, they extended the deadline homework one and the pre-surveys because they had a spike in students. Yeah.

Great. Cool, cool.

So, so, yeah. It’s, it’s, uh, you know, roughly 15,000 people and there’s and it’s paralleling this on-campus course that’s about, you know, 1,000 or so, uh, using rough numbers. “What would you anticipate the outcomes of the larger MOOC version of the course to be as compared to be on-campus in person?”

No clue.
Okay.

Light

Uh, in a-a, I could give you an answer that was, uh, and-and I’ll tell you how I could refine an answer to suggest things to you, but it really depends on the demographic. Right, we roughly know the demographic folks on-campus. Right? And, supposedly we’ve prequalified them to be in course. You know, many of them aren’t really qualified to be there in and they won’t pass and they’ll dropout and so forth. But, nonetheless there’s a process in place to say: “Alright, it’s reasonable that you are here.” There is no such process for the MOOC. You know, anybody and their dog can sign up, it doesn’t, it doesn’t matter. And so, what I think will be very interesting is: one, the survey and finding out something about the demographics their preparation. But, as an example, there’s a guy who posted a YouTube on the Power of Electronics class and about his experience. And, you know, he spent, you know, two days on his homework and this one was easy but it’s been since ‘95 since he’s done much math. And, you know, he’s serious and working really hard.... Alright, well, what are the folks here, in the physics class? So, it’s a different level, but nonetheless there is a question of the commitment, there’s question of background, there’s a question of not only background but the freshness of that background, uh, and, I think, more than anything, and this-this will be the thing that we learn from and, I don’t know, is to what extent can the forum replace recitations and LA sessions and things like that.

Jack
Okay.

Light

And, you know, that’s the big question. And, I-I don’t know.

Jack

Alright.

Light

I really don’t.

Jack

Fair enough. Well, thank you.

Light

You’re more than welcome.

Jack

This has been awesome...learning of things.

Light

Great.
Great. Thanks

And, a pleasure meeting you.

I’m going to turn this off. Let’s see....
C.8  DIANE SIEBER – OCTOBER 24, 2013
Interviewer: Jack Olsen (Jack)
Interviewee: Diane Sieber (Diane)

Topic 1: CU Boulder’s MOOC on introductory physics
Topic 2: CU Boulder’s Andrews Hall Residential College
Topic 3: CU Boulder’s Global Engineering Residential Academic Program

C.8.1  Time: 0:00

Jack

It should be recording now. Um, if you’d like to give a brief introduction to yourself?

Diane

Sure.

Jack

And then, just consent that you’re being interviewed.

Diane.

Okay.
Jack

...and it’s recording and all of that.

Diane

Great. Yeah, I’ve done this too. *Laughs* I’m Diane Sieber. I am the Associate Dean of the College of Engineering and Applied Science at the University of Colorado, Boulder, and the Director of the Global Engineering Residential Academic Program, at the same campus. I give my full consent to use any of this interview for any purpose which involves research or self-improvement.

Jack

*Laughs* Awesome. Um, so, my, uh, first question is going to be dealing, uh, just a little bit with the MOOCs on campus.

Diane

Yeah.

Jack

So, uh, if you’d like to detail your involvement with the MOOCs on campus, that’d be great.
Diane

Sure, okay. Um, so, I guess, one of the things I’ve been doing is behind the scenes trying to get people to work together.

Jack

Mhmm.

Diane

Because it seems like, um, we are at cross-purposes, um, an awful lot on this campus. So, I am on the, uh, President’s Task Force, which just wrapped up and filed a report, which – do you have the report? I can give it to you....

Jack

No. That would be great.

Diane

I have a print out right up here.
Diane

Um, so, I’m on that Task Force which Mike Lightner Chaired. I’m on the campus Task Force, which nobody appears to have Chaired, although I think it was supposed to be Michael Grant. Um, I represented, uh, the Dean Davis on, uh, the Dean’s Council when we were talking about MOOCs and how to go ahead with Coursera. Um, I worked directly with Coursera. I worked directly with Google, also, uh, as they try to enter into the higher ed market and start thinking about different platforms for MOOCs.

Jack

Awesome.

Diane

Um, I’ve been approached to teach a MOOC and said “No.” already.

Both

*Laughter*
Diane

Uh, because it kind of just didn’t strike me as the kind of thing I particularly wanted to do. But, I’m also aware that, one, our Engineering Advisory Council, which is the money people and the advising people, um, think it’s very important for us to be involved and I think it’s hugely important for the future of higher education –

Jack

Mhmm.

Diane

- to be engaged with it. But, even more importantly, to learn from what we’re doing in MOOCs how we can do better in the classroom. So, um, I’m very much – because I, obviously, live on-campus with students – I’m very much a proponent of the face-to-face way of education. Um, my parents are academics; I grew up on University campuses –

Jack

Mhmm.
- um, and around students and with lots and lots of books. So, I think, um, nothing replaces face-to-face engagement. On the other hand, I think MOOCs are a brilliant potential preparatory move. We’ve been complaining for, at least, twenty years that K-12 is not preparing students for higher education

Jack

Mhmm.

Diane

And, this would be a way to do it. Um, we have a number of agreements already for, uh, these-these sort of co-classes with high schools, um, where the same curriculum is supposed to be taught by a high school teacher. But, we’re finding that the results are pretty lame.

Jack

Mhmm.

Diane

And so, you know, one potential is to have a pre-calculus, a calc 1, um, an intro to computing – all of these background classes that are a barrier to students, to diverse students getting in, to women getting in. Um, we could be offering and have high schools – have it giving credit for them. And, students would be exposed to the pace, to the personalities, to the nature of a college education.
Diane

So, I mean, I think there’s huge potential, but not as – I don’t see it as a moneymaker, at all.

Jack

Mhmm.

Diane

I see it as, um, a great way to help students, um, not pay too much for their education. As a great way, therefore, to suppress the argument that higher ed just costs too much and is just escalating and not doing anything about it. Um, but I don’t, I don’t think we’re going to turn this to for profit. Um, it, you know, look at the music industry, look at journalism. Um, once you’ve given it away for free, it’s very hard to charge.

Jack

Right.

Diane

Jack

Mhmm.
And I just don’t – I don’t see how that works. Um, we are trying with, uh, one of our MOOCs, which is, uh, the linear programming course in computer science, um, it is taught for profit by Kate – through Kate. Um, and the MOOC is three-quarters of the course. So, we’re experimenting now with the number – I think it is 28,000 who are currently in the MOOC – to see how many of them we can turn to take the Kate course and pay for it. And then, get the actual credit for it.

Jack

Right.

Diane

Um, it, particularly by saying “You know what, now that you’ve taken this, you know you can pass it.”

Jack

Right.

Diane
So, it’s already a pre-investment, that they’ve made, in order to do well in the class and they’ll get the credit.

Diane

And also, could we be using MOOCs, like a few very Pressiant universities are, to recruit the best students.

Diane

So, can we give Fellowship to the top 50 students who finish the MOOC?

Jack

Mhmm.

Jack

Mhmm.

Diane

So, can we give Fellowship to the top 50 students who finish the MOOC?
- for example, and end up getting students we would never, would never otherwise have attracted to an on-campus experience.

So, I think it needs to serve the on-campus. And I don’t – I hope it’s not going to replace the face-to-face, high-touch nature of higher ed.
My greatest fear – sorry to go on, but I have a big fear about this – my greatest fear as, uh, as, uh, the child of academics and as somebody who’s grown up in the system, is that we’re going back to the 19th century model of gentlemen who are educated at private institutions and everybody else is not.

Jack

Mhmm.

Diane

You know, they get vocational training and that’s it. And, my concern is that we end up with face-to-face reserved for the rich and MOOCs being the substitute for the poor.

Jack

Right.

Diane

And, um, I just can’t imagine that that’s good for democracy.

Jack

Mhmm.
Diane

Education, public education was about democracy, was about educating a public to understand the point of democracy. We appear to be, have been doing a pretty lame job of it recently because nobody seems to get democracy anymore. But, if education is no longer a public good, I don’t know what we’d do.

Jack

Mhmm.

Diane

And, you know, dropping the state funding to 4%, suggests to me that people don’t see education as a public good. Um, so there’s a realism to the model, to the economic model. I’m afraid that state institutions are going to disappear.

Jack

Mhmm.

Diane
How’s that?

Jack

Okay. Um, you-you mentioned that you are trying to get people together, um –

Diane

Mhmm.

Jack

- to work together.

Diane

Right.

Jack

Um, could you just detail, I guess, uh, specifically what you’ve done for that?
Sure.

Jack

Uh, and then, I guess, just your role on the committee and bringing MOOCs to campus, or getting MOOCs started anyway.

Diane

Sure. Um, so I think that the role I played on the committees that was, that turned out to be important, was in the meeting where I was representing Engineering –

Jack

Mhmm.

Diane

- um, saying, you know, “If you’re going to do this, own it. And, particularly, you have to support it” And, my concern right now, is the campus has said: “Well, we’ll experiment.” And, um, we don’t have a facility. We don’t have a recording studio. We don’t have an expert in MOOCs. We don’t have a support infrastructure. These courses are costing between 50 and 150 thousand dollars for institutions that are really taking it seriously, like Stanford and Georgia Tech.
And, we are giving faculty members who volunteer a graduate student assistant –

- for a semester. And, you know, that—that’s no way to run a business. And it’s, you know, maybe we’ll discover some wonderful, sort of, handheld camera approach to education through lack of funding, but I’m concerned that without a centralized place and anyone to consult with, we’re just going to end up doing what we’ve always done in transposing it to online, um, instead of really rethinking, radically, how we teach. You know, the idea that you can flip the classroom, um, is already…it is still foreign to most faculty on campus. So, I mean, just, you know, thinking about any kind of educational reform is a big deal. But, thinking about organizing a class that is quarterly, that is asynchronis, that is synchronis but partial, that is, um, not just video but interaction with peers, that is social network based.
Diane

Um, we-don’t – so, basically, we have one person on campus, Cory Pavicich, who knows something about this. And, the thing that concerned me was that OIT, this is the Office of Information Technology, seemed to be trying to come up with its own strategy and in competition with the President’s Committee. And, uh, the campus was in competition with the President’s Committee and saying that the President’s Office shouldn’t interfere with what was going on on the campus.

Jack

Hmm.

Diane

And so, for me, it’s been a matter of getting the right people to talk to each other. Um, so, I had a meeting with Larry Lavigne, who’s the head of OIT, saying so, um: “I understand that you and Jeff Lefteigg are building some strategy, well, have you talked to Mike Lightner about this? Because he’s actually the person on campus who does this...” *laughter* you know, and they hadn’t.

Jack

Right.
And they were doing this completely in isolation. But, uh, Kelly Fox, who’s the campus CFO, um, and who funded the bit of funding that the MOOCs got, is working with both of them...without them working together. And so, um, my concern is that we’re, we’re, one, duplicating and, two, in competition on campus. Um, I think that an entrepreneurial spirit might involve seed funding some competitive projects, and that would be great, but it has to be intentional.

So, um, my feeling has been that because, uh, two of the four MOOCs are in Engineering, the Engineering College needed to be a big part of owning what’s going on with MOOCs. Um, our Engineering Advisory Council advised us to leap ahead and not wait for the campus and just start experimenting and seeing what we learn and report back to them.
Diane

So, um, I’m all for doing that. Um, Cory Pavicich is now working with the Intro to Engineering class, which is, in fact, a massively closed, uh, person-to-person class –

Jack

*Laughter* Okay.

Diane

- um, it’s a thousand students –

Jack

Mhmm.

Diane

- and divided into five sections, and so Cory is, uh, working on, um, how you leverage a social network, how you use Google Hangouts. You know, how you MOOCify the, uh, the-the person-to-person experience.
And, I think we’re going to learn a lot from that. I think, if we are intending to scale anything, particularly looking at our 30%, or even more recently 50-60%, growth plan for the college, we’re going to have to think seriously about how we leverage that kind of technology. Um, also for the pre-engineering program. So, I’m very much involved in that, uh, in trying to figure out how to bring those students up to speed.

We’ve learned a fair amount from GoldShirt failures, I think. Um, and fundamentally this is the same exact demographic. Um, so, uh, if we can, for example, provide pre-calc as a MOOC the summer before people arrive and get them up to speed and then test them, you know, test them with ALEKS before and after, and see if it made a difference.
Diane

Then, I think, we can make an argument to the campus that this makes sense and that we should do it for free.

Jack

Mhmm.

Diane

Because a MOOC really doesn’t cost much, once you get it designed. Um, but that’s a service we could be providing to the state and to ourselves, by getting students to be able to graduate on time, getting stu – not making promises we can’t keep.

*Beeping*

Diane

What on earth is that? That was a strange – oh! Laundry. That...no, dishwasher. Okay.
Diane

Glad that’s in your recording...alright, dishwasher. Great.

Jack

*Laughter*

Diane

Does that, does that answer your question?

Jack

Strange beeps.

Diane

Uh, a lot. Yeah.
My concern is, that what you end up with is these really-weird competing groups. I think what the President’s Office is doing is great, but the campus is strangely resistant to being told what to do by the President’s Office.

Jack

What is the President’s Office doing?

Diane

Um, so Deb Keyek-Franssen, and here’s a bit of politics, um, probably not to be put in anything written....

Jack

Mhmm.

*Censored*

Jack

Um, awesome. Yeah, that’s a great perspective.
Um, so now, moving on to, uh, your role as, uh, somebody high up in the Engineering School....
Diane

Um, so I wasn’t as much a part of this.

Jack

Okay.

Diane

Because, I started being Dean last summer. Everything I know is fundamentally secondhand from either Scot Douglass or John Bennet, who at the time was the Associate Dean.

Jack

Okay.

Diane

Um, so, my guess is if you talked to either of them, you’d get more accurate information –

Jack
Okay.

Diane

- about that.

Jack

Well, I’ve talked to Scot about it.

Diane

Okay, about that process.

Jack

I just, didn’t know what your perspective was on it, so....

C.8.4 Time: 14:51

Diane
Um, my perspective is that for many years, I thought Scot was really complaining an awful lot about Housing and should just stop whining...until I met them. *Laughter* And, I realized he was totally understating everything. Um, it’s the most obstructionist group I’ve ever come across. So, um, everything he’s achieved, I believe quite strongly, has been in spite of housing.

Jack

Hmm.

Diane

And, uh, the, the-the fight that I am fighting from an Associate Dean perspective is to convince the campus that there are acceptable multiple models for RAPs; um, that the Arts and Sciences model is not the model that a different college, Engineering, is going to follow. Um, so, I’m in the process of establishing a RAP on Andrews model. Um, we have another RAP that is failing miserably and they’re talking about closing down: Sustainable by Design, which was established on the A&S model. So –

Jack

Is that the one in Will Ville?

Diane
That’s Will Ville. So, we’re putting it into receivership, we’re giving it a new interim director, um, we’re going to see what we can do to turn it around, using the Andrews example. Um, because…. Here’s one example: um, the A&S RAPs hire scabs to teach their classes. And, generally, these are people who, um, have not been vetted by departments. Which means that departments then are reluctant to accept credits from the RAPs, they don’t accept the academic credentials of the RAPs. Students find themselves treated differently by their departments, if they have lived in the RAP even thought it’s a RAP that is ostensibly associated with the department.

Jack

Departments....

Diane

Um, an example would be, uh, Sustainable by Design, um, applied to have, uh-uh, an instructor of their own choosing to teach the intro chem class and the chemistry department, uh, chemical engineering said “No.”

Jack

Mhmm.

Diane
For, I think, all the right reasons. They said: “Well, who’s, who’s oversight is it? You know, it’s our class. This student might take our later classes. Who’s going to make sure the class is what we think it should be? Who’s going to make sure that the credentials of the instructor are right. If we don’t have hiring privileges or, at least, interviewing privileges, um, how do we guarantee that this is real chemical engineering?”

Jack

Mhmm.

Diane

Um, and that’s how we’re going to operate. And, it’s completely different from A&S. So, you know, if I hire somebody to teach a calculus class, it’s going to be somebody from applied math.

Jack

Mhmm.

Diane

It’s not going to be somebody I found on the street.
Diane

Or even, you know, somebody who comes highly recommended from somewhere else. It’s – if I were to hire that person, I would have to run that person through applied math and make sure that there’s an agreement. So, um, my job is to try to align the RAPs along a new model that I think really works and that is Scot Douglass’s model, um, for building, uh, for emphasizing community above saying there’s just some intrinsic value to smaller classes –

Jack

M’kay.

Diane

- which is what I hear from A&S: “Well, no, it has to be smaller classes.” And I’m thinking: “What the hell? A smaller class with a bad teacher is not a better class.”
Diane

Um, I’m teaching a class right now with my entire RAP, because I think it’s important for them to be together once a week.

Jack

Right.

Diane

Um, well, there’s no room for that in the A&S model. So, I think, for me, the importance is going to be to establish the criteria for an on-going model for Engineering.

Jack

Mhmm.

Diane

Um, the Dean and the, uh, Engineering Advisory Council have agreed to my proposition that every incoming engineering student should be living in a RAP that’s run by Engineering –
Diane

- Um, and that they could switch back and forth. You know, my ideal would be next year a bunch of kids from Andrews who want to speak Spanish lived with me and a few of my students who are both, who are honors students go back to Andrews.

Jack

Mhmm.

Diane

And, that there’s movement among these spaces. That students can come in and say: “Well, I’m interested in sustainability...okay, now I’m interested in global...” –

Jack

Right.
"...okay, now I want to do technology, arts and media. Hey, wait a minute, now I’d like to do, you know, mechatronics. Now I want to..." *Laughter* So, I could, I already have in mind seven or eight RAPs that engineering could have. And that would encompass our whole incoming class.

Jack

Right.

Diane

And, you know, 40% returners, which I think is also critical. I think the campus is not nearly aggressive enough. Um, they’ve set a goal of 20% returning students. That’s still a pretty-small minority, if you’re looking at freshmen in the, in the space.

Jack

Right.

Diane

So, you know, I think it may be that Andrews has gone overboard at 53%, I think, because there’s no way to get more students into the residence halls. But, you know, 30-40? I think that’s a tipping point.
Diane

It certainly is with women in Engineering. Um, at 28% females, suddenly people have stopped noticing this year that there’s a woman in the class, because they’re just women.

Jack

Right.

C.8.5 Time: 19:54

Diane

So, you know, at least 28%, probably a minimum of 30, is where RAPs need to be with upperclass students so that freshmen don’t feel like they’re in a freshmen zoo.

Jack

Right.
Diane

Um, anyway, so that’s, my Deanly perspective is, um....

Jack

Forward looking?

Diane

Yeah, that we need a plan, that we need to be looking larger scale. I mean, one of the things we’re talking about very much is whether we try to give up the quad and try to take over Kittridge –

Jack

Right.

Diane

- um, so that we surround the Idea Forge, which is kind of the beating heart of of freshman experience. You know, being able to design and build stuff right there that doesn’t have to do with a class, but is just the thing you came in and wanted to learn.

Jack
Mhmm.

Diane

Um, that’s, to me, fundamental about a living experience in Engineering. So, um, it’s ironic that the-the two RAPs that are doing this are both run by Humanities people. *Laughter* But, maybe it takes that outside perspective to know what Engineering can be.

Jack

Mhmm. Okay. Um, let me browse these questions. Um...uh, so, and I’m just learning this; I don’t really know all the, uh, intrinsic details of everything with Andrews. But, uh, so you didn’t have a huge role in starting or forming the community, but –

Diane

This was all Scot.

Jack

Right. And then, once it was in Andrews –

Diane
Mhmm.

Jack

- you started to, uh, recognize its merits.

Diane

Right.

Jack

And, to look forward for what can happen.

Diane

Definitely.

Jack

Um, so would you say most of the stuff, uh, that you just said, is mostly a “what you’ve learned from seeing the, uh, RAP” –
Diane

Right.

Jack

- come together.

Diane

So, from teaching Andrews students, from seeing Andrews students start to show up on every
committee in the college: EEF, you know, um, from-from finding out that the kids who are volunteering,
that the kids who are getting outstanding graduate, um, you know, obviously there’s-there’s
predilection for success because of the nature of the people who live in Andrews, but the GoldShirt
students who are living there are also doing well in that regard.

Jack

Mhmm.

Diane

Um, not all of them, but GoldShirt is an entirely different matter that I won’t go into right now, uh, not
on tape anyway. Um, but – Oo ‘tape,’ that dated me!
Both

*Laughter*

Diane

- not digitally anyway. Wow! Um, but, uh, I think, I’ve gone to a number of events since I became Associate Dean. So, I cooked breakfast for the GoldShirts over the summer, I did summer bridge for the GoldShirts a couple of times and got to figure out what was the problem with integrating them. I taught their first class in Andrews, uh, with the first cohort four years ago. And, as a result, I was in Andrews for an entire semester.

Jack

What was that class?

Diane

This was The Meaning of IT, uh, which I taught in the spring of the, uh, the spring semester of the first year of the first cohort. Um, so I was...

Jack
Did that coincide with the first year of Andrews?

Diane

Uh, no, that was... Did it? It might have. I think it did.

Jack

Unless it was before Andrews.

Diane

Yeah, the classroom had just opened. You’re right. So, we didn’t even know how many seats get. Yeah, so it was the first, it’s true. So, I was there for entire semester and I would hang out there, before and after class. And then I, students would invite me to events. Once my first Open Mic Night, I think it was the first one.

Jack

Andrews one?

Diane
Yeah, the first one in Andrews. That’s right. Um, and, uh, went to dinners and, you know, began to engage as a, as an administrator later. But, but really felt the love of the faculty of, you know, what this place was. And, saw how different it was.

Jack

Um, that sounds like a really interesting perspective.

Diane

Yeah.

Jack

Could, uh, we delve a little bit into, just the details, of that experience that semester?

Diane

Yeah.

Jack

You’ve mentioned a lot of them, but...
Diane

Sure, yeah. Um, I think, one of the things that struck me immediately was, uh, how integrated the front desk was into the daily lives of the students, how important it was. The fact that I knew everybody at the front desk, uh, even if they weren’t all Andrews students. And, they were incredibly helpful. Um, the fact that students know each other’s names. They were just saying: “hey” which you see all over campus, you know: “hey” which is what you say when you don’t know somebody’s name. Um, people put down their phones to talk to each other. So, I mean, my class is mostly about mediated communication things I saw was that communication was not mediated, it was direct in Andrews unlike what I was seeing the engineering center. Um, what else? Students would find out from students in my class what was going on and ask if they could sit in because they actually just wanted some knowledge. So, I posted my syllabus and people would send me an email and say: “can I come to your class?” I had, like, two extra seats so I would say: “sure, that’s great.” Um, just this-this interest in learning because somethings interesting as opposed to taking a course because it’s required. I wanted to understand what had created that world. Um, and of course, Scot has been a colleague for years and I totally respect him and his way of dealing with people in the Herbst and people in engineering. So, I mean, I know that a huge amount of this was because of him. But, I still didn’t understand how he could make other people own it in the way that he does, to use one of his terms.

Jack

Other people being students?

Diane
Yeah, students, uh, anybody living there, the people working there who didn’t even live there. Um, this sense of belonging. Um, I was struck by the fact that his daughters were around, that I’d see during the day. So, I would come out of class or I’d be starting class and Thali would come running in and show me something. And, I would stop class and talk to her for a minute. And then, she’d wave everybody in and out. And, that makes a difference. These things make a difference. There were no, you know, faculty ever in the dorms, you know, when I was in college. There was no kids of faculty in the dorms. But I change the game, and I think it really does. Um, and, I think, just, uh, having this sense that one might be invited to participate in student lives as a faculty member was really powerful to me.

Jack

Mhmm.

Diane

Um, I was asked to give a talk. I was asked to come to a dinner about women in engineering, and I, very embarrassed, sent back a message saying: “you know, I’m not really an engineer.” And they said, you know: “that’s okay, we know that.” You know, I thought those were great things. And, uh, it made me feel like I was a privileged person because I was invited to be part of this community sometimes. So, that matters. There is a Tom Sawyer-ism to that. I, you know: “come, volunteer your time at night, give a free talk.” And-and, I wanted to –

Jack
Right.

Diane

– desperately, because I knew I get something out of it.

Jack

Right.

Diane

There’s this promise that something will be back to you, that you couldn’t possibly calculate beforehand.

Jack

Right, cool. Thank you. Um, so, uh, now moving on to, uh, your inspired –

Diane

This?

Jack
– a little bit. To, uh, to the faculty live-in for the newest – is that the newest RAP?

Diane

It’s the newest RAP.

Jack

– the newest RAP on-campus.

Diane

Yeah, it’s post-moratorium pilot. We are still unofficially a RAP.

Jack

Oh, okay.

Diane

I got it under the wire because there is no process to apply to have one, uh, and I had to create a committee to approve it as a pilot. And so, I’m operating on a shoestring budget. I’m doing this for free.
Diane

Yeah, so, uh, I mean so, I’m already Dean, so basically I have two full-time jobs and then my daughter lives here and I’m supposed to be a faculty member. I don’t know, I don’t know how many jobs I have any more. But –

Jack

I imagine you might be feeling stressed?

Diane

I am, but I took the week off. I can do this because I took the week off from work this week at the Dean’s office.

Jack

Oh.
I told everyone to just... Shove it. It was great, everything I thought it’d be. I may do it next week to, no

I’m just kidding. I wish, I wish I could do next week too, but I have stuff to do. So, um...

C.8.6 Time: 28:46

Jack

So the, uh, specific question would be, uh, well, we've kind of gotten a sense of, uh, “how and why you
decided to start this RAP.” But, if you have any more things to say about that?

Diane

Yeah. Um, I am really concerned about the Catch-22 engineers find themselves in. So, you show up on
this campus as a freshman, uh, you have an incredibly demanding schedule, and yet the very thing you
most need, which is global experience and maintaining all of the languages that you learned in high
school, you don’t have time to do.

Jack

Mhmm.

Diane
So, uh, I was the H&SS advisor for many years, as the head of Herbst, during which time I saw how few students were actually continued languages that they had taken high school. Um, and then I talked to the EAC board members, who all say: “we want to hire people who know something about somewhere else, because otherwise they won’t move. You know, we can’t hire people at CU because people won’t leave Colorado.” So, I started hearing more and more about global skills, what was needed, uh, you know, I read *The World Is Flat* when he first came out, I thought it was hogwash and slowly begun to work on me. Um, in my sense was that we were doing the exact opposite of what we needed to do and that this was an end run around the language problem. So, if we can get engineers to live together, to continue with the languages that they had just finished studying in high school, even if they didn’t have time to take Spanish, they would maintain it –

Jack

Right.

Diane

– maybe even long enough, until they got their sophomore year, and could take Spanish classes. Or, maybe, if we’re really lucky, they speak enough Spanish that they could place higher so that they’re wasting less time.

Jack

Right.
Diane

So, you know, to me it was a rogue way of getting language back into the engineering lifestyle and, uh, to think, to start thinking globally. And, to start preparing for market it’s already 50% international collaboration and, which by the time these guys graduate, will be 75% international collaboration. So, the second challenge, uh, is trying to get global into curricula across the college. So, not just you can live in the RAP or you can get the certificate, but, uh, infusing it this year into the first year course, for example. Um, getting different departments who are real champions, like civil engineering, to think seriously about MOUs and what kinds of partnerships they want.

Jack

What’s an MOU?

Diane

Uh, Memoranda Of Understanding, so with foreign institutions. Uh, hiring a new, so don’t say this –

*Censored*

Diane

I spent the last six months, uh, advising every student in engineering who’s abroad.
Jack

That’s a lot of students.

Diane

That’s a lot of students, not as many as I want, but a lot of students. So, we now have a full-time advisor for the students, who will actually help them if they get hosed abroad.

Jack

Right.

Diane

Which is, a wonderful thing, to have somebody to help. Um, you know, we have a list of faculty who can call and get irate with foreign institutions, uh, I think that’s going to be big. She’s also going to be advising international students here. Um, they’ve been our most significant, uh, cheating problem and cultural adjustment problems and so we need to be more systematic. I’ve been forcing the campus to adapt and orientation for international students that actually matters. Um, I’m thinking about a GoldShirt-type year for people who cheated on the TOEFL, who arrived and can’t speak English, who need an extra year learning was before they can take technical classes.
Um, so, all of that really, kind of, was part of my obsession when I accepted the job in the Dean’s office. And then, my first day I went and talked to the head of housing and said: “actually, you know, I’d like to propose something: what would it take to get a new RAP? Is there a way to start?” So, I –
Some, not this past, but the one before. And, the-the biggest thing to me was to look at three groups: one is our students going abroad, two is our students who can never afford to go abroad and therefore the RAP might work for them or the certificates, and three international students coming here. So, not only how do we make their education a good one, but how do we get there international experiences spread throughout the college.

Jack

Right.

Diane

So, anyways, those are all the issues. We’ve got a group of about 50 faculty across campus who all do global development run by Paul Chinowski. We’re trying to start channeling all of their talks through our building so that people know that Kitt Central is where you come find out about global development.

Jack

Okay.

Diane

Um, so, I think, the RAP is about Spanish. It’s about global development issues. It’s about creating a new community for freshman. It’s about creating a supportive community. It’s about having a faculty
member here, uh, who can, one, exact her revenge on the world by giving other people a very good first year because I really terrible first year in college and I want to make sure that doesn’t happen to anyone else. And, uh, and, I think it’s also about, uh, getting involved in-with students because no prior Associate Dean for Education has ever actually known a lot of students or interacted with them or heard, or seen their faces when they come back for wretched Calc night –

Jack

Which was last night.

Diane

– which was last night, I was upstairs for hours. And actually understood wow, that just knocked a whole bunch of people out of engineering, just that one experience. Even if they pass the class now, they feel bad about it. Um, how do we change that?

Jack

Right.

Diane

So, I think, you know, to me, living here is partly about being Associate Dean, but it’s largely about living here in making a freshman world good.
Right, okay. So, uh, so “what, uh, to the best of your memory, have you done to make it happen? With dates and stuff included, if you can.”

So, July 1 –

This year?

– of 2011 –

Two years ago?
Right? 2012. Let me think... This is 2013, July is already over... July 1 of 2012, my first day as Associate Dean, and I met with the head of housing on that day.

Okay.

And, at that point, I was asking: could they build a faculty apartment in the quad? Because, I was interested in trying to start a pilot. And, that obviously wasn’t going to happen because of costs.

Right.

Um, so, then it turned out, I found it a month later, that Kitt Central at faculty apartment and no one had claimed. So, that’s when I propose: “hey, uh, how about we try this.” Um, the original proposal was 38 students, which we ended up with 57, uh, because we had so many applicants, we had close to 100
applicants for the RAP. Um, and, uh, I started, let’s see, by September, I had caused the campus to reconvene a committee that would be the committee they could actually look into a proposal, uh, convinced the Engineering Advisory Council that they needed to support a proposal, got them to corner Phil DeStephano at cocktail parties for months to ask him when he was going to approve the proposal.... And, late November, we finally got a meeting, me and Rob and Russ and Phil, to approve the proposal and its funding. So, uh, in terms of University, uh, calendars, this was lightning-fast.

Jack
Right.

Diane
In terms of the way I wanted to go, it was slower than I could believe.

Jack
Right.

Diane
Because, nobody would take responsibility for it. So, uh, I didn’t think it was going to happen and tell, uh, November by which point the building was under construction. Um, nobody fought for the
apartment, I mean interestingly, faculty thought I was insane. Nobody wanted to live here. Um, it is a strange design, but I like it. I think I really like it, I made it work.

Jack

Great.

Diane

So, um, but, uh, the building wasn’t really designed for a RAP. So, uh, well, for faculty engagement. So, I walk out my front door... So, Scot walks out his front door and he is in the dorm, and there are rooms across from him. I walk out, and I am isolated by this Leadership RAP office space. And then, there is a door that closes at night that I keep having to prop open that leads to the rest of the building. So one, students can’t get to me through the building, they have outside which is wrong. So, that door’s propped open now. There are two tiny classrooms, based on the A&S model of tiny classes, which I can’t use. Um, there’s a common room, which is supposed to be shared between all of the RAPs on the third floor, the North building, and us. Um, and we finally just started taking it over, which is great. So, we took a lot. So, part of what we’re doing is, uh, we make paella every Sunday, we are making meals together. So, everybody knows different Latin American food, so were cooking a lot. We’re doing study sessions a lot. Um, the puppy has helped. So, Inigo Montoya is the official puppy of the RAP. He goes upstairs every evening and somehow, I convinced the students that he can only speak Spanish. So, when I appear with the dog they only speak Spanish. It’s amazing. The reality is, they are not speaking Spanish all the time, probably 60%.
Diane

Um, and, I realize now that I should have had a conversation class this fall, with me. I didn’t do it. Um, I couldn’t, I don’t think I could have done it this fall, but I’m going to plan to do next fall.

Jack

Um, a conversation class is...?

Diane

Well, I’m just speaking in Spanish, a weekly vocabulary, particularly, engineering vocabulary, which they don’t know and I don’t know. I’m learning. I’m teaching my class, I started in English, moved through Spanglish, and we’re teaching in Spanish. Um, I don’t know the IT terms because I left Spain before IT happened. So, you know, I’m learning all the vocabulary that I need.

Jack

Right.
Um, you know, cloud storage and, you know, uh, thin clients...cliente liviano, you know, that’s thin client in Spain. Um, so, uh, so, I’m having to learn a lot of the vocabulary with them. Um, and then students are taking leadership. So, there’s a decorating committee: they decorate for holidays. We have Day of the Dead stuff upstairs right now.

Jack

Cool.

We got a foosball table donated by students and that’s turned out to be a huge community builder. Um, so much so that some drunk from the third floor tried to steal it by ramming it up the staircase.

Jack

Oh my.
Instead of taking into the elevator just 4 feet away, they tried to ram it up the staircase and damaged the stairwell.

Jack

Really?

Diane

Yeah, so Housings response was to tape the thing up and take away the balls so that we wouldn’t play with it anymore.

Jack

That’s unfortunate.

Diane

Yeah, well Will Derryberry got so mad, if you can imagine. Do you know Will?

Jack

I do know Will, and I couldn't imagine him mad.
Diane

He got so mad, he demanded to get the balls back, and they gave them to him. And he went upstairs and un-taped it, and put the balls back. And, dammit, we have a foosball table.

Both

*laughter*

Diane

But, they’re never going to approve the ping-pong table that somebody else has offered to donate. Um, but we have a study room with a library with, I bought a bunch of Spanish novels: all of the *Harry Potters* in Spanish, all the, *Charlie and the Chocolate Factoring* in Spanish all the, you know, the *Hunger Games* in Spanish, uh, lots of kids books, lots of grown-up of books, a bunch of junk novels. Um, so that people are just kind of incidentally trying to read stuff that they already know. *Star Wars* in Spanish. Uh, we’re doing movie nights in Spanish, so: we’ve done *The Princess Bride* and *Star Wars* and were moving on towards the *Terminator* series in Spanish, which is priceless.

Jack

*Star Wars* IV-VI, I assume?

Diane
Oh, hell yeah. La Estrella del Muerte, the Death Star, which sounds hilarious and we were laughing. Um, so I think, you know, what we’ve ended up with is actually quite an interesting community of coincidentally great kids. Um, so far, about 35 of them want to return next year, out of 55, I guess, I can count, two are RAs, but the RAs will return too.

Jack
Hmm.

Diane
So, um, we’re talking now with Housing about doubling or tripling in size and taking over the third floor and eliminating some of the issues we’ve had with the building and then we’ll own it, then we’ll have the kitchen.

Jack
Right. Um, so, just getting back to things that you’ve done along the process, so July 2012 up through November is –

Diane
Making it happen.
Jack – making it happen. Uh, and then, after that, uh –

Diane

Recruiting.

Jack

There was a lot of recruiting?

Diane

Yeah.

Jack

I’m just wondering when all of the planning and buying books or things like that –

C.8.8 Time: 42:10

Diane
Well, recruiting was totally late, uh, because we got approval so late and the Engineering Sampler was already over and I’ve had, this was for the prospective students, and I’d already had to say, you know: “there is a likely chance, uh, but the, uh, application won’t go online until almost Thanksgiving.” Um, students earn filling out over Christmas. And, we had way more applicants than we could handle by March. But so, slow start big hump of people as they realized one, when the building would be finished, because nobody thought it would be done on time, because it looked like there was no way.

Jack

Right.

Diane

Um, so, uh, during that time I was frantically building a website, uh, getting things, uh, my course started for fall, and a projects are scheduled for the spring. Um, and that’s going to be taught by Paul Chinowski, in global development. It’s going to be a very cool class, in fact, people who are not in the RAP are trying to get in now to the class. Um, and then, uh, for, for me, just staging trying to move. To imagine packing, I’ve been living in the same place for 14 years. Just trying to reduce, I mean, I just reduced everything to nothing –

Jack

Right, to this size.
Diane

— in order to do this. Right. Um, getting my daughter ready to move, uh, partly the bribe was the puppy, so I had to follow through on that. Um, and then, uh, lots and lots and lots of interaction with parents. Um, I think that, probably the biggest recruiting moment turned out to be the mocktail party that the BOLD Center had for women who had been admitted to engineering, we’re 50% female.

Jack

Nice.

Diane

Yeah, which is not a coincidence. In fact, most of the really cool women were living here I met then, there and that was huge. And then, we had a couple of last-minute: “oh, I got into MIT, I got into Harvard people” and so we had a couple of last-minute admits off the list, which unfortunately, honors was doing, so they took Ben Cloud. There were a couple of people who went over there, who-who had been waitlisted by me. Um, so, uh, anyway that was kind of fun because it turned out there is a huge amount of overlap, uh, easily two thirds of the students who applied also applied to the engineering honors. What was interesting was, uh, there’s been this argument in the Dean’s office that engineering honors is a problem for the college because students want so badly to get in, that if they don’t get in then they don’t even come at all. And, what was interesting was the number of students who didn’t who
came to global engineering. So, I think if we have strong options then we can eliminate that and get the strong students.

Jack

Right.

Diane

Um, I’ve got Boettcher scholars, you know. I think that’s great.

Jack

Yeah, strong students.

Diane

So, we’re, the college is trying to figure out how to target the top 5% from Colorado, and we’ve traditionally done very badly at that. And so, uh, I’m thinking that, with very strong offerings at the freshman year, nobody else does this, so were the only, uh, language community for engineers in the country, in the world, as far as I know. Um, and that’s kind of cool. And it’s a selling point.

Jack
That is cool. It is. And so you’re the first.

Diane

And 2, well in 2 years, in one year, and one year we add French and we add Portuguese. And then in two years after that, we add Mandarin and Arabic, which I don’t… So, that will be an interesting challenge. But, uh, we begin to imagine language wings in this building. As opposed, and they’re, they’re houses right? The French house within, uh, global engineering. Um, so, I think we’ll have sort of subsets as we grow, we’ll have subsets of language that will help it remain small. Um, and, you know, we can pick our favorite authors to name the wing: Cervantes, Spanish wing. I don’t know. The Borges wing.

Jack

Um, so, did you write the application? Or, how was that made?

Diane

Yes. I made the application. Cory Pavicich made it a Google doc. So, it’s a Google form, which was a down and dirty way to get it done. Um, they would’ve worked great if we had 30 applicants, it was a little harder when there were 100.

Jack

Right.
Diane

Um, so, I’m hoping to work with the framework that Andrews is using for next year. Um, so, and, you know, the website was literally a six hour adventure to get it up, because it was so needed at the point, that point.

Jack

What time about, did you make the website?

Diane

November, yeah.

Jack

November? Same as the application?

Diane

It was about Thanksgiving. Yeah, all that one up, the application when up at the same time.

Jack
Right about at the time you got the go-ahead?

Diane

Yeah, I mean it was sitting, I mean, literally the week after I got the go-ahead, everything went up.

Jack

Alright. Cool, pretty quick.

Diane

Yeah, it was pretty quick.

Jack

Um, and what is the review process of the applications like?

Diane

So, I had, uh, five RAs and mentors, who agreed as returning students to be here, and I asked them to help. Um, what I’d like to do is go to the Scot-Bot algorithm approach, uh, with more applicants to be able to, you know, where out bottom and top scores, to be able to get students who, you know, who see five different applications and don’t duplicate anything. So, that would be ideal.
Jack

Right, so just going into similar application review system?

Diane

Up until now, everybody’s reading everything, well, everybody who was available. Stephen wasn’t around, so he didn’t do it. But, anybody I could tap, like, Isis, who is working in BOLD all summer, you know, those people ended up reading stuff. And, it was kind of a, uh-uh, I don’t know, a crapshoot. It was really, really scary because you just don’t know who these people actually are going to be. Um, and then we ended up, after we started we ended up with defectors from the Leadership RAP. So, one person join us in transfer is these before they got really angry at us, and I had to start telling people “No, but you know what, why not you with your next year.” So, I think we’re going to end up with a bunch of the leadership kits who speak Spanish living with us next year.

Jack

Interesting.

Diane

Yeah, which will be good. And they’re the cool people, they’re the ones that are already around all the time anyway.
Jack

Um, just a detail, was the application in Spanish? Or...?

Diane

English with one Spanish essay.

Jack

Interest.

Diane

So, I, uh, I-I happily stole some of the Andrews questions, like: “who do I live down the Hall from?”

Jack

A good one.

Diane
But, I added a, uh, in Spanish, a: “Why are you interested in Global Engineering?” And, that was actually fascinating because you could see the people who had cheated and gotten help. And I accepted the people who hadn’t, and were really trying. Um, I think that was a big personality test for us.

Jack

It’s interesting what you see an application, that you wouldn’t expect.

Diane

Yeah, exactly, I mean, the ones that were completely perfectly honed, if they weren’t native speakers...hmm, I’m curious about that. Right. So, uh, yeah, I was really pleased that that process worked out. I think, really, there’s only one person who’s absolutely not belonging, out of 57. That’s pretty good.

Jack

It is. Cool. So, uh, so, uh, looking at the schedule again, uh, because I’m focusing on how you build one of these –

Diane

Yeah, no kidding. God, I want to know. I still want to know.
Jack

To be a resource for potential, future visionaries.

Diane

Yeah.

C.8.9  Time: 50:06

Jack

Um, the applications without, and then the reviewing process just started is that claim? Or...?

Diane

Yeah, I did rolling reviews because I was afraid I wouldn’t get enough people because, uh, I was told by someone people that engineers wouldn’t do this. So, I was actually little petrified that I was going to make an ass of myself. Because I think highly of engineers, and then as-as application started rolling in, I got a lot calmer, we got a lot more selective. The first two people probably got it easy, and then we got harder just as things picked up. That went on through, I think a final deadline was the same as the final deadline for honors. So, I think, that would’ve been, like, April 1, or something like that.
Jack

Something around then.

Diane

Yeah, something around there, whatever that date is, that’s the date I used to, uh, because people were particularly asking, could they apply to both. And then, if they got into both could they be in both. So, I think Scot and I have two students who are in both.

Jack

And, uh, do they live here?

Diane

They live here, but they are taking his class. So, and that in the spring, they will take the project class.

Um, so, he and I had to kind of figure out on-the-fly as-as we presented, I mean I think it was Boettcher Scholars Day that we got the question, and we were presenting together. And, we looked at each other and just said: “I know, what do you think?” And he said: “Well, it sounds good to me.” And so he told everybody: “Sure, apply to both. You can be in both.” We’ll figure it out. And so, I’m glad that-that we have this –

Jack

606
It’s already be getting the model of you can go between different things.

Diane

Yeah, and we’re hoping that that’s what will happen. The people will feel like: “well, I want to be in Andrews my first year, but maybe I’ll do Spanish my second year. And then I’ll go back to Andrews.” Um, so, it provides another chance, another possibility.

Jack

Yeah, that’s really cool.

Diane

Yeah, so, and then, the panic was about the building. I mean, I was, I moved down to 12th St. and was riding my bike here with my daughter every night to see if the building was going to be finished on time. And, at the same time, you know, I couldn’t see the inside, so I couldn’t set up, you know, there were no glass boards anywhere, there’s no signage, we really didn’t know what to do until the week before the dorm opened the leadership group moved in and started, like, decorating. It was that late. And, yeah, so there was some panic about starting things out because of the building. And, over the summer, I bought all of the books, so those were all sitting in my basement waiting. And we moved them in. And so, we got a bookcase at IKEA, and we put in all the books. And then, the computers still aren’t done. We were going to have computers in a room, Andrews is building them, I contracted that. So, our Minecraft server isn’t up yet, but we are going to have a Minecraft server in Spanish, which is very important.
And, a World of Warcraft charter in Spanish as well. So that, people who are prospective students can join us, which I think is actually kind of a cool recruiting idea. Um, you know, this is the Army works, we can try it here too. Because, I think, you know, appealing to the geek in all of us is not a bad thing.

And, the slightly OCD.

And, the slightly OCD.

I have to make the tiles perfect.
Exactly.

Jack

I am in Terraria right now.

Diane

Oh, are you? This is, this is why my books are all the right size, you know. That shelf, which are just took things off of, is driving me crazy right now.

Jack

Fair. Um, so there was no, you had no communication with the, uh, building of the building or the design of the building or anything like that?

Diane

No. The building was already being built, and it was being finished. So, I got to come through twice, and take pictures and figure out what I had to get rid of, and that was it.

Jack

Right, okay.
Diane

But, I did take pictures and send them to the students who were in, because they needed to know.

Jack

So that they had an idea.

Diane

Yeah, they needed to know what their rooms would look like.

Jack

Right, they’re bigger, or more square.

Diane

Right, orientation is important, uh, I gathered all of the ideas, I think all of the best ideas, well not all of them, the mentors provided a bunch of good ideas. Basically, I said: “I’m a dork, I have no idea what’s cool. Tell me what we need to be planning.” And they did, uh, so we had a welcome empanada party for all of the students and their parents catered by the Rincon Argentino and we’ve done music nights, and we have Spanish music for study nights, uh, they just come up with great ideas. But, the students have
come up with a lot of them. And, orientation is when they told me, that’s where the Minecraft server came from.

Jack

So, during orientation you all of the students at large?

Diane

Yeah, all of the students who were coming. So, they came to my session if they were admitted to the RAP. And so, I said: “Great, this is our chance. Tell me what we’re doing.” And, that was great. Um, and they were thrilled to show up and find that some of their suggestions happened too. Um, so, you know, that’s where the foosball table was offered and that’s where we came up with the idea for the, uh, “Keep Calm and Speak Spanish” theme, although I really wish we had done minions, I really like the minions a lot, silly minions. So, anyway, we did, I did design T-shirts in a panic. They turned out great, but who knew. So, we’ll be design, there will be a contest to design T-shirts for next year. We’ve got water bottles, you know, we got, we had tattoos: they are just “ñ”. Um, so, I think, just trying to build this sense of identity, uh, and also, the parents come back in they’re thrilled.

Jack

Mhmm.
Diane

Their kids are speaking Spanish. We did a tapas night for parent weekend and we had probably half the
parents at this event we were serving tapas that we’d made.

Jack

That’s awesome.

Diane

That was fantastic, I mean, they were totally impressed. And, they couldn’t believe I was there. They
couldn’t believe my daughter was there. They couldn’t believe Inigo was there. So, I think they were
really into this, uh, you know, I can say, finally, what Scot has been saying for years that orientation,
which you’ve heard because you’ve done it, which is: “I want a place where my daughters are able to
live in. And you and I will have something common, that our kids are both living in this building.”

Jack

Right.

Diane

And, that’s wonderful, that matters. So, yeah.
Yeah, very. Um, cool, uh, so, as the year began, uh, it sounds like you started with, uh, plopping ownership right in the students’ laps and asking: “What you want this place to be like?” So, just so far, kind of in a running list of what happened and how well has it gone?

Diane

An assessment? Um, I’ve learned a lot about what I should have done, uh, because nobody on this campus has done a language dorm before. And I was starting from scratch. So, we needed to have a one hour or three hour option for a conversation class all fall with me. Um, that will happen next year. Um, the Meaning of IT class has been a really good, uh, unifier, I think, particularly because so much of what we talk about is about global communication. And, that’s what we’re focused on. Um, I think this spring project class will also be useful that way. We will be doing language classes this spring, the conversation thing. Um, I’ve learned, uh, that I can’t do everything and that I need more mentors and that I need to delegate more. This is partly Scot harping on the fact that I need to delegate more. But, I mean, the reality is, he’s even forgotten kind of what it was like at the beginning. And, he didn’t have people to delegate to yet. And, I’m also kind of, with the mentors who’ve all lived in Andrews, I keep having to remind them: “you know what, this is our first semester.”

Jack

It is.
Diane

Um, Andrews has been around for five years and has built its culture and, this is our first semester.

Jack

And, it’s much bigger than the pre-Andrews 22 students.

Diane

It is, and that was what I was aiming for, you know, 38 was really, to me, ambitious. Um, I mean, it was kind of a shock to the system. I mean, it took me weeks to learn names and normally, with the class of 150, I know them each by the second week. So, it took longer, even though I was living with them.

Jack

Mhmm.

Diane

Um, so, uh, I need to figure out a better way to know the students early. So, we need to do some form of retreat and some thing where I get exposed to their names constantly for weeks, you know, or release for several hours. Um, I think, uh, they’re not, they started out in Spanish a lot and then drifted
and I should have been upstairs more, beginning. But, I’m also concerned about figuring out proxy-ness.

It can’t, you know I don’t, it’s like vampire movies, I don’t feel like can cross the threshold without being invited. You know? But –

Jack

That’s all of the Fae.

Diane

But, to what extent in my welcome in the study room. And, to what extent does my presence disrupt everything. Or, uh, what happens if I take the puppy up, everybody comes out of the rooms. One, it’s greatly social, but to what extent is it distract everybody. Um, so, I think, what I’m finding out is they would like to have more meetings, uh, they would like to be here more. So, I’m going to be doing dinner for six for the rest the year, where six of the time the coming here and were making dinner together.

Um, I think things like that are going to make a difference and I’m just kind of discovering them. Um, it is really hard to get students when they’re supposed to be speaking a language they don’t know that well because it’s very hard to find the minimum when they feel like they can talk to you. So, I’ve also been pulling people aside for just outside the dorm discussions where I get to know them better. I’ve got a couple kids who I’m concerned about. I’ve also done something the Andrews didn’t do, which is to accept pre-engineers. So, I’ve got three students who are not in engineering yet, they’re trying to get in. And, their struggles are quite different, but I think it’s helping them to be part of this community and to not be looked at as different. So, uh, I’m thinking it might be good to stick with, like, 20% pre-engineers in the future, as a way to get them in. Um, they are, uh, we are encouraging them to apply to the quad
and were also trying to make this building overflow. So, a bunch of kids on this first four are pre-engineers, but they don’t speak Spanish. So, I’m over there talking to them too. And then, we have athletes on the second floor, a number of them who speak Spanish, who can’t join a RAP because they’re athletes, they’re prohibited.

Jack

Really? Interesting

Diane

Yeah, which is weird, but they want to, uh, but they’re also not even anywhere near engineering. So, you know, in theology or something. So, I can’t take them into the RAP, uh, and yet, they’re coming to all of our activities.

Jack

Right.

Diane

So, fundamentally, we have this list of friends growing. So, there’s a lot of things that I’m learning.
Mhmm. So, would you say that, uh, program attendance, I mean it sounds like it’s the entire program plus, but...?

Diane

It’s been pretty amazing. I mean, we’ve got three kids who decided to go Greek, and they are not around as much, which irritates me to no end.

Jack

What you mean by go Greek?

Diane

Uh, fraternities and sororities. I’m sorry.

Jack

Oh, got you. I was thinking of the food, which, I guess, is Mediterranean. Maybe it was different language
Yeah, yeah, yeah, those big people. I was at UVA, which is 80% Greek, and, you know you were a God damned independent Gamma-Delta-lota, people really looked down. And, I was one. And so, I’ve had a, sort of, chip on my shoulder with this whole Greek thing. I pledge the sorority free and it was terrible, it was an awful experience. And so, I don’t want to encourage people. And, it draws their time too. So, so I, there are couple of kids that on see as much and I worry about them. But, for the most part, we have this core group it’s just completely in, and show up everything. A couple of them have signed up for the global engineering certificate, which is sponsored by the Mortenson Center, and they’re getting 20% of it by living here. So, you know, there’s a kind of running start that they are getting. And, a ton of them want to go abroad. So, I’m sitting down with them now, looking at their schedules and saying: “well, Junior isn’t a very good idea. Let’s look at next year.” And, trying to find programs for them.

Jack

Right, right.

Diane

Which, with my new international advisor, I’ll be able to do, I just had to delegate more. But, on the other hand, anybody who wants to go to Spain, I can find a place to live. So, yeah.

C.8.10 Time: 1:03:20
Mhmm. Uh, so, “what other things that he learns, uh, would you do differently, if you’re going to try and start this again?”

Oh, if I were going to start again.

Yeah, well, I think it would be quite different if one could start knowing that one was a RAP with full funding, as opposed to a pilot. So, the fact that we kind of had to do it backwards sideways mean that I haven’t been able to ask for things, that I would have asked for. You know, like, more input on design, more input on furniture, more input on all sorts of things, more ability, for example, to affect the way the classroom’s work. Because they suck, you know, classrooms are horrible.
Diane

You know, the tables way hundred pounds and they are not on wheels, seeking with anything around. The speakers don’t work. The projection doesn’t link. I mean, there’s all this stuff. So, I would’ve been much more, because I mean, much more into the IT, the teaching spaces, community spaces. And, I think we lucked out with this kitchen, it’s a great kitchen. But, the common room isn’t very good. It’s mostly, like, walk-through space and stuff.

Jack

It’s a very large, large, long space.

Diane

Well, it’s a large, long space, and it has doors everywhere, you know, so people are coming in and out and there’s no, like, there’s no eddy space.

Jack

Yeah, there is, like, that whole wall of doors. Aren’t they exit only?

Diane
Yeah, there’s just a weird lack of eddy space, a lack of pooling spaces where people would actually congregate. And are one common space is upstairs, and it’s between the elevators, the stairs, and the laundry room. So, it’s pretty small. Um, I think they actually use it well, but it’s not ideal. So, you know, I would have started with full rights and privileges. I would have started with full input into design. And, I would have had a building that I could’ve spent the summer, you know, preparing for what was going to happen. Um, I would definitely have emphasized more on the foreign-language equalizing part. I would have divided my class and to smaller groups, so that I could’ve learned names faster. Um, so that something Scot does, that I thought I didn’t need to do because I normally teaches class with 150. And, I realized, if you living with them it’s different.

Jack

Right.

Diane

Um, so, that would have been good. Um, I probably would’ve had a calendar with some traditions on it already, like, premade traditions. So, it would have felt like they were stepping is something already made and adding to it, as opposed to we’re just inventing from whole cloth. Um, that would’ve been useful. So, for example, we’re doing movie nights, like I said, in Spanish, uh, but, if we knew that we were doing to those every month, and it was is already assumed, that would’ve been good. Um, office hours.
Jack

Right, are you able to do to movie nights a month?

Diane

Yeah, I think it makes sense, you know, snacks a movie nights. Or, alternate movie nights a study nights. Or, you know, something like that.

Jack

The six person dinner.

Diane

The six person dinner, which I, you know, didn’t have to begin with to do this fall. Um, I took the week off from the Dean’s office to regroup, and now I’m thinking maybe, I can start imagining doing that. But, uh, it’s taken a couple of days of watching TV to feel like that. So, nothing like Hawaii 5-0 to reset you.

Jack

The new Hawaii 5-0 or the old one?

Diane
The old one, of course.

Jack

The old one? My dad got into the new one, so...

Diane

Oh, terrible: “Book ‘em Dano.” No, it’s got to be the old one. So, I think I would not, anybody tells me I can’t do something, I will immediately react against. And, a number of people told me that I couldn’t be Associate Dean and direct this RAP. And, they were right. But, I refused to admit that. Um, so –

Jack

Except for, on tape.

Diane

Except for on tape, yes, just don’t broadcast that. It’s hard. It’s really hard. And I, uh, feel like, uh, I’m not doing either job as well as I could be. So, if-if I had, you know, and I fantasize having the time that Scot has with his RAP. If I had that time, I’m not sure that I would use it as efficiently as I’m using it now, you know, to get the impact that I’m getting. But, it would’ve been easier the beginning.
So, just assuming that the faculty in residence is going to be really hands-on, is going to be doing nothing else all fall, would have been wise. Um, it’s been harder to build the relationships, I haven’t felt like I’ve learned it yet in ways that, I think, Scot has over time earned it. On the other hand, he started, as I remind myself, by not living in. He was in Hallet, and she was living in Lyons. So, you know, for a first year, it’s not bad. Actually, for first-year it’s pretty darn good. And, I love these kids. So, we’re at the point now where, a something happens in middle of the night, they’ll text me.

And, that matters a lot. And, that I know before Housing knows, matters a lot. And, that, uh, people feel like they can tell me something and I want to turn them in, that matters a lot. So, I think they finally just figured out because we had a big meeting last week about an incident in the RAP, uh, I think they finally figured out that I don’t have an obligation to report, like the RAs do.
Um, now, admittedly, if they’re in huge trouble in engineering, eventually their appeal comes to me because I’m there Dean. So, that feels a little conflicting. But, I also know every rule in the college. So, any question may have, I’m there. It’s like: “don’t even bother with that advisor. Just don’t you try that.” So, uh, so, I think I’m more useful than I would be if I was just faculty, and I have more credibility than I would if I was just a humanities faculty member. But, I also have less time. And, that’s bad. And, the dog is not helping. Being a single mom is not helping. And, a few other things.

Well, bringing the dog out makes them all speak Spanish.

Well, and the dog has been, you know, they totally own him. It’s funny, you know, three kids from Smith were walking him on Friday. And, I got frantic text messages from six people in the RAP, including Andy, saying: “The dog has been kidnapped.”
Saying: “Who has the dog?”

Diane

Pictures! They were sending me pictures of the guys who had the dog, like: “do you know these guys? They have Inigo.” Anyways, so when I came back, I show because all the pictures that have been taken of them. And they were like: “oh my God, we were being surveilled!”

Both

*Laughter*

Diane

So, yeah, I think he’s brought people together. And, he won’t do so, I think, when he’s Molly’s size, as much. But, having a, having a mascot helps. Um, sports. We’ve got kids who are organizing sports teams, and they are just kicking ass. I’m really proud of them. Andy has kids were doing volunteer work. We have volunteer work set up all spring. They want to do it. So, uh, I think that is also another part about community. And then, the question is, how much do we pay you back with Andrews, which already has an infrastructure. And, how much does that interfere with the Andrews ability to establish a strong identity as engineering honors apart from GoldShirt, which is a problem now. So, I’m kind of hypersensitive to not saying: “me too” all the time, because I think honors needs to do something on its own, uh, to be itself. So, anyway, that’s a fine line to walk.
Jack

Yeah, well, I think it be a fine line, as well, if there were multiple RAPs and you could go between the RAPs and there’s lots of, I think there’s a lot of fine line things.

Diane

Yeah, if there’s a lot of mobility. Yeah, and we won’t always have faculty who get along so well either, you know. So, I mean, there’s some faculty in A&S were just assholes, uh, and, you know, who ranted and used expletives in emails and, you know, just crazy things. Um, so, I can imagine ending up with a couple of engineering RAPs, if we had nine or so, that aren’t playing well.

Jack

Right.

Diane

Um, so, that will be a different world, be weird... Right?

Jack

Mhmm. Um –
Diane

Does that answer your questions? Or, do you have something else?

Jack

Yeah, uh, it’s just, uh, if you have more things that you’ve learned? Um, I have a final question to ask after that, but if you had more things that you learned?

Diane

I’ve learned so much more than that, but I couldn’t possibly put it into cogent words yet.

Jack

Okay, that’s fair.

Diane

Yeah, but I-I, actually one of the things that I am trying to learn is not to feel the-the heavy guilt that I feel about not being “mom.” And, that may be a female thing, uh –

Jack
To all of the students?

Diane

Yeah. Right, right. That I’m not mom, you know, and some of them want me to be mom. And, I keep saying, you know: “you’re a grown up.” You got to be, you know, not in the sort of “tough love” way that Tanya does it, at all. But, just, you know, I have a daughter... You have a mother.

Jack

Right.

Diane

Let’s talk through how are going to improve that relationship. So, uh, I am kind of trying to work on what my role is. Um, I’m not big sister, I’m not Dean, I’m not... you know, what-what is that? That’s not something that I can articulate yet, but it’s something I’m learning.

Jack

But, that there is a-a role that you are trying to fulfill that is not easy to give a name to at this point.

Diane
Right, exactly. Um, yeah, I’m not sure what that ends up looking like yet, but I think that’s critical, uh, to me. Um, it’s going to be critical for founding new RAPs because I’m definitely not Scot. And, he has his own type of role, and it’s sort of, you know, secular minister. Really.

Jack

Yeah.

Diane

And, and I’m, that’s not what I am.

Jack

Right.

Diane

But, I’m something else. And I’m, so, trying to find what that is.

Jack

Your own Diane-ness.
Diane

Yeah, right, well, there’s other Scot-ism.

Jack

I’ve been trained! I am a disciple of the...

Diane

You have been trained, that’s right. Um, yeah, I taught, see I taught with that all spring, so I know these terms. Um, yeah, still trying to find out what my Diane-ness is in this world. And, what my director-ness is apart from my personal thing. I think, uh, the personality of the faculty who directs and lives-in is so crucial to the way the community develops.

Jack

Right.

Diane

And, I can’t replicate, nor do I intend to replicate Scot. Um, but, what is the me-ness of this? And, how what I help the next person, but their their-ness?
Jack

Right. Do you think it’s important to, you know, have identified that before starting this? Or, in terms of

Diane

I don’t think you can. I mean, I’m a pretty thoughtful person and I’ve spent the year thinking about it and I, and I’m just figuring out now because you don’t know until you here. It’s like –

Jack

Right, the practice is different from –

Diane

Well, it’s like designing a building and then figuring out how people actually use it. It’s quite different. So, you can design a program and then find out that the roles in it are quite different. And, uh, you might think, partly I am a different role with every kid who’s living here. Um, but, when I’m public I have two completely different roles: one is teacher and the other is, you know, confidant, mentor, problem-solving person.

Jack

Right.
Diane

So, uh, maintaining multiple identities, uh, is hard. And, I’m living here.

Jack

Well, they’re all potentially part of the unidentified role.

Diane

Right, yeah. Totally. And, that’s part of, that’s an example of the tons of things that I haven’t really learned yet, but I know I need to.

Jack

That’s fine, it’s the first semester.

Diane

It is, that’s right.
Jack

Um, so, uh, I’ll just continue. Or, are there any other things that you’ve learned that you’d like to enumerate.

Diane

No, I think, that’ll, that’ll do for now.

Jack

Okay. Um, so, for my last question is, uh... Oh, to ask questions. The good thing have this out, because I would’ve forgotten one of them.

Diane

I’m going to close this window.
Yeah, uh, so, second to last question, what do you believe, and I think you’ve touched on this sometimes, but just to get it out explicitly, uh: “what do you believe are the strengths and weaknesses of having a RAP versus not having a RAP at all? Or, having, as you said before, the A&S type RAP?”

Diane

Right, while. Okay. I think that, this University is alienating, quite alienating. I think engineering at the pressure of performance to that alienation. And so, it’s particularly important for kids to feel like they have a home base from which they can, a safe home base from which they can explore things. Um, against which to react, in some cases, you know, which is why the Catholic Church is so great. Because, you know, the best writers have all been lapsed Catholics. Um, I think, uh, feeling like a part of community when you’re going through things at the same time, and living with people who are a year ahead, who just gone through it is a pretty critical thing to changing the college looks. Otherwise, otherwise it is Peanuts, you know, every adult is going well: “Wah Wah Wah Wah Wah.” And there is, there’s zero impulse control. There’s no need to figure it out until it’s too late. So, I think, uh, I think for engineers in particular this is huge. I think, for the parents this is huge. Because, although, I would have been mortified had my parents ever once been allowed to exist on the college campus or, God forbid, had contact someone who it taught me. Um, these parents are quite different in the expected ongoing relationship with the, their kids and with anybody their kids are associated with. So, uh, I think it helps there. I made some promises to parents about taking care of these kids. And, I intend to keep them. Um, I think, uh, the engineering model makes more sense because it takes the RAPs very seriously. You know, it says: “you are living here and this is actually engineering plus more stuff.” As opposed to: “this is some light version of what you would get if you took something in the department.”
Diane

I mean, there’s nothing light about the calculus classes in Andrews.

Jack

Right, right.

Diane

To some extent, I mean, just as a student, I feel like the engineering isn’t up-played by the RAP, but that the RAP is the ’plus.’ And then, engineering is what irony have. Or, what I would have already had, at least.

Diane

Yeah, exactly. So, to me, that’s, instead of the A&S model, which is more “this is your access point and from there go to A&S,” uh, I think the opposite here. You know, you’re in engineering. This is, and this is the community that will help you as you go through engineering.

Jack

Right.
Diane

I think the fact that people are more serious and it’s a more challenging curriculum, is great. Um, it’s, again, it’s teaching honors students all the time. That’s what I’ve always said, uh, moving here from A&S. It’s huge, I had no idea how great students were in engineering. Um, and, I think, uh, I think is going to improve our retention. I think it’s going to improve our 4-year graduation rate. I don’t even care about the 6-year, I care about the 4-year. I think it’s going to improve the lot because people are going to know already, in their freshman year, what’s next. What do I have to be doing now. Um, what does it mean to be Andy? Um, what is it mean to be Stephen? Um, how do I get there? I didn’t have any perspective on that, as a freshman.

Jack

Right, and you didn’t have a RAP experience?

Diane

No, I was dumped into an anonymous dorm at UVA. One of, I don’t know, 100 dorms. Um, there were no adults. We had an RA, that nobody talked to because we knew she would turn us in for anything. And, there was absolutely zero mentorship going on. So, I think this matters because, uh, the faculty member is not going to be the mentor that people need, it’s going to be the sophomores and juniors and seniors that they can accost it two in the morning and say: “So, am I hosed?” You know: “How do I dig my way out of this?”
Diane

I think that that’s an important question. I think RAPs, done well, should provide – I’m a huge fan of game theory – I think RAPs, done well, should provide power ups. You know, when you fail, there’s some way to recover. There are people around who will help. I think RAPs should provide social capital. We’ve been talking a lot about that in our RAP because that’s part of our course, you know, but, uh: if everybody contributes, then everybody will be able to draw from it. And, I think they’re beginning to get that now. I mean, we had a huge crisis a week ago, I alluded to it before. Um, everyone, they’re a bunch of people who feel like they didn’t do what they needed to do and, so, they lost social capital. And, the person who precipitated the crisis lost social capital. And, they’re all trying to rebuild it right now, consciously.

Jack

Right.

Diane
So, uh, there’s no way to build social capital in engineering. You have to raise your hand and ask the question that makes you look smart, it’s not really a question. I mean, the traditional ways of building social capital and engineering, I think, are just competitive and damaging. And, especially alienating to women. So, uh, I think this is a way to change that.

C.8.12 Time: 1:21:46

Jack

Cool. Um, “so, what you expect the students to learn?”

Diane

Um, I expect them to learn how to be successful engineers. I expect them to learn that engineering is not about Boulder, but about the world. And, I expect them to learn that, uh, if you’re an engineer, you don’t give up your life. Um, you don’t give up your language. You give up traveling. You don’t give up the idea that you might have culture. I think that’s about it. Um, yeah.

Jack

Uh, and then, this is kind of a funky question that goes along with that, but, uh, can also go along with just measures of success. Um, so, “how would you measure students, or, what are you doing, or, what
you think you will do in the future – it’s the first semester – to measure whether or not students are getting the things you think they learn? Or, other things that...? “

Diane

Alright, so, community I would be measuring the number of people who want to stay or who want to join another RAP because they see value in it. Or, the number of people who choose to live together after they leave the RAP, uh, which we see tons of Andrews. Um, language I want to measure by having them take the placement exam when they arrive and having them take it at the end of their year.

Jack

That’s going to be interesting.

Diane

Because, if I can prove empirically that they have the equivalent of at least one semester, then I can give them credit for the language, uh, for having lived.

Jack

Right.
Um, that’s hugely controversial to the Spanish department, where I used to be. And, I’d just love to ram it down their throats, I really would. Um, the global thing is way harder to measure. So, I’m trying to figure out what those measures are right now. We have, you know, the strategic plans to globalization our education in the college of engineering, but we don’t have an outcomes list yet. So, I’m trying to nail that down this year. What are the outcomes? And it, and then, at the end of this year when the Idea Forge opens, we have our global telecom room. So, we can do a lot more of what I hoped to do this year, which is working with engineers abroad. Just, you know, on a basic level trying to figure out how the hell their communicating and what their communicating, uh, you know, proxy mix, which, hard enough in person, are really bad on a flatscreen. Um, and then, what is a collaboration look like. You know, how do you hand stuff off? How you trust somebody? How to the timelines work? You know, that’s the thing, you know, this guy worked on it at two in the morning, and actually here it’s, I could still work on it. It, you know, what do handoffs look like. How does a multinational channel work?

Jack

Right.

Diane

Um, so, you know, there’s a lot of stuff like that that were not set up to do this year yet, but that, next year we will be. Um, so, I could see things like that figuring an outcomes. Um, but, you know, how do you measure global mindset?
Diane

That’s a big one, you know. I think a number of people have tried to define it, but they can’t quantify it. So, we’re in the messy area of soft skills, according to ABET. But, the soft skills matter. So, uh, public speaking, presenting, uh, carrying oneself. Um, everybody who leave this RAP will have a totally cleaned up online identity, and a completely conscious choice of what persona they’re going to project from now on, publicly, for example.

Jack

Right.

Diane

I think every engineer should have that, but it’s what I teach, so, they’re all going to be really good at it. I’ve already ruined their music collections by pointing out that their MP3s suck. I’m his well ruin their sense of identity by showing them why their profiles suck too.

Both
*Laughter*

Diane

So, I mean, those-those are a few, uh, but this is really my year of defining outcomes. And then, knowing by next year, I mean, for example, what does participation in? Everybody gets a participation scholarship from the Dean’s office. How do we define that?

Jack

Mhmm.

Diane

BOLD quantifies it. I refuse to do that.

Jack

Well, it seems like people are participating.

Diane

They are, yeah.
Jack

So... Without the emphasis of there being a quantitative measure made up.

Diane

Exactly, right.

Jack

That’s one thing we start with... In Andrews.

Diane

But, how I start exemplifying that, and what participating looks like?

Jack

Right.

Diane

You know, so, you decided to be the official camera documenter of all events. So, you decided to be, uh, the person who oversees service work. So, you wanted to direct decorations of the dorms. You know, I mean, they’re so many different formats that can take.
Jack
Right.

Diane
And, you know, had even present the possibilities? Um, how’s that?

Jack
That’s awesome. Uh, I’ll probably go ahead and turn this off then because that’s all the questions.

Diane
Excellent.

Jack
Thank you.

Diane
Yeah.
Jack

Cool.

Diane

Good to see you.

Jack

Yeah, good to see you. And, it’s off.
D. COURSERA WEBSITE DETAILED

D.1 COURSERA SUGGESTIONS FOR UNIVERSITY
Coursera has recommendations for each University to follow in terms of creating and maintaining an identity on the website. What this involves, essentially, is creating a customized main page where all of the courses offered by the University will be available which also details the University itself. An example of this “University Page” is included in the figure below.

University Page

Figure D-1: Example University Coursera page. (Coursera, Inc., 2014)
Two of the biggest components for this recommendation page are the University Logo, the large square image next to the name of the University, and the banner, the large picture behind the logo and name. Coursera recommends that each University develop their own distinct branding in order to better maintain an identity (Coursera, Inc., 2014).

The next component for these branding recommendations comes in the way of Instructor Profile Pages. These pages are for each of the course instructors and are linked to from the University Page. The example Instructor Profile Page is included in the figure below.

**Instructor Profile Page**

![Instructor Profile Page](image_url)

*Figure D-2: Example Instructor Profile page. (Coursera, Inc., 2014)*
The highlighted recommendations for this page are the instructor’s photograph and course thumbnails. The instructor photograph is the circular picture next to the instructor’s name and qualifications. The courses that the instructor teaches are then displayed on the right-hand side of the page with their course thumbnails.

### COURSERA CHECKLIST/TIMELINE FOR STARTING A MOOC

Coursera provides a lot of support pages with recommendations for MOOCs. One of the more relevant pages to read when creating a MOOC is the Planning checklist page. This page includes recommendations for what instructors should be doing prior to the launch of their course and then while the course is running. The bulk of this page was captured with screenshots and is included below in a series of figures.

**Planning checklist: Building your first session site**

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**Checklist**

This page contains a time-oriented checklist of what typically goes into building out and running a class. The times listed reflect coming quality assurance measures but should be treated only as an absolute minimum, whereas more proactive work can only lead to a better result.

All of these tasks will be shared between the instructor(s), teaching staff, and university administrators / school support. The exact division varies from school to school and course to course, but will largely fall along the lines detailed in our Roles and Responsibilities document.

**At announcement of course**

Setting up your course/session in the course admin platform

- Create a course, and populate its course description page
- Create a session, and set the start date and duration
- Allow students to sign up for your course by opening up enrollment
- Grant administrative access by adding the appropriate instructor(s) / teaching staff to the session

*Figure D-3: Coursera recommended planning checklist at the announcement of the course. (Coursera, Inc., 2014)*

When a new MOOC is announced, Coursera recommends that the course’s page and description be set-up so that students can see the course and sign up for it.
Coursera has a more detailed description of what should be done in the months and weeks leading up to the launch of a MOOC. The recommendations for the first two months are shown in the figure below.

**Begin more than two months prior**

**Plan and coordinate with Course Operations**
- Draw out a basic description of the course for the Course Description Agreement (CDA)
- Sign the Course Development Agreement no more than two months before the course begins

**Record / edit / upload lecture material**
- Create lecture material, breaking it up into about 2 hours per week of lecture content, in 5-15 minute chunks. To record your videos, please read the recording articles, which provide a suggested equipment list and recording/producing instructions.
- Edit the lecture videos (each 1 hour of recording by the instructor typically translates into 2+ hours of editing work).
- Upload the videos onto the Coursera platform.
- Upload any corresponding resources such as powerpoint slides and other accompanying materials.
- Keep lecture accessibility issues and copyright guidelines in mind from the start!
- Create in-video quizzes for the video lectures (maybe 1-2 quizzes per 6-12 minute video).

*Figure D-4: Coursera recommended planning checklist two months before the course. (Coursera, Inc., 2014)*

In the two months before the launch of a new MOOC, Coursera recommends that instructors begin to record, edit, and upload their lecture material. This is where Coursera provides a recommended length for the lecture videos, 5-15 minutes, and the number of lecture hours to upload per week (Coursera, Inc., 2014). Too, this is where Coursera provides a prediction for the amount of time each hour of lecture recording takes to edit: 2+ hours (Coursera, Inc., 2014).

The last month before the launch of a new MOOC is where the next set of Coursera recommendations focuses on. The recommendations for one month prior to launch are included in the figure below.
One month prior to the launch of the course is when Coursera recommends that instructors develop the MOOC’s assessments: homework assignments and exams, as well as the MOOC surveys: a demographic survey or a motivations survey, for example. Coursera uses this space to recommend that homework and exams be machine-gradable or to consider using the Coursera peer assessment tool (Coursera, Inc., 2014). Along with these tasks, Coursera also recommends that the instructor focus on the MOOC’s course page as well, to make sure that the MOOC has a syllabus, a welcome announcement, grading policies, etc.
The next set of Coursera recommendations are for two weeks before the launch of the MOOC, and are presented in the following figure.

**Begin more than two weeks prior**

**Final checks and finishing touches**

- Send out a class-is-starting-soon email. It’s a nice gesture, and if you wait until the first day of classes to initiate contact with students, some of them will send in emails asking if the class is really going to start, etc.
- Send at least the first two weeks of lectures for subtitling (can be done from Lecture Management).
- Check that the forum structure has been created according to design.
- Check through our accessibility guidelines and make sure all assessments and videos adhere to these. Likewise, do a final pass to make sure that copyright status is all cleared.
- Take a deep breath and give yourself a pat on your back. The hard work is about to pay off!

*Figure D-6: Coursera recommended planning checklist two weeks before the course.* (Coursera, Inc., 2014)

These recommendations are detail-oriented as much of the content was already recommended to be created. Specifically, these details are a class-is-starting e-mail, the forum structure, and accessibility concerns. The next recommendations are for the launch date and while the course is running, as presented in the following figure.

**On or before the starting date**

**Launching the course**

- Coordinate a starting time between instructor, admin team and Course Operations. (tip: some courses choose to open early, either announced or unannounced. The benefit of the former is to allow students extra time to gather the necessary preparations; the benefit of the latter is that the inevitable adjustments will be seen by a smaller group).
- Go to [https://www.coursera.org/admin/](https://www.coursera.org/admin/) and click on your course. Click on the session of your course you would like to launch so that it opens in another tab. Go ahead and click the button which says “Active?”. Your session site is now open for students to explore.
- Make sure to send an email reminding students that the course is open now. Even if you sent an email a few days ago, sending a reminder email now with a link to the active session site will remind students they can get started now.
- If you haven’t already sent out a pre-course survey and demographic survey, email students with links to these surveys shortly after the course launch.

**Maintain and monitor the site while the class is running**

- After the class starts (especially the first time it is run), monitor the online discussion forum to make sure things are going okay, and help fix bugs and typos that are found. Students appreciate the teaching staff talking to them on the forums.
- Consistent announcements and emails to the students encourage participation and retention. Announcements are automatically sent as emails and are saved to the system. They may be reused for future iterations of the course.

*Figure D-7: Coursera recommended planning checklist at the launch of the course.* (Coursera, Inc., 2014)
To launch the MOOC, the instructor has to go into their administrator profile and make the MOOC active (Coursera, Inc., 2014). After the instructor does this, Coursera recommends that a reminder e-mail be sent out to the students and that regular announcements and e-mails be sent out throughout the running of the MOOC.

The final piece of the Coursera checklist is an overview of what each stakeholder in a MOOC should do to prepare for the launch of a new MOOC and while that MOOC is running, besides creating MOOC content. These stakeholders are: the instructors, the institution, the teaching staff, and the Coursera staff. These guidelines are presented in the following figure.
Preparing to go live

Instructors
- Creating a class syllabus
- Creating a class grading policy and writing it up for students

Institutional support
- Providing support for questions associated with launching a class, including navigation bar, grading policy issues
- Flipping the switch to enable the course to go live and be visible to students

Teaching staff
- Setting up class logistics, such as customizing the navigation bar, etc.
- Checking the session site for errors and inconsistencies (quality assurance)
- Previewing lecture videos and assessments before they go live

Coursera staff
- Reviewing course materials and providing feedback on site consistency and usability
- Providing additional support for any unforeseen issues

While a course is running

Instructors
- Helping to manage student interactions
- Handling issues that come up in classes, e.g., refining the grading policy if needed
- Customizing questions for an end-course survey

Institutional support
- Providing support for questions associated with running a class, including student interactions and grading policy issues

Teaching staff
- Monitoring the online Q&A forum
- Monitoring reports of plagiarism and Honor Code violations
- Handling regular announcements and emails to the students

Coursera staff
- Handling any Coursera platform-related technical issues

Anytime during the process of creating and running your course, we would love to hear suggestions for improvement for the Coursera platform.

Figure D-8: Coursera guidelines for each MOOC stakeholder prior to and during the MOOC. (Coursera, Inc., 2014)

D.3 COURSERA SUGGESTED MATERIAL FOR FIRST TWO WEEKS

Coursera provides a more detailed breakdown of what content should be provided by a MOOC. The breakdown is for the first two weeks of material for a MOOC and can be seen in the following figure.
## Planning timeline: First two weeks of material

This timeline details typical amounts of time that it takes instructors to create their first 2 weeks of Coursera class material, including lecture videos, in-video quizzes and assessments. This is a rough guide, and depending on your class these numbers may vary significantly. These numbers are also likely to be very optimistic! As a good rule of thumb, most instructors find that the actual time it takes to prepare a class well exceed their original estimations, therefore, starting to prepare your materials early is extremely helpful.

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
<th>Estimated time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruiting teaching staff and other support</td>
<td>Audio/visual support personnel may help with editing the video, and if teaching</td>
<td>Varies.</td>
</tr>
<tr>
<td>personnel</td>
<td>staff support is available, they may help with the lecture and quiz uploads once</td>
<td></td>
</tr>
<tr>
<td></td>
<td>you have created the content.</td>
<td></td>
</tr>
<tr>
<td>Recording lecture video material</td>
<td>You may have about 3-6 hours of lectures for the first 2 weeks. Especially</td>
<td>9.18 hours to record the first 2</td>
</tr>
<tr>
<td></td>
<td>at the start, recording every 10 minutes of lecture usually takes up to 20-30</td>
<td>weeks’ worth of video.</td>
</tr>
<tr>
<td></td>
<td>mins in real time, to allow for repeats.</td>
<td>Possibly significantly more</td>
</tr>
<tr>
<td></td>
<td>This doesn’t take into account the time it’ll take to split the lectures up</td>
<td>time to prepare the lectures.</td>
</tr>
<tr>
<td></td>
<td>into shorter segments, and reorganize them for your online class.</td>
<td></td>
</tr>
<tr>
<td>Editing and uploading lecture videos</td>
<td>Your teaching staff or audio/visual department typically helps with the</td>
<td>6-12 hours to edit the first 2</td>
</tr>
<tr>
<td></td>
<td>editing. Video editing time is usually in a 2:1 ratio; please budget at least</td>
<td>weeks’ videos.</td>
</tr>
<tr>
<td></td>
<td>20 mins of editing time for every 10 mins of video. This number can go up</td>
<td></td>
</tr>
<tr>
<td></td>
<td>depending on the complexity of the production process, e.g., if you are</td>
<td></td>
</tr>
<tr>
<td></td>
<td>using a green screen background.</td>
<td></td>
</tr>
<tr>
<td>Creating in-video quizzes</td>
<td>Instructors typically have 1 in-video quiz per 6-10 minutes of class, and</td>
<td>7.14 hours to create the first 2</td>
</tr>
<tr>
<td></td>
<td>each in-video quiz may take about half an hour to conceptualize and create.</td>
<td>weeks’ in-video quizzes.</td>
</tr>
<tr>
<td>Creating assessments</td>
<td>Many courses typically have 1 quiz per week, and/or a midterm and a final,</td>
<td>10.20+ hours to create standalone</td>
</tr>
<tr>
<td></td>
<td>as well as peer assessments or programming assignments if they’re applicable.</td>
<td>quizzes for the first 2 weeks.</td>
</tr>
<tr>
<td></td>
<td>If your regular course assessments are already online-format ready, you can</td>
<td>Potentially many, many more</td>
</tr>
<tr>
<td></td>
<td>have a teaching staff member help you convert them into online formats. A 10</td>
<td>hours to create peer assessments</td>
</tr>
<tr>
<td></td>
<td>question standalone quiz may take 5+ hours to create, depending on how much</td>
<td>or programming assignments.</td>
</tr>
<tr>
<td></td>
<td>material you are merely adapting or creating from scratch, and on how much</td>
<td></td>
</tr>
<tr>
<td></td>
<td>randomization you intend to employ.</td>
<td></td>
</tr>
<tr>
<td>Getting the site ready for launch</td>
<td>Beyond the items listed above, there are many more things to get ready on</td>
<td>10+ hours</td>
</tr>
<tr>
<td></td>
<td>your site. For example, you’d want to set your grading policy, write a course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>syllabus/outline, create your forum structure and navigation bar, draft a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>welcome email, and so on.</td>
<td></td>
</tr>
</tbody>
</table>

*Figure D-9: Coursera recommended content for first two weeks of a MOOC. Includes estimated time to create each piece of content. (Coursera, Inc., 2014)*

Overall, the total amount of time Coursera estimates it to take to prepare the first two weeks of material for a MOOC is 42-74+ hours. The amount of time estimate by Coursera to create a video, edit
it, and insert the concept questions is 22-44 hours, more than half the total amount of time estimated to create all of the content.
E. EXTENSIONS FOR MOOC ANALYSES

E.1 GEO-ECONOMIC BREAKDOWN BY ANNUAL HOUSEHOLD INCOME TIERS
The geoeconomic breakdown by annual household income is a very specific analysis made possible by the data available in the demographic survey. This is one example of how the vast amounts of available data can be used to learn more about the types of students who are engaging in MOOCs, how MOOCs are being used, and the overall impact of MOOCs. This breakdown stemmed from the fact that most of the MOOC students preferred not to answer the income-based statement. It turned out that the students who preferred not to answer lived in countries with a similar geoeconomic breakdown as the student who did answer the question. However, when the students who did answer the income-based question are broken up into based on their reported annual household income, there are noticeable differences in their countries’ geoeconomic distribution. The following figures are the breakdowns for low-income (<$20k), middling-income ($20-$60k), and high-income (>-$60k).

*Figure E-1: Distribution of the low-income MOOC students' countries by GNI, as classified by the 2012 UN Statistics (United Nations, 2012).*
There is clearly a trend for the MOOC students with higher-incomes to live in countries classified with a high income economy: 90% of the high-income MOOC students live in countries with high incomes. This could simply be due to the fact that the countries with higher incomes then have citizens with higher incomes.
incomes. This also indicates that the people with lower incomes in the high income countries are less prevalent.

E.2 FMCE DISTRIBUTIONS BY PHYSICS BACKGROUND TIERS

The matched pre-/post-FMCE results were broken up by the students’ previous experience with physics and the average results and gains were reported. The following figures represent the pre-/post-FMCE distributions for each of these groups where the range of the plots is specified by the college physics and beyond subset so the distributions can be compared visually.

Figure E-4: Pre-/Post-FMCE Distributions for the MOOC students with no previous physics experience. N=8
Figure E-5: Pre-/Post-FMCE Distributions for the MOOC students with previous physics experience at the high school level. N=40

Figure E-6: Pre-/Post-FMCE Distributions for the MOOC students with previous physics experience in college and beyond. N=85
There are too few students with no previous physics experience for the first distribution to be extremely meaningful. However, the fact that there are so few students is, itself, indicative of the types of students who make it through the MOOC. Overall, the distributions are very broad, but the post-FMCE distributions all shift positively overall.

**E.3 CLASS RESULTS — FULL PRE-, FULL-POST, MATCHED PRE-/POST-**

The overall results of the CLASS demonstrated that the MOOC students started with highly expert-aligned beliefs and that the MOOC had a positive impact on those beliefs. This is reflected in the fact that the full pre-CLASS scores are very similar to the matched pre-CLASS scores. These similarities can be seen in the overall break down for the CLASS. Too, the full post-CLASS is similar to the matched post-CLASS. The results, broken down into the different categories, are demonstrated by the following series of figures which show the percentage of students who agree with the expert opinion, the percentage of students who disagree with the expert opinion, and the percentage of students who are neutral for the full pre-CLASS, the full post-CLASS and the match pre-/post-CLASS responses, along with the shifts seen in the matched pre-/post-CLASS responses.

![Figure E-7: CLASS Responses for Applied Conceptual Understanding.](image-url)
Figure E-8: CLASS Responses for Conceptual Understanding.

<table>
<thead>
<tr>
<th>Conceptual Understanding</th>
<th>Full Pre</th>
<th>Full Post</th>
<th>Matched Pre</th>
<th>Matched Post</th>
<th>SHIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
</tr>
<tr>
<td>1. A significant problem in learning physics is using jargon to communicate all the information I need to know.</td>
<td>22%</td>
<td>28%</td>
<td>50%</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>2. I feel study a topic in physics and feel that I understand it. I have difficulty solving problems on the topic.</td>
<td>25%</td>
<td>22%</td>
<td>50%</td>
<td>26%</td>
<td>22%</td>
</tr>
<tr>
<td>3. Knowledge in physics consists of many disconnected topics.</td>
<td>13%</td>
<td>19%</td>
<td>58%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>4. I do not expect physics equations to help me understand the ideas they are just for doing.</td>
<td>12%</td>
<td>13%</td>
<td>58%</td>
<td>13%</td>
<td>8%</td>
</tr>
<tr>
<td>5. I start remembering a particular equation needed to solve a problem on an exam, there's nothing much I can do.</td>
<td>10%</td>
<td>20%</td>
<td>66%</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td>6. Spending a lot of time understanding where formulas come from is a waste of time.</td>
<td>4%</td>
<td>8%</td>
<td>88%</td>
<td>4%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Figure E-9: CLASS Responses for Learning Style (not a validated category).

<table>
<thead>
<tr>
<th>Learning Style Q’s (not a validated category)</th>
<th>VINAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students believe to be useful for learning</td>
<td></td>
</tr>
<tr>
<td>Q’s: 3, 11, 14, 25, 28, 30</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>Neutral</td>
</tr>
<tr>
<td>4. It is useful for me to do lots of problems when learning physics.</td>
<td>71%</td>
</tr>
<tr>
<td>5. I find that reading the text in detail is a good way for me to learn physics.</td>
<td>56%</td>
</tr>
<tr>
<td>6. I can learn physics if I like does not explain things well in class.</td>
<td>46%</td>
</tr>
<tr>
<td>7. Learning someone is capable of understanding physics, I don’t want to.</td>
<td>74%</td>
</tr>
<tr>
<td>8. I would rather discuss physics with friends and other students.</td>
<td>38%</td>
</tr>
<tr>
<td>9. Mind carefully analyzing only a few problems in detail is a good way for me to learn physics.</td>
<td>37%</td>
</tr>
</tbody>
</table>

Figure E-10: CLASS Responses for Personal Interest.

<table>
<thead>
<tr>
<th>Personal Interest: Do students feel a personal interest in connection to physics (Q’s: 3, 11, 14, 25, 28, 30)</th>
<th>Full Pre</th>
<th>Full Post</th>
<th>Matched Pre</th>
<th>Matched Post</th>
<th>SHIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
</tr>
<tr>
<td>3. I think about the physics I experience in everyday life.</td>
<td>69%</td>
<td>21%</td>
<td>11%</td>
<td>76%</td>
<td>18%</td>
</tr>
<tr>
<td>4. I am not satisfied until I understand why something works the way it does.</td>
<td>68%</td>
<td>11%</td>
<td>2%</td>
<td>85%</td>
<td>13%</td>
</tr>
<tr>
<td>5. If I study physics to learn knowledge that will be useful in my life outside of school.</td>
<td>72%</td>
<td>19%</td>
<td>9%</td>
<td>72%</td>
<td>19%</td>
</tr>
<tr>
<td>6. I enjoy solving physics problems.</td>
<td>76%</td>
<td>20%</td>
<td>5%</td>
<td>89%</td>
<td>11%</td>
</tr>
<tr>
<td>7. Learning physics changes my ideas about how the world works.</td>
<td>84%</td>
<td>13%</td>
<td>3%</td>
<td>80%</td>
<td>13%</td>
</tr>
<tr>
<td>8. Thinking about physics can be helpful to me in my everyday life.</td>
<td>89%</td>
<td>10%</td>
<td>2%</td>
<td>88%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Figure E-11: CLASS Responses for Problem Solving (Confidence).
### Figure E-12: CLASS Responses for Problem Solving (General).

<table>
<thead>
<tr>
<th>Question</th>
<th>Full Pre</th>
<th>Full Post</th>
<th>Matched Pre</th>
<th>Matched Post</th>
<th>SHIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. I do not understand physics equations to help my understanding of the course.</td>
<td>Agree 12% Neutral 13% Disagree 75%</td>
<td>Agree 13% Neutral 6% Disagree 80%</td>
<td>Agree 13% Neutral 14% Disagree 72%</td>
<td>Agree 14% Neutral 7% Disagree 80%</td>
<td>Agree 1% Neutral 6% Disagree 5%</td>
</tr>
<tr>
<td>15. If I get stuck on a physics problem on the first try, I usually try to figure out a different way that works.</td>
<td>Agree 72% Neutral 10% Disagree 18%</td>
<td>Agree 60% Neutral 12% Disagree 30%</td>
<td>Agree 82% Neutral 15% Disagree 4%</td>
<td>Agree 80% Neutral 12% Disagree 2%</td>
<td>Agree 5% Neutral 2% Disagree 2%</td>
</tr>
<tr>
<td>16. I feel overwhelmed with too much information in my physics class.</td>
<td>Agree 72% Neutral 15% Disagree 9%</td>
<td>Agree 78% Neutral 15% Disagree 7%</td>
<td>Agree 67% Neutral 20% Disagree 13%</td>
<td>Agree 73% Neutral 14% Disagree 6%</td>
<td>Agree 15% Neutral 5% Disagree 3%</td>
</tr>
<tr>
<td>17. I enjoy solving physics problems.</td>
<td>Agree 72% Neutral 20% Disagree 5%</td>
<td>Agree 65% Neutral 11% Disagree 5%</td>
<td>Agree 82% Neutral 12% Disagree 4%</td>
<td>Agree 84% Neutral 11% Disagree 4%</td>
<td>Agree 1% Neutral 5% Disagree 0%</td>
</tr>
<tr>
<td>20. In physics, mathematical formulas express meaningful relationships among measurable quantities.</td>
<td>Agree 90% Neutral 9% Disagree 2%</td>
<td>Agree 84% Neutral 5% Disagree 1%</td>
<td>Agree 92% Neutral 9% Disagree 4%</td>
<td>Agree 94% Neutral 5% Disagree 1%</td>
<td>Agree 2% Neutral 1% Disagree 0%</td>
</tr>
<tr>
<td>24. I can usually figure out a way to solve physics problems.</td>
<td>Agree 60% Neutral 34% Disagree 13%</td>
<td>Agree 68% Neutral 24% Disagree 7%</td>
<td>Agree 82% Neutral 33% Disagree 20%</td>
<td>Agree 86% Neutral 23% Disagree 20%</td>
<td>Agree 10% Neutral 3% Disagree 7%</td>
</tr>
<tr>
<td>26. When working on a physics problem, I base my final answer on intuition.</td>
<td>Agree 9% Neutral 19% Disagree 72%</td>
<td>Agree 7% Neutral 16% Disagree 78%</td>
<td>Agree 8% Neutral 11% Disagree 80%</td>
<td>Agree 8% Neutral 11% Disagree 80%</td>
<td>Agree 2% Neutral 3% Disagree 0%</td>
</tr>
<tr>
<td>35. When working on a physics problem, I base my final answer on intuition.</td>
<td>Agree 43% Neutral 25% Disagree 32%</td>
<td>Agree 40% Neutral 22% Disagree 38%</td>
<td>Agree 41% Neutral 24% Disagree 35%</td>
<td>Agree 41% Neutral 23% Disagree 36%</td>
<td>Agree 3% Neutral 4% Disagree 0%</td>
</tr>
</tbody>
</table>

### Figure E-13: CLASS Responses for Problem Solving (Sophistication).

<table>
<thead>
<tr>
<th>Question</th>
<th>Full Pre</th>
<th>Full Post</th>
<th>Matched Pre</th>
<th>Matched Post</th>
<th>SHIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. After I study a topic in physics and feel that I understand it, I usually solve problems on the topic.</td>
<td>Agree 25% Neutral 25% Disagree 49%</td>
<td>Agree 26% Neutral 22% Disagree 52%</td>
<td>Agree 22% Neutral 10% Disagree 52%</td>
<td>Agree 23% Neutral 20% Disagree 52%</td>
<td>Agree 3% Neutral 5% Disagree 0%</td>
</tr>
<tr>
<td>21. If I don’t remember a particular equation needed to solve a problem on an exam, there’s nothing much I can do.</td>
<td>Agree 16% Neutral 20% Disagree 64%</td>
<td>Agree 13% Neutral 16% Disagree 72%</td>
<td>Agree 13% Neutral 20% Disagree 65%</td>
<td>Agree 13% Neutral 15% Disagree 72%</td>
<td>Agree 3% Neutral 5% Disagree 0%</td>
</tr>
<tr>
<td>22. I want to apply a method used to solve one physics problem to another problem, the problems</td>
<td>Agree 27% Neutral 32% Disagree 41%</td>
<td>Agree 33% Neutral 21% Disagree 45%</td>
<td>Agree 25% Neutral 34% Disagree 45%</td>
<td>Agree 33% Neutral 20% Disagree 45%</td>
<td>Agree 8% Neutral 3% Disagree 0%</td>
</tr>
<tr>
<td>25. I enjoy solving physics problems.</td>
<td>Agree 72% Neutral 20% Disagree 5%</td>
<td>Agree 84% Neutral 11% Disagree 5%</td>
<td>Agree 84% Neutral 12% Disagree 5%</td>
<td>Agree 84% Neutral 11% Disagree 4%</td>
<td>Agree 1% Neutral 0% Disagree 0%</td>
</tr>
<tr>
<td>26. I can usually figure out a way to solve physics problems.</td>
<td>Agree 9% Neutral 19% Disagree 72%</td>
<td>Agree 7% Neutral 16% Disagree 78%</td>
<td>Agree 9% Neutral 11% Disagree 80%</td>
<td>Agree 7% Neutral 10% Disagree 80%</td>
<td>Agree 2% Neutral 3% Disagree 0%</td>
</tr>
<tr>
<td>35. I feel that I can usually figure out a way to solve physics problems.</td>
<td>Agree 60% Neutral 34% Disagree 13%</td>
<td>Agree 85% Neutral 24% Disagree 7%</td>
<td>Agree 85% Neutral 33% Disagree 20%</td>
<td>Agree 85% Neutral 23% Disagree 20%</td>
<td>Agree 1% Neutral 3% Disagree 0%</td>
</tr>
</tbody>
</table>

### Figure E-14: CLASS Responses for Real World Connection.

<table>
<thead>
<tr>
<th>Question</th>
<th>Full Pre</th>
<th>Full Post</th>
<th>Matched Pre</th>
<th>Matched Post</th>
<th>SHIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>28. Learning physics changes my ideas about how the world works.</td>
<td>Agree 94% Neutral 13% Disagree 5%</td>
<td>Agree 95% Neutral 14% Disagree 5%</td>
<td>Agree 95% Neutral 12% Disagree 5%</td>
<td>Agree 95% Neutral 11% Disagree 2%</td>
<td>Agree 3% Neutral 2% Disagree 0%</td>
</tr>
<tr>
<td>30. Reasoning skills used to understand physics can be helpful to me in my everyday life.</td>
<td>Agree 89% Neutral 10% Disagree 2%</td>
<td>Agree 88% Neutral 10% Disagree 2%</td>
<td>Agree 87% Neutral 12% Disagree 1%</td>
<td>Agree 90% Neutral 9% Disagree 2%</td>
<td>Agree 2% Neutral 1% Disagree 0%</td>
</tr>
<tr>
<td>35. The subject of physics is too real to relate to what I experience in the real world.</td>
<td>Agree 9% Neutral 11% Disagree 81%</td>
<td>Agree 6% Neutral 12% Disagree 82%</td>
<td>Agree 6% Neutral 12% Disagree 82%</td>
<td>Agree 9% Neutral 11% Disagree 82%</td>
<td>Agree 3% Neutral 2% Disagree 2%</td>
</tr>
<tr>
<td>37. To understand physics, I sometimes think about my personal experiences and relate them to the topic being studied.</td>
<td>Agree 62% Neutral 24% Disagree 13%</td>
<td>Agree 75% Neutral 21% Disagree 8%</td>
<td>Agree 68% Neutral 22% Disagree 7%</td>
<td>Agree 73% Neutral 21% Disagree 6%</td>
<td>Agree 3% Neutral 2% Disagree 0%</td>
</tr>
</tbody>
</table>
The CLASS results of the Certificate Earners are very similar to, if not better than, the overall CLASS results. The specific details for each of the CLASS questions are included for the Certificate Earners in the table below to demonstrate the overall pre-CLASS, post-CLASS and shifts.
Table E-1: CLASS Results for the MOOC Certificate Earners.

<table>
<thead>
<tr>
<th>#</th>
<th>Matched Pre</th>
<th>Matched Post</th>
<th>SHIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
</tr>
<tr>
<td>1</td>
<td>18%</td>
<td>26%</td>
<td>56%</td>
</tr>
<tr>
<td>2</td>
<td>73%</td>
<td>18%</td>
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The 7 shifts towards expert-like beliefs and the 2 shifts towards novice-like beliefs are demonstrated in the above table.

E.5 CLASS RESULTS/Demographics — Non-Certificate Earners
The 20 matched pre-/post-CLASS responses which did not belong to students who were Certificate Earners are presented in the following table, similar to the table found in Section E.4.

Table E-2: CLASS Results for the MOOC Non-Certificate Earners.

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There are a lot more shifts reported for these non-Certificate Earners than for the rest of the CLASS results: 9 expert-like shifts and 14 novice-like shifts. Overall, there is a trend for these twenty towards the novice-like opinions, as contrasted by the Certificate Earners. And so, not only did these students not succeed in the MOOC, but the MOOC negatively affected their attitudes and beliefs.

Interestingly, 18 of these 20 MOOC students filled out the demographics survey. So, a brief look at these students’ demographics is the first step towards understanding why these students were negatively affected and why they did not earn a MOOC Certificate.
These 18 students were 33% female and the most prominent age ranges were 18-24 and 45-54, which are both younger and older than the average age-range of the Certificate Earners.

The geographic distribution of these 18 students is still similar to both the overall MOOC population and the Certificate Earners. Most prominently, these 18 are from the United States, followed closely by India. The other countries represented are Canada, Spain, Australia, Italy, Japan, Croatia, and Kuwait. The distribution is demonstrated in the following figure.
Figure E-19: Distribution of Matched CLASS Non-Certificate Earning MOOC students’ geographic presence by specific country

These students’ general education level and previous experience with physics is also similar to both the MOOC population as a whole and the Certificate Earners, as demonstrated by the following two figures.
Figure E-20: Distribution of education level of the Matched CLASS Non-Certificate Earning MOOC students

Figure E-21: Distribution of previous physics experience of the Matched CLASS Non-Certificate Earning MOOC students
The last piece of information that will be delved into for this subgroup, at this time, is the students’ engagement in the MOOC content. The students’ participation in lectures, homework assignments, exams, and on the surveys is presented in the following figure.

![MOOC Engagement Chart](image)

*Figure E-22: Matched CLASS Non-Certificate Earning MOOC students’ engagement in the content of the MOOC.*

The students did not all participate in the exams. Also, the students relative engagement in the homework assignments steadily declined with all 18 completing the first assignment and only 6 (33%) completing the last. These students all engaged in the lecture videos throughout the whole MOOC. These behavior are different from the Certificate Earners who engaged in all of the assignments and exams, but steadily disengaged in the lecture videos.

This is a curious data point, and one that deserves more investigation. Further analysis, however, will not be performed in this thesis. Rather, this is to demonstrate the potential for more research made possible by the MOOC’s data sources.
F. EXTENSIONS FOR RESIDENTIAL COMMUNITY ANALYSES

F.1 EHON 1151: CRITICAL ENCOUNTERS
Critical Encounters is the main course of the AHRC (Douglass, October 13, 2013). Prof. Douglass teaches the course in the fall semester to all of the new first-year AHRC students. This is one of the methods by which Prof. Douglass introduces the students of the AHRC to its ideals of Community, Opportunity, Excellence, and Hagian Skubalon. This is also where students are introduced to the ideas of being ambitious without being competitive and engaging one another in critical and meaningful ways (Douglass, 2014). As such, this course is one of the main methods used to enculturate students into the AHRC community.

The course consists of a series of texts – philosophical excerpts, foreign films, classic literature, and even children’s stories – for the students to consider and discuss in recitation sections led by older AHRC community members. These recitation sections are one method for encouraging vertical integration (Douglass, 2014). As Prof. Douglass describes, of the 227 AHRC students, 90 are first-years taking Critical Encounters, and then another 30 are older AHRC students who have already taken the course (Douglass, October 13, 2013). And so, there are 120 students (<50%) thinking about the texts and central themes of the community every fall semester.

F.2 HUEN 2843: THE MEANING OF IT
The Meaning of IT is the main course of the GE RAP (Sieber, October 24, 2013). Dean Sieber teaches the course in the fall semester to all of the RAP students in one class. This is one of methods by which Dean Seiber introduces the students of the RAP to the global mindset and even transitioned into teaching the course fully in Spanish (Seiber, October 24, 2013). This course serves, in the same way that Critical Encounters does, to enculturate the students to the ideas and focal themes of the residential community.
The course introduces students to the methods for thinking about how technology has changed social dynamics and how technology can be used in international projects. On the GE RAP homepage are details of the specific topics brought up in the course including: how technology mediates and affects person-to-person communications, who people become in online games, virtual worlds, and global collaborative networks, basic experience with global collaboration tools, and experience cleaning up online profiles to develop a public professional identity (Sieber, 2014).

F.3 ENGINEERING HONORS PROGRAM AHRC SUBGROUP STATISTICS
A significant portion of the AHRC students are a part of the Engineering Honors Program (EHP); on average 52% of the AHRC is EHP (Douglass, 2014). The AHRC began with EHP and so this subgroup is discussed in much higher detail in the Internal Review. The statistics for EHP retention in the College of Engineering and Applied Sciences (CEAS), graduation rates, and GPA are presented. While these data are limited to the behavior of EHP students, the results can be attributed, at least in part, to the AHRC community as a whole.

The chart below demonstrates the retention of EHP students in CEAS and at CU in general:
These numbers show an overall retention rate of 95% for EHP students to stay with CU and an 89% rate for staying with CEAS (Douglass, 2014). The retention of these students includes both currently enrolled students and graduated students. The graduation rate for students in the first four years of EHP are presented in the table below:

Table F-2: EHP Graduation Numbers and Rate in CEAS and at CU. Data provided by the AHRC. (Douglass, 2014)

Graduation Numbers (note different time frames—6, 5 and 4 years)

<table>
<thead>
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<th>Entering Class</th>
<th>Started</th>
<th>Graduated CEAS</th>
<th>Current CEAS</th>
<th>% CEAS Graduated</th>
<th>Graduated BS/MS, MS</th>
<th>Current BS/MS, MS</th>
<th>Graduated A&amp;S</th>
<th>Overall CU Graduation</th>
<th>Time Period in View</th>
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<td>0</td>
<td>92%</td>
<td>8</td>
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<td>91%</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>93%</td>
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<tr>
<td>FALL 2008</td>
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<td>44</td>
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<td>70%</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>75%</td>
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<td>59%</td>
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</table>
Where the first two years use 6-year graduation rates and show 90%+ graduation rates in CEAS, with even higher rates for graduating from CU in general (Douglass, 2014). The third and fourth years show lower rates, but also have a shorter time-lapse to analyze.

The previous charts show high retention and graduation rates. In part, this could be due to the students being high-achieving honors engineering students. To better understand how these numbers would change if the students were not a part of EHP (and so not a part of AHRC), there would need to be a similar analysis performed on an equivalent subgroup of non-EHP CU students. To select an equivalent subgroup, the Internal Review used the CU Admissions Office’s Projected GPA (PGPA) which uses a range of information from each prospective student’s application to predict how well that student will perform at CU (Douglass, 2014). This PGPA number was used to find a subgroup of non-EHP CU students who could be considered statistically equivalent to the EHP CU students based on the students’ high school performance. The study also matched the non-EHP students to have the same class size for each year and so includes students from 2006 to 2013. There were 418 EHP students compared to 418 non-EHP students.

This study found that – between these two groups who entered CU with the same PGPA and in the same years – there was large discrepancy in the final GPA for each group after over 50,000+ credit hours. The EHP group had a final GPA of 3.51 while the non-EHP group had a final GPA of 2.95 (Douglass, 2014). The study also compared the rates at which these students entered into the CEAS graduate schools. To account for the requirements of the CEAS graduate school (that each student has 4 years of school), only 199 of the 418 students could be used as these are the students from the entering classes of 2006-2009. This comparison found that 23% of EHP students entered the graduate school and 2% of the non-EHP students entered the graduate school (Douglass, 2014). The last comparison this study ran was on the 6-year graduation rate from CU for these two groups. Again, due to constraints of this comparison, only
70 of the 418 students could be compared as these are the ones from the entering classes of 2006 and 2007. This final comparison found that 95% of the EHP students graduated over a 6-year period while 65% of the non-EHP students graduated over a 6-year period (Douglass, 2014). These numbers again in table-form:

Table F-3: EHP Students compared with statistically equivalent entering non-EHP Students in GPA, 6 year graduation rate, and presence in CEAS graduate school programs. Data provided by the AHRC. (Douglass, 2014)

<table>
<thead>
<tr>
<th>Category</th>
<th>EHP</th>
<th>non-EHP</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>3.51</td>
<td>2.95</td>
</tr>
<tr>
<td>6 yr Graduation Rate</td>
<td>91%</td>
<td>65%</td>
</tr>
<tr>
<td>Graduate School CEAS</td>
<td>23%</td>
<td>2%</td>
</tr>
</tbody>
</table>

The major difference between these two groups after entering CU was participation in EHP, and subsequently in the AHRC.