Insights from Focus Groups: A Qualitative Assessment of Students' Perceptions of Their Communications Skills

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Introduction

At Louisiana State University a gift from an alumnus made possible the establishment of a university-wide program to improve undergraduate students' communication skills. As we initially described in a 2006 paper, the Communication across the Curriculum (CxC) program was established in 2004 with an initial emphasis on engineering students.[1] A key element of the CxC program was the inception of Communication-Intensive (C-I) courses. C-I courses are intended to be integrated into existing discipline-specific courses, with additional requirements for emphasis on two of the four modes of communication: written, spoken, visual, and technological. In a 2007 survey designed to solicit student perceptions of the value of C-I courses in the engineering curricula, our students overwhelmingly agreed that the assignments contributed to their communication skills, and that these skills were important to their future careers in engineering.[2] Faculty assessment of C-I courses in 2008 showed that the workload increased somewhat for both faculty and students in C-I courses; however, faculty also acknowledged that students' knowledge of traditional course content was enhanced.[3]

Other components of the CxC program were further described in a 2013 paper.[4] Some key elements were as follows:

- Establishing communication studios in the various colleges to support students and faculty with communication assignments.

- Developing a "Distinguished Communicator" certification program to honor exceptional students at graduation and to annotate the award on their permanent transcripts.

- Conducting a three-day "Summer Institute" to inform faculty of ways to integrate communication instruction into technical curricula. Participants learn to use innovative teaching tools and to design discipline-specific assignments and rubrics for each of four CxC communication modes.

During the continuing development of the CxC program, assessment has been vital to validate its academic value and to demonstrate its importance in the professional development of engineering graduates. This latter outcome is particularly meaningful, not only to our students but also to budget-conscious public funding agencies. It was with the goal of improving the CxC program for students as well as to the satisfaction of all stakeholders, that we have explored using focus groups, a qualitative assessment method, somewhat atypical in the engineering community. At this stage in CxC's development we opted for focus groups because we believed that a more in-depth and open-ended approach to assessment lends itself to expanding our comprehensive reflection of the program to-date. More to the point, we were curious about the unique experiences of our students and wanted to know how they compared to previous assessments we'd performed about CxC.

Key Findings of Previous Assessments

From the beginning of the CxC program in the College of Engineering, faculty and CxC staff have sought feedback on how to effectively implement communications into traditional engineering courses. A 2006 paper entitled "Integrating Communication-Intensive Classes and Communication Studios into the College of Engineering" detailed the establishment of several sources of feedback, including an Engineering Industry Advisory Council, who reinforced the clear need for improved communication skills among engineering undergraduates; a University Advisory Council, who helped guide the implementation of the campus-wide program; and invited experts and local faculty, who came to present and exchange ideas at CxC's first Summer Faculty Institute.

Our 2007 paper, "Assessing the Integration of Communication into Engineering Curricula," examined feedback we received in our inaugural semesters. Our Engineering Industry Advisory Council was enthusiastic about our ideas for bringing communication lessons into the traditional engineering curricula; however, Council members were concerned that students did not realize the importance of communication in engineering. Council members and students participated in a panel discussion about the skills a novice engineer would need to be successful.

We also presented results from a questionnaire assessing the students' opinions regarding the value of C-I courses. Of those completing the C-I course evaluation form, 60% indicated that the course was highly effective in improving their communication skills. Additionally, 68% indicated that they would seek more C-I courses to improve their communication skills. We also noted that a disproportionately high percentage of the total number of students participating in the Distinguished Communicator program were engineering students, indicating their awareness of the necessity of strong communication skills for successful engineering careers.
Based on feedback from councils, faculty, and student surveys, we continued to fine tune the CxC program. Because our program was new, wide-spread buy-in from faculty and students was critical in order to create a culture which valued the teaching and learning of communication skills. Our 2008 paper, "Implementing Informal Writing Assignments and a Written Feedback and Revision Loop to Enhance Learning in Engineering Courses," detailed the generally positive attitude about improving communication skills among students in C-I courses. Results from C-I course completion questionnaires showed that we still had some room to improve our students' perception of the value of the communication assignments they completed (see Figure 1). However, results also indicated that students realized that improving their communication skills was essential for careers in engineering (see Figure 2).

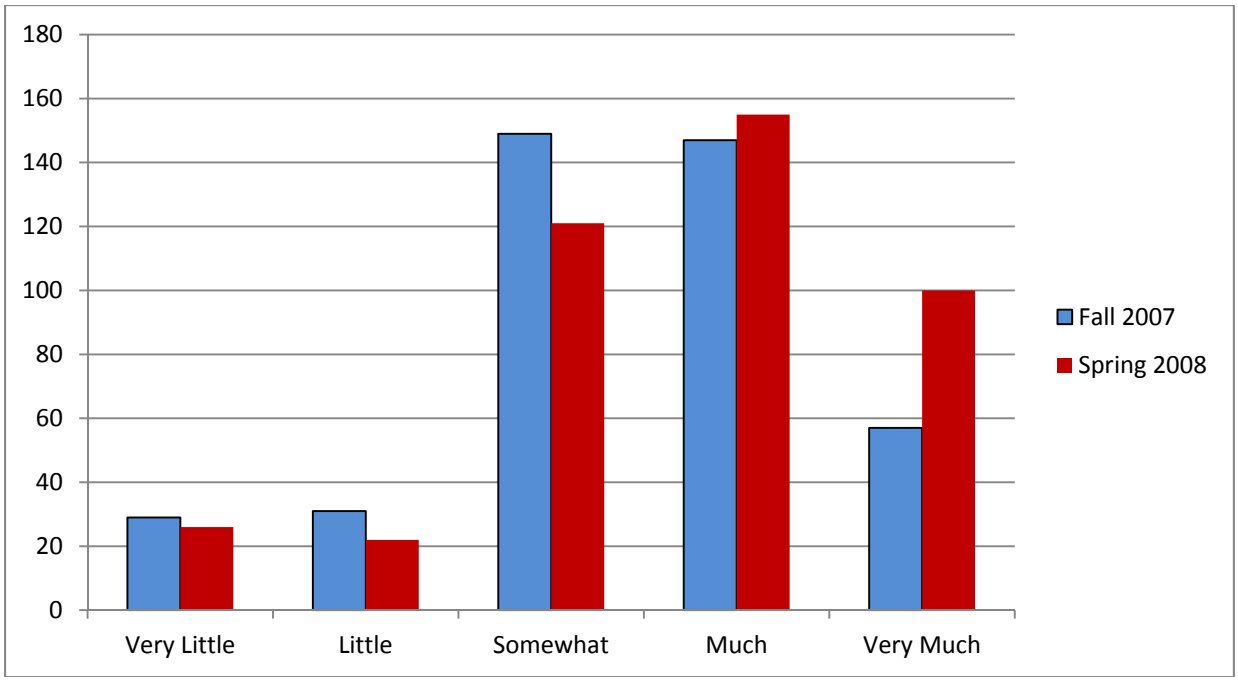

Figure 1: Student responses to question, "How much did the communication assignments in this course help you to improve your communication skills?"

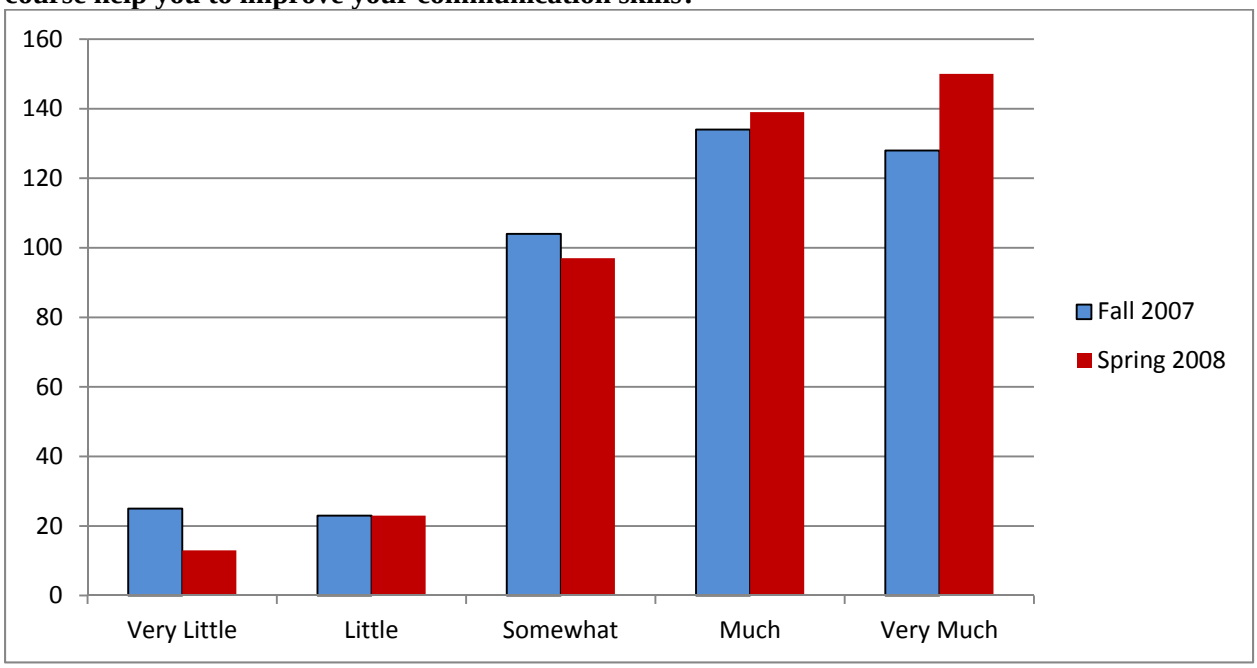

Figure 2: Student responses to question, "How likely are you to use what you learned about communication in this course as you work on future communication projects?"

Because the CxC program replaced the more traditional technical writing courses at our university, our 2009 paper, "An Innovative Model for Teaching Communications Skills in the Engineering Curriculum," examined the return on the university's investment in the communication program. This paper reported that the integration of communication assignments into traditional engineering courses had more than compensated for the loss of technical writing courses. Both faculty and students overwhelmingly agreed that by taking C-I courses

undergraduates improved their communication skills, partially because of the program's expansion from technical writing to include the additional modes of spoken, visual, and technological communication**.** However, even more encouraging results of this assessment indicate that faculty agreed that including communication assignments did not require sacrificing traditional course content; in fact, most faculty reported that students learned course content in more depth because of the communication assignments. While C-I course faculty indicated that changing their course objectives and lesson plans to include more work on communication skills had initially increased time spent on course preparation, they also indicated that because of the dual benefits of improved communication skills and improved understanding of engineering concepts, the extra work was worth the effort.

At this time, the culture of the College of Engineering was beginning to value and embrace these programmatic changes. The program grew because of successful efforts at faculty buy-in, as well as positive assessments of the program by students. The program was built from faculty's grass-roots perceptions of student needs rather than from a top-down administrative decree. Students and faculty alike used the communication studio as an effective support system for these programmatic changes. The CxC program addressed a wider range of communication modes, increased understanding of traditional engineering concepts, established an effective support system for students and faculty, and did it all for a cost comparable to that of the technical writing courses that it had replaced. Additionally, the administration projected that this curricular model better met ABET communication outcomes than the more traditional approach of technical writing courses.

Our assessments historically relied upon surveys and questionnaires developed by the CxC staff; however, we were always aware that these quantitative tools were limited by the effectiveness of the design itself. Graduating students with some professional experience via internships or cooperative education hinted to potential shortcomings during informal discussions. We recognized that these students, now completing their capstone courses, could provide valuable perceptions of their communication skills developed during their academic program. We also realized that designing a quantitative tool to extract such information would be a challenge. It was with this goal in mind that we investigated focus groups, a qualitative assessment methodology.

Focus Groups as an Assessment Tool

Appearing in social sciences research early in the 20th century, focus groups were used during World War II to gather reactions to propaganda and to training films; after the war, they became a widely popular tool for product development and marketing research.[5] Toward the end of the century, administrators and faculty in higher education applied various kinds of quantitative, qualitative, and mixed methodologies to assess and improve instruction, including focus groups which offered a means to explore or confirm a topic through direct contact with participants. Although MacNealy, writing in 1999, could identify no published studies of writing researchers using focus groups in composition, she predicted their popularity in the next century because of their value in helping researchers to “develop a clearer understanding of people’s perceptions, motives, attitudes, and feelings.”[6] She was right. Recent assessments of engineering programs using focus groups include efforts to understand how undergraduate students interact with

professors, what teaching methods are most frequently used in the classroom and how students perceive course evaluations[7]; interpersonal skills related to team development in computer engineering courses[8]; and, in the research described here, how students self-assess their communication skills in academic and professional settings and the role of the university's CxC program in developing those skills.

Focus groups can give feedback into how people, in this instance students, think about a topic or phenomena under investigation. Surveys—with either open-ended or closed-ended prompts—provide responses only to those questions the researcher considers relevant to ask. Interviews, usually conducted one-on-one, are time consuming and the data difficult to aggregate. Focus groups, on the other hand, combine the best features of surveys and interviews, using focused questions with open-ended responses in a group interview setting. The results can provide a deeper, broader understanding of the topic at hand primarily because the respondents can interact with one another, agreeing or disagreeing with other respondents, elaborating on answers with concrete examples, making connections to other learning experiences, and sometimes even interpreting a question in a way unforeseen by the focus group moderator. Furthermore, the moderator is also able to pick up on non-verbal cues—laughter, nods, sympathetic groans, for example--and to ask participants to clarify or elaborate on vague responses.

Focus group methodology uses a scripted interviewing process to engage a small number (~7-10) of targeted participants whose opinions the researcher values in a discussion for a specific purpose. Typically, a series of three or more focus groups are conducted with different participants drawn from the larger targeted group, using the same protocol to guide discussion until the researcher is satisfied that all the different views on the topic have been expressed. Consensus is not the goal; rather a focus "group possesses the capacity to become more than the sum of its parts, to exhibit a synergy that individuals alone don't possess".[9] It is particularly useful in situations where opinions and attitude are shaped by various factors and result in different complex behaviors and motivations.

Focus group methods are fairly standard. Combining advice from three popular guides (Stewart, et al; Krueger and Casey; and MacNealy) generates the following procedures:

> *Identify the problem(s) to be addressed and the purposes of the study*. As noted earlier, focus groups are most useful for exploring or confirming a topic. Because of the small sample size, they do not provide statistical projections or lend themselves to causal analysis. Therefore the problems and purposes identified and the questions asked should be open-ended and directed toward understanding participants' behaviors, motivations, attitudes, and opinions.
>
> *Generate and order a limited set of question to guide the discussion*. The success of a focus group depends highly on the quality of the questions asked. Krueger and Casey identify five categories of questions with different purposes: *opening questions* to introduce participants to one another and reveal their common interests; *introductory questions* to establish the topic in general and participants' past experiences related to it; *transition questions* to move on to the key questions and the broader view of the topic; *key questions* to get to the heart of the study; and *ending questions* (1) to invite participants to state a final position or (2) upon hearing the moderator's summary of the main insights from the discussion, to ask participants

to agree or add information or (3) to encourage participants to contribute ideas related to the purpose of the study that have not yet been stated.[10]

Define and recruit the target audience; assign to a specific group session. Focus groups work best when participants share characteristics related to the topic under investigation. Often an incentive (money or food, for example) is offered to solicit participation.

Chose a moderator and decide the method of recording responses. A moderator should possess skills in interviewing and leadership and understand the goals of the focus group project. To avoid seeming biased, the moderator should not be someone whom the target audience identifies with the topic under study. Ideally a moderator should have experience conducting focus groups and know how to "balance the requirements of sensitivity and empathy, on one hand, and objectivity and detachment on the other."[11]

Conduct a pilot session to test the questions, location, timing, and other logistics. Conducting a pilot focus group is not a requirement, but doing so can save time and avoid problems in the long run. A pilot session allows the moderator to test the interview guide estimate the time needed for discussion. The logistics of place, time of day, room arrangement, and recording equipment can also be checked. If a pilot session is not conducted, the moderator will want to reflect on the processes after the first focus group to make necessary adjustments.

Conduct a series of focus groups. Plan on conducting a series of focus groups until similar responses, trends, and overall patterns to the questions emerge.

Transcribe and analyze the results. Although it is possible to work from the moderator's or an observer's notes of participants' responses to the questions, a written transcript allows for more accurate content analyses. The overall purpose for conducting the focus group and the use that is to be made of findings will determine the kinds of analyses used to derive meaning from the discussions. Both quantitative and qualitative data can be gathered from a transcript, although findings tend to be reported in qualitative ways, coding for overall impressions, categories of comments (either arising from a single question or across questions), and sometimes even single words or phrases. Often several readers (researchers, moderators, colleagues, and sometimes even the participants themselves) will review the transcripts and interpretations to ensure validity and reliability of the findings.[12]

Publish the findings with stakeholders.

Use the insights gained through the focus group to help solve the identified problem(s) and enact changes as indicated.

Current Assessment

We wanted to gather information regarding students' experiences communicating in internships, capstone courses, and Communication-Intensive courses in general. We also hoped to hear from students about specific examples of successes and failures to communicate in academic and professional settings and to learn their perceptions of what is working or missing in the CxC

program. The questions asked during the CxC focus group (Appendix A: Interview Guide) follow the general categories described earlier as identified by Krueger and Casey.

In the CxC study we targeted senior engineering students enrolled in spring semester engineering capstone courses and then through email invitations sent from the Office of the Dean of Engineering (Appendix B: Invitation to Participate), we recruited students selected at random until three focus group sessions with 6-10 students (24 total) were filled on different dates during a two-week time span. Although students came from various engineering departments, they had all been part of the CxC program and most had completed internships in their fields. These common experiences made them well suited for our study.

A graduate student in Geography and Anthropology skilled in qualitative methodologies including interviewing and focus groups served as moderator. Although she was also a part-time member of the CxC staff, she did not work directly with engineering undergraduates and thus was unknown to focus group participants so as not to bias their responses. The director of CxC, who was also unknown to the students, served as co-moderator and observer, asking follow-up questions and seeking clarifications as warranted. Mostly she took notes so that she could serve as a co-analyst of the transcripts and check the validity of the coding.

We conducted one pilot study in March 2015 to refine the interview guide (see Appendix A) and three focus groups during April 2015, after students had finished their senior projects. Participants in the pilot study shared majors and interests with those selected for the study, with one exception: pilot study participants were in their third year or first semester of their fourth year of the engineering program and as such hadn't experienced the same milestones as those students participating in the study (fourth and fifth year engineering students). Pilot study participants, for example, had yet to undertake their senior design projects, which we anticipated would comprise much of the discussion for the actual study since our study participants were in the process of completing their capstone courses. Additionally, only a few students in the pilot study had experienced in-depth internships in their fields. Participants in the study, by comparison, had completed their senior projects for their capstone courses and where preparing to graduate. Furthermore, all had undergone experiential learning in their chosen professions, either during internships or their capstone courses, which by design engage industry professionals for feedback.

Nevertheless, the pilot study served as a trial run for our protocol and questions and to gauge if the hour allotted for the discussion would be adequate. The moderators provided introductions and ran through the draft question set with the pilot study participants and later adjusted question order and language in response to clarifying comments or moments from the pilot study. All questions from the pilot study appeared in the final focus group protocol, with a few exceptions: two questions that proved redundant during the pilot were combined and one multiple-part draft question revised into separate questions to allow participants to respond in more detail. The information gathered from the pilot study, while representative of the focus group responses, is not included in the official data or analysis discussed herein.

During both the pilot and the active focus groups all participants attended sessions in the same conference room inside the Engineering Complex, a familiar, conveniently located space in which participants felt comfortable. The conference room had external windows and opaque

interior walls and was tucked away from high-volume traffic areas, providing privacy throughout the duration of the sessions. Participants sat in a semicircle facing the moderator, and an audio recorder was placed in the center so as to capture all voices. (We opted not to video the session and assured students that their comments would remain anonymous.)

All active focus group students were advised of their rights as participants and signed an acknowledgement (Appendix C: Consent Form) that they understood the risks (minimal) and benefits of the study, in this case a $50 check mailed upon completion of the focus group and a chance to help improve the CxC program. The moderator confirmed each participant's address. She then reviewed the focus group process and stressed that all students' responses were valuable even if they disagreed with other participants. Because they had been chosen at random, it was possible that other peers in the engineering program shared their views even if fellow focus group participants voiced different ideas. She advised participants of the purpose of the study, reading through the introduction provided in the interview guide (Appendix A: Interview Guide). Participants were asked to verbally provide their name and major and to briefly describe their senior design projects as an introduction to each other and the study. Many participants in the group knew each other; all were reminded of confidentiality agreements within the study.

Following introductions, we conducted the study according to the question sequence laid out in the interview guide but allowed for (indeed, encouraged) organic discussion of each question rather than a sequential participant-response method (structured turn-taking.) We determined that in order to provide organic interaction and allow for in-depth discussion about topics and ideas it was more effective to offer students the opportunity to first self-select to answer a question at any time and/or respond to another student's perspective about a question. During each session we noted the frequency and length of participant responses and provided prompts at certain points for one participant to wait a moment while another was speaking or to specifically invite a quiet participant to add anything. For each of the three focus group sessions we completed the scripted introductory material and the interview guide within sixty minutes. Because of the organic nature and unique dynamics of each focus group session we adjusted question order as participants transitioned conversation into topics related to various questions. While this occasionally led to challenges in the transcription process due to the non-sequential nature of participant interactions, the overall effect was that of deeper discussion and group analysis of their experiences. In general, the discussion was amiable and lively, and the participants seemed to enjoy the chance to offer their opinions.

Analysis of Results: Effectiveness of the Session, Trends and Unexpected Outcomes

As previously noted, the emphasis on conversational engagement between the moderators and the participants sometimes led to asking and answering questions outside the order provided in the interview guide. Occasionally we also had to cut off participants from veering too far off topic, such as when students commiserated about a specific project or expressed appreciation for a specific professor, but participants were able to quickly and seamlessly return to the specific questions we outlined during the sessions. Overall, we consider this to be an effective model for gathering qualitative data for our programming. Each session, while consisting of different tones and personalities, offered specific examples and anecdotes related to the questions we asked. By our third focus group session, many responses were redundant from those in the first two

sessions, indicating that the 24 participants were identifying trends and perspectives representative of the broader CxC engineering student population. What follows is an extrapolation of some major themes and notes that emerged for moderators as a result of the three focus groups with fourth- and fifth-year engineering majors across sub-disciplines.

We identified themes according to a simple frequency assessment and coding. In addition to serving as moderator for the focus groups, the same researcher also transcribed the sessions and as such was able to use handwritten notes collected during the interview to set a baseline for themes to identify based on frequency of occurrence during sessions. During the process of transcribing, the researcher/moderator coded names of respondents as only male or female in accordance with confidentiality agreements outlined in the consent form (Appendix C) and to further distance participants from any potential identification. Once the initial transcription of conversation was completed, she then re-read the transcripts, color-coding moments in conversation where common thoughts and themes emerged. After this, she cross-referenced the transcribed themes with her written notes taken during the focus groups. After another review of transcripts to identify majors themes, she indexed each transcript so co-researchers could easily access quotes and themes. Co-researchers then read the transcripts and the initial analysis of themes, discussed revisions and additions, and made those changes supported by consensus.

Before summarizing our findings we want to suggest the possibility of broader significance of our study for engineering education in general: Though the themes that arose through the focus groups are specific to CxC activities and the College of Engineering, the overall trends and subsequent approaches to mitigating these challenges may well be applicable across higher education settings and disciplines. We suspect that the challenges in interpersonal communication discussed below are not unique to our students nor are the disconnects between communication education principles and communication education practices unique to our program.

Understanding Communication Protocols in the Workplace: Across all three focus groups, participants discussed challenges related to interpersonal communication. Frequently students identified such difficulties in their internships and suggested that instruction related to interpersonal development become part of CxC's instructional goals. Interpersonal issues ranged from confusion about how to set up and when to talk during a phone call/teleconference, to format and language style for emails, to when (or whether) to communicate via text message with their supervisors while on the job. Many students, particularly in the first focus group, cited age differences as a major source for such confusion. Students often suggested building deliberate training related to email and phone etiquette into the CxC program. Although some students were aware of an email etiquette workshop offered annually by CxC, most participants agreed that a more rigorous, systematic training either in the classroom or through CxC would be beneficial.

Learning and Translating Internship/Professional Culture and Lingo: Similarly, several students identified challenges related to learning and applying behaviors and language specific to their internship and/or professional placements. These challenges included some anticipated aspects of entry-level experiences, such as being advised on which specific deliverables matter most to individual companies and being "initiated" by veteran employees from different backgrounds.

From the CxC perspective, one particular note of interest that emerged was the emphasis on learning new language, including acronyms and initialisms, and translating engineering language for the non-engineer. A few students articulated that the internship experience challenged them to adjust their language according to their audiences, which often included supervisors, clients, co-workers and sponsors who did not hold engineering degrees. One student shared that his internship on a drilling platform gave him the opportunity to work with several veteran drillers who lacked formal academic training but had much more practical experience. This situation in turn forced him to learn new terms for concepts and equipment while also adapting his own technical language to better convey his messages to his peers. Several other students discussed the process of translating engineering concepts for specific audiences by adapting their presentations to cover main ideas as opposed to process specifics or translating process specifics in such a way that a client can see what is and is not possible. Some students indicated a preference for using visuals to communicate complex ideas or processes. Students indicated that their main strategy for handling language difficulties was to ask questions--lots of them--in the first weeks of their internships. But the recurring challenges associated with audience adaptations have since led to numerous discussions within CxC about continuing to develop programming enforcing the rhetorical triangle, role playing for presentations, and increasing feedback from industry partners when presenting on projects in engineering.

ESL/Multicultural/International Challenges: Many students identified linguistic, cultural, or geographic challenges to communication in both their academic and internship experiences. In some cases, the challenge of coordinating communication with industry partners or professors in other time zones was a scheduling challenge that also fed into challenges about teleconference and Skype etiquette. For some students, this manifested in intragroup communication. One student, for example, identified cultural and linguistic barriers between one individual and her colleagues for their capstone course, which stalled the project in its early phases. The student reported taking extra time to make sure everyone was on the same page about both content and the workflow that the group felt comfortable with, and cited the course design as valuable preparation for communication challenges she expects will be a part of her career. In addition, numerous students identified language barriers contributing negatively within the academic setting. Some students identified problems communicating and interacting with professors whose lack of proficiency in English hinders understanding both of project guidelines and feedback, as well as their general communication skills across written, spoken, visual and technological modes. Other students reported the same language challenges with teaching assistants.

Disconnect between CxC Principles/Classroom Deliverables/Industry Standards for Communication: In all focus group sessions students identified challenges regarding classroom presentations, written materials and technology requirements. In some cases, students referred to academic writing as ineffective training for industry writing. Others lamented not receiving enough software training to apply it to their specific internships, though they admitted this issue is hard to address because of the breadth of industry software requirements. In most cases, however, students cited inconsistencies or confusion related to poster and oral presentations. Some students cited examples of classes wherein they were asked to provide feedback to their peers but it was unclear whether or not the feedback would be graded or even welcomed. This uncertainty, they reported, led to hesitation by some classmates in giving meaningful feedback. Students contrasted this with feedback and work at their internships, where they felt the stakes

were higher. They reported they were more likely to give, receive, and act on feedback when they believe their employment depends on it. Most students reported that in general, they sense that the stakes are higher when they are working in the industry. It was also evident that students viewed feedback as an important means of learning how to improve their communications regardless of mode. This attitude toward feedback is an important finding since the feedback loop is a key component of CxC pedagogy in communication-intensive courses and in the Distinguished Communicator program.

One valuable note through this discussion is that CxC poster/oral presentation skills seemed to dovetail with many industry standards. Students reported receiving compliments on successful presentations that reflected best visual communication practices in clarity, content streamlining, design, and presentation flow. Several used the word "confident" to describe how they felt about their presentation skills. In other cases, students expressed concern that many of their professors had little or no experience outside academia and thus struggled to connect theory to practical application.

One final tension that a few students mentioned between academic and industry standards had to do with conflicting directions on senior projects. Occasionally the instructions given by professors and the requirements and expectations of the industry sponsors differed: "it feels like we have two different bosses who want two different thing for the same project." Students were unsure about how to negotiate the conflicting communications, pointing again to the need for training in interpersonal communication.

CxC's Overall Success in Connecting to Students/Suggestions for How to Increase Awareness about CxC and Improve Services: Overwhelmingly, participants agreed that their experiences in the CxC Engineering Studio and with CxC-related activities such as workshops and communication-intensive certified courses were beneficial to their professional development. Students cited repetition of practice with oral presentations (sometimes with, sometimes without posters), as well as the consistent feedback loop in written reports (for those classes in which this occurred), as helpful. Students did, however, identify challenges and suggestions for improving the experience. Many students suggested that informative outreach about resources be more rigorous and continue from the beginning of the first year through their fifth year. Some students reported learning about CxC and the resources available at the Engineering Studio "late in the game." Of the students who successfully completed the CxC Distinguished Communicator certification, most identified direct contact and follow up with staff as the guiding force behind their completion. One student suggested that in future semesters CxC consider pairing upper-level students in the Distinguished Communication program with incoming interested students to help guide them through the process and act as a work buddy. Other students suggested identifying upper-level students with industry experience, or recent graduates, to act as industry mentors to help students translate their academic experience into the workforce.

Because the Engineering Complex which houses the CxC Engineering Studio is undergoing extensive renovations, students also had suggestions for what they hoped to see in the new educational space. (Ironically, they will all have graduated before the new facility opens, but their excitement about the expanded studio space showed a sense of pride and identification with the engineering program in general and the CxC program in particular.) High on students' lists

were more areas specifically for group work fitted with large tables and whiteboards in a more conference-like setting and more computers with high-end software needed for advanced projects.

Summary and Future Directions: Applying Lessons Learned from the Focus Groups

Our previous assessments gave us some level of confidence that our communications integration efforts were yielding quantifiable data attesting to the effectiveness of our CxC program elements, i.e., students' communication skills are being enhanced without detriment to the technical content of communication intensive courses. As anticipated, focus groups revealed some things about our CxC program that we can do to make it even more robust, addressing the needs of students and stakeholders alike.

A key finding of this assessment using focus groups was that although students were comfortable with their basic communications skills, they had reservations about their abilities to translate these skills to professional settings. Sources of their uncertainty were both contextual--such as generational gaps, intercultural differences, workplace norms, and corporate protocols--and language-based--not being aware of industry-specific terms or problems communicating with non-native speakers of English, for example. CxC staff recognizes the strain put on all parties who try to communicate across professional and language barriers. As we address global communication issues in our curriculum, specifically in case studies and assignments, we need to also teach strategies for working with non-native speakers and writers of English. Filling this gap will require development of scenarios in which students apply communication skills and then receive feedback on shortcomings and strengths. Whether such instruction is integrated into coursework or offered as optional enhancement has yet to be fully determined.

But we have started taking some steps this spring. To help student better understand workplace dynamics, particularly interpersonal and intergenerational communications, we will host the inaugural seminar of our recently established Engineering Leadership Academy this semester. This learning opportunity will be an industry-lead, interactive event for a select student group with a central theme of intergenerational communications. Afterwards, our goal will be to then develop additional workshops to engage more engineering students in such training before their internships and first jobs as engineers.

Focus groups confirmed for us the importance of feedback as a means of learning. While C-I faculty attending the Summer Institute learn strategies for giving meaningful feedback, few teaching assistants attend these sessions. It may well be time to extend the CxC program, particularly the faculty development component, more regularly to teaching assistants.

A final important perception shared by some students is that our CxC program still has work to do to adequately connect with students, particularly early in their academic programs. We found this a troubling outcome because of our own perceptions of broad student exposure to the CxC program offerings. Our challenge is to find better ways to help them gain a clearer understanding of how CxC impacts their curricula and their careers but also to increase awareness of the resources available to them through the Studio, workshops, and special programs such as the Distinguished Communicator certification. We see this as an important program element that must be addressed repeatedly as students enter our engineering programs at different times and with different needs.

For the purposes of CxC program assessment and improvement, focus groups proved especially timely and appropriate, allowing us to meet at least three *Principles of Good Practice for Assessing Student Learning* as identified by the American Association for Higher Education[13] and enabling us to see new ways to make CxC an even stronger academic program.

- *"Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time"*[14:] The focus group sessions were conducted at the end of the first decade of the CxC program at a time when CxC staff felt the need to supplement quantitative studies with face-to-face meetings with students to hear their experiences, their ideas for improving the program, and suggestions for equipping a new learning center.

- *"Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes"*[11:] Throughout the focus groups, students related not only how and what they had learned through their communication-intensive courses but also how that knowledge transferred to capstone presentations and internships. They also pointed out skills and topics they felt should have been addressed throughout their curricula but were missing.

- *"Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about"*[11:] Careful crafting of the interview guide for the focus groups encouraged researchers and moderators to articulate important questions that had not previously been answered through more quantitative methods. The focus group discussion also allowed the moderators to judge when students were most excited about what they had learned and their accomplishments related to communication presentations in various modes and to hear many of them express interest in mentoring other engineering students, especially in the Distinguished Communicator program.

This qualitative assessment purposely targeted graduating seniors and yielded information critical to the future development of the CxC program. Given the insights we gained by conducting the focus groups, we will be developing a strategy to employ this type of assessment earlier in students' academic programs to complement, and enhance, our existing quantitative tools.

References

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Appendix A: Interview Guide

Script for Focus Groups in Engineering

Remarks/rationale Introduction: "Hello everybody, my name is Annemarie Galeucia and this is Sarah Liggett. I will conduct the focus group discussion this evening regarding your communication skills and experiences, the Communication across the Curriculum Program (CxC) at LSU and the CxC Engineering Studio in particular. Sarah will observe and take notes.

This conversation will be recorded on tape. This is only for the purpose of analysis and assessment. Only the transcriber, Sarah, and I will listen to the tape. No names or personal information will be used in any report we write.

As I said, we've invited you all to discuss your communication skills and experiences, the Communication across the Curriculum Program (CxC) at LSU and the CxC Engineering Communication Studio (now known as the Chevron Center for Engineering Education) and any impact it has had on your communication skills. I will ask you several open questions. If at any time, you do not understand the question, please ask me to clarify.

Your personal opinions and views are very important for us. You've been selected to participate at random so your views are likely to represent those of other students who aren't here. If your views differ from the other participants, please make them known. There are no right or wrong answers. Please feel welcome to express yourself freely during the discussion. Remember, only one person should speak at a time so that we can clearly hear your views.

Some practical issues: the discussion will last for about one hour. We ask you to please switch off your mobile phones. Please give everyone the chance to express their opinion during the conversation. You can address each other when expressing your opinion, we are only here to assist in the discussion. I may occasionally encourage someone to speak who hasn't answered a question, or if someone has gone on at length, I may ask to hear someone else's views so that we can keep to the hour's time limit.

Is everything clear about the purpose of the focus group discussion?

At the conclusion of this discussion, we will ask you to provide us with a mailing address to send your $50 stipend.

(Before starting the focus group discussion, all participants were informed about the purpose of the discussion, confidentiality and practical issues. All signed a permission form.)

Questions:

1. Let's begin by learning your major and in a sentence or two describe your capstone project.

2. Think about an internship, co-op or similarly professional opportunity you experienced during your training to be an engineer. What kinds of communication skills did you realize were important as a result of this experience?

3. To what extent do you think your communication skills have measurably improved as a result of your assignments in C-I courses? (not at all, some, quite a bit, to a great extent). What evidence do you have to back up your claim?

4. What communication skills do you wish you had better mastered through C-I courses?

5. What are the biggest communication challenges you are now addressing in your capstone course? How are you handling them?

6. Are you familiar with the LSU Distinguished Communicator award? Did you consider participating in this program, and if so, are you a candidate for this award?

7. The Engineering Communication Studio is a CxC initiative to support students and faculty. How have you used this facility for your communication and group assignments?

8. How could the Studio, now commonly known as the Chevron Center for Engineering Education, and its staff have better supported you?

9. What else would you like to tell me about the CxC program, the Studio, or communication-intensive courses that we haven't discussed or is there anything you'd like to add to a previous answer?

10. (if there is time) Did you feel prepared to handle the kinds of communications required in your internship? If not, were they skills that can be learned in a classroom or are specific to a job?

Thanks for your thoughtful answers and time this evening. We will use this information to improve the CxC program. As the saying goes, your check will be in the mail

Appendix B: Consent Form

Consent Form for a Non-Clinical Study

1. Study Title: Focus Groups to Evaluate Student Perceptions of Communication Initiatives in LSU Engineering Curricula

2. Performance Site: Louisiana State University and Agricultural and Mechanical College

3. Investigators: The following investigators are available for questions about this study, M-F, 8:30 a.m. - 4:30p.m.

PI: Mr. Warren Hull	578-7994
Co-PI: Mr. David Bowles	578-9952
Co-PI Dr. Sherif Ishak	578-4846
Co-PI Dr. Sarah Liggett	578-7843

4. Purpose of the Study: The purpose of this project is to provide more in-depth understanding as to how students view and use CxC services in order to promote program growth and innovation in the new Chevron Center for Engineering Education.

5. Subject Inclusion: Subjects will be randomly selected from students currently enrolled in engineering Capstone courses during the spring 2015 semester. Individuals will be between the ages of 18 and 65 and do not report psychological or neurological conditions.

6. Number of subjects: 30

7. Study Procedures: Focus groups will be conducted during the two week period of April 13-24, 2015. Three focus groups, consisting of 7 to 10 students each, will each participate in a one hour-long discussion led by an experienced moderator.

8. Benefits: Subjects will be paid a $50.00 stipend to participate in the study. The study may yield valuable information about student use of the Chevron Center's resources, and may lead to improved facilities and resources within the Center.

9. Risks: The only study risk is the inadvertent release of responses directly attributable to you; however, every effort will be made to maintain the confidentiality of your responses. Files will be kept in secure cabinets to which only the investigator has access.

10. Right to Refuse: Subjects may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might otherwise be entitled.

11. Privacy: Results of the study may be published, but no names or identifying information will be included in the publication. Subject identity will remain confidential unless disclosure is required by law.

12. Signatures: The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Dennis Landin, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. I agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Subject Signature: _____ Date: _____