

Integrating Composition Skills within Construction Curricula: A Pilot Study

John Killingsworth, Ph.D., Mitchell Ogden, Ph.D., Jon Elliott, Ph.D.

Colorado State University and University of Wisconsin - Stout
Fort Collins, Colorado, Menomonie, Wisconsin

Low engagement in written communication, English composition, and language development has been persistent for decades in STEM majors. Students are often resistant to learning skills, such as English composition, for which they have created a pre-determined disconnect from their chosen field of study. Construction industry members posit that Construction Management (CM) graduates are generally well prepared for the technical aspects of project management (estimating, scheduling, etc.). However, they struggle in the area of professional communication. In an attempt to address this weakness in CM graduates, a two-semester collaborative co-teaching pedagogical intervention between the Construction Management and Professional Communication programs at The University of Wisconsin - Stout was developed. The current study describes the intervention and reports the results of a mixed-method survey administered as a pre- and post-test. Respondents were CM majors (n=36) who participated in a contextualized course in composition for construction materials and method. Quantitative results revealed that students' level of agreement with items such as "Being able to write well is important to the construction industry" increased at post-test. However, qualitative results revealed that students' attitudes and perceptions about writing were unchanged. Durability of student perceptions, opportunities for intervention improvements and areas of further research are discussed.

Key Words: Team Teaching, Professional Communication, Writing in the Disciplines

Introduction

The question was asked to a small group of industry advisors, "What can we do as instructors to better prepare our students for the challenges they will face in the workplace?" The response was resounding and unanimous: "The graduates are doing well in estimating, in scheduling, in their knowledge of methods and materials. But they continue to have trouble with professional communication."

In an effort to respond to the need for better communicators in the construction industry, a collaborative project between the Program Directors from Construction Management and from Professional Communication was made. This problem of low engagement in written communication, English composition, and language development has been persistent for decades (Birk, 1921), particularly for STEM majors. The students are often resistant to learning skills for which they have created a pre-determined disconnect based on their own perception of their education requirements (Boyd, 1999). One effective strategy has been to contextualize the general writing skills in real world situations (Stebbleton & Nowes, 2001). Such context is often created in advanced writing courses (e.g. technical writing or business writing). Additionally, the advanced-level courses will often require more content-related writing assignments, sometimes through a writing-intensive model. This upper-division orientation to professional communication often comes too late, "after negative attitudes about writing and communication and the divisions

between discipline-specific learning” have been established in the mind of the student (Ogden & Killingsworth, 2016). In a traditional liberal-arts model where English composition is taught to a diverse audience of students, the challenge of creating personalized context relevant to the professional goals of each student is nearly impossible. In most institutions, a composition class population of 20 to 30 students is often made up of nearly as many different college majors, each with their own goals and perceptions of writing in their future career. Creating engaging context for this broad audience poses one of the most significant hurdles in teaching composition and professional communication. “Students seem to arrive at college already holding some deep-seated views of their disciplines. Clearly these views will affect their curricular choices, which will limit their exposure to disciplines they already perceive negatively and perhaps inaccurately (Elmore, 2006).” English and composition are routinely perceived negatively by incoming STEM students.

This research project was conceived to address several problems. First, we sought to understand the level of engagement—or disengagement—of the construction management student in written communication skills development. Additionally, we considered the pedagogical approach of written communication for construction management students, specifically. An integrated, team-taught approach was developed for the delivery of a Learning Community between a construction management course (methods and materials) and English composition. This consideration included both the context of communication and the delivery method for teaching this discipline within a construction management curriculum. The essence of the research question was twofold: 1) Can we measure and improve student engagement in professional, written communication? and 2) Can a deeply integrated, team-taught curriculum serve to make that improvement?

Background for Integrated, Team-Teaching and Learning Communities

The integrated, team-teaching approach is a well-established delivery method in academia (Lardner & Malnarich, 2008) (Dinitz, Drake, & Gedeon, 1997). The Washington State Board for Community and Technical Colleges has developed the Integrated Basic Education and Skills Training (I-Best) program for the express purpose of integrating adult basic education (ABE) into technical programs. The I-Best model has become a model for a number of similar programs across the country (Torraco, 2014), including nationwide awardees of the U.S. Dept. of Labor’s Trade Adjustment Assistance Community College Career Training (TAACCCT) grants (Hewett, 2016) (Meridian Community College, 2013). In the I-Best model, ABE teachers are teamed with technical program instructors to integrate remedial content within the technical content. This approach reinforces basic skills and just-in-time instruction which can be immediately applied and contextualized for the student.

A Learning Community is another well-established model for increasing engagement and weaving together learning disciplines (Smith, MacGregor, Matthews, & Gabelnick, 2004). The premise of a Learning Community has been to both help students build a social environment for learning as well as the blending and contextualization of two dissimilar disciplines. There has been some criticism of this model for favoring the social aspects of the Learning Community and neglecting the disciplinary integration (Lardner & Malnarich, 2008). As such, the development of this pedagogy focused on the perceived benefits of both the Learning Community and the I-Best models, namely a substantive integration that aligned both content and pedagogy in meaningful ways.

Method

A Learning Community of two disciplines combines the resources and expertise of both instructors. A two-semester pilot was approved to combine English Composition 1 and Construction Methods and Materials. The two courses were scheduled consecutively on the same day. A two-hour, freshman lab-based construction course was followed by an eighty-five minute composition course. Coordination of other teaching requirements was made to allow both

instructors to be available and present during both courses. This allowed the teaching team to practice active integration of instruction and content rather than taking turns and being absent for half of the instructional time.

The intentional presence of both instructors was designed to serve many purposes. A unified curriculum was considered critical for student buy-in, meaning that the students need to view the Learning Community and the curriculum as well-planned, specific, and purposeful. The premise being that if students considered the Learning Community as such, they would engage in its purposes. In this case, the intent was described during orientation. Thus, the students knowingly enrolled in an English Composition course as an integrated part of their construction management program. This framing contrasts the composition-as-general-education-requirement model that perpetuates the dis-integration of learning. The presence of both instructors was designed to achieve deeper integration of the disciplines through learning from each other. The two instructors come from differing backgrounds of discipline and learning. On the one hand, a liberal-arts education and the other an engineering-based education. The recognized differences in disciplinary backgrounds as well as teaching techniques were considered beneficial to developing a dynamic classroom environment. The presence of both instructors, therefore, allowed for purposeful improvement of teaching and for a more organic development of learning activities. Lastly, the presence of another instructor in the classroom would encourage ongoing assessment of the efficacy of the Learning Community.

The purpose of the integrated curriculum was to help students connect the learning of written communication to their technical program, thus engaging them to improve on their writing skills. To measure this engagement and improvement, a simple methodology was designed. First, an intake survey was created which allowed students to express their perceptions of the value of written composition and its role in their careers. The survey also asked students to reflect on their abilities as a writer and communicator. Second, targeted activities, lectures, and assignments were designed to be contextual to the content of the materials and methods course. Since these freshmen were self-declared CM majors, the content was assumed to be of high interest to the students. Enrollment in the Learning Community was voluntary, and an option to take the traditional course was provided. Upon completion of the semester term, an exit survey was required of the student. Similar to the intake survey, students were asked at exit to reflect on the change of their attitudes towards written communication and its purpose in the construction industry. Students were again asked to consider their improvement as writers, as well as their impressions of the integrated approach to teaching.

Intake Survey

In order to compare the students' attitudes to writing, composition, and communication, an intake survey was administered to the enrolled students in two learning communities. Enrollment in the Fall Semester 2015 and the Spring Semester 2016 was nineteen (19) and seventeen (17) respectively. In both semesters, the intake survey was administered in the first week of classes. Qualtrics software was used to administer the online-based survey and to maintain anonymity for the students. Students were encouraged to provide forthright answers to the questions. These questions were designed to understand the level of engagement in English/language writing classes as well as their understanding of the use of such skills in the construction industry.

Question-statements from the survey included a Likert type scale from one (Strongly Disagree) to ten (Strongly Agree):

- I enjoy writing
- I consider myself a strong writer
- I have generally enjoyed my English/language arts/writing classes
- Being able to write well is important to the construction industry
- One reason for choosing Construction as my major was to avoid writing

- I am motivated to become a strong writer and effective communicator in my career

These question-statements were followed by short response questions such as:

- What do you think is most important about good writing?
- What do you think is most important about being a good writer?
- Why is it important to be able to write well?
- Why is writing important to being successful in construction management?
- Name something specific you expect to learn in the Composition 1 course
- Name something specific you expect to learn in Materials and Methods

The Intervention: Integrated Course Elements

In a given English Composition course, certain themes, or principles are taught which seek to strengthen the students' ability to communicate effectively. Students are then expected to make connections between their writing skills and their respective disciplines and to apply those skills in practice. These principles include genre awareness, audience-focused persuasion, and technical client-facing communication. Central to the evidence of student disengagement is that students have difficulty making the connection between written communication and their career interests. As such we designed activities, lectures and assignments that explicitly connected the three writing principles to construction.

I. Construction Document Genre Analysis

Genre awareness is an essential skill in composition, and particularly critical in an industry such as construction that encompasses a wide array of documentation. Recognizing the importance of identifying features and conventions of these differing genres empowers the construction manager to appropriately and professionally respond to a given document. In a typical composition course, genre-based projects would often include analysis of general persuasive essays, literature, and academic research articles while writing formal letters, argumentative essays, and academic research reports. With the Learning Community, we were afforded a specific set of practical genres from the construction industry. Documents were provided by industry advisory partnerships to the construction department. The genre analysis was designed to 1) help students identify and analyze conventions and features of different genres, 2) familiarize students with the expansive library of construction documentation, and 3) develop students' confidence to penetrate the sophistication within these documents.

The idea of genre can be challenging for students to conceptualize without a frame of reference. For this exercise, we began the lecture with playing soundbites from a variety of musical genres. We asked the students to identify the type of music they heard and to share with each other why a particular musical piece fell under a certain category. This exercise helped define the terms as we associated the category with *genre* and the musical elements with *generic conventions*. Following this initial exercise, each student was given a different construction document. These documents varied from technical specification, to permit applications, to formal correspondence, negotiated contracts, lump-sum bids, general liability insurance forms, and city building codes. Knowing the complexity and sophistication of these documents, this exercise was purposefully overwhelming and intimidating. This exercise soon became known as the Doc-Shock activity. Students were required to analyze the document by describing the conventions used within the document. In turn, the students shared their respective document with the class and unitedly came to identify specific genres within construction documentation.

II. Audience-focused Persuasion

The terms logos, pathos, and ethos, are not commonly used in the construction dialogue, but the principles are used in every-day communication. Construction managers are, in many ways, persuasive communicators. Whether they are addressing a building owner, or an architect, engineer, subcontractor, supplier, or even the laborer, the

construction manager must know how to persuade their audience. Understanding the audience is just as important as the rhetoric of the argument, and knowing how to appeal to a specific audience will strengthen the construction manager's ability to persuade. For this reason, it is important for the construction manager to understand the appropriate use of different appeals; namely logos, pathos, and ethos.

Logos is an appeal to logic. To reinforce this approach, students were required to compose a written description of a particular method or material used in construction. This paper was addressed to a fellow student, as if describing the logical method, process, and steps for the assembly of a wall, roof, or floor framing section.

Pathos is an appeal to emotion. For this exercise we had students analyze existing construction company logos, slogans, and websites. The students described the responses they experienced and provided critique of how effective the instrument was in triggering an emotion.

Ethos is an appeal to ethics. Students were given a letter from a hypothetical owner for which they were working. In a letter, this hypothetical owner expressed concern for costs, schedule, and quality of work. The students were required to compose a persuasive letter, specifically appealing to the ethics of the situation.

In each of these exercises, students were challenged to isolate the use of a specific method of appeal. These exercises were accompanied by dialogue and contextualized examples, where varied situations and audiences will require different methods of persuasion. In the final written report, the students were encouraged to consider how to incorporate multiple methods of persuasion. This final report also combined the principles of the technical client-facing communication as students were expected to win over a client for a design-build project.

III. Technical Client-facing Communication

Construction managers are in constant communication with clients. Much of that communication is explaining technical details to the client at the level that they will understand. In the case of technical writing, the author is educating the audience about the technical content, but in a way that requires an awareness of foundational technical processes and domain expertise. It also requires a self-awareness of the use of jargon. Once the technical content understanding is established, the author must have an audience-awareness that allows an accurate and accessible message for the reader. The audience is not always the traditional client. Often, the audience is a tradesperson, supplier, or peer. Communicating technical content is critical to the success of a project.

To teach the students the skills involved with technical writing, the researchers created an opportunity for students to write directly to a genuine audience. In a project-based assignment, students were given the requirements for a small micro-cabin to be built on a remote site. As this Learning Community was associated with a methods and materials course, students researched various materials to be used in the construction of the micro-cabin. In teams of two, the students were required to provide a physical three-dimensional scale model of a building section. The building section model was accompanied with a formal proposal, including technical details for the materials to be used in the construction. Simultaneously, the students were unitedly building the full scale cabin in the construction lab. Upon completion of the semester, teams were required to present their technical detail to the client, and provide a tour of the actual cabin being built. This particular communication assignment combined the expertise of both instructors, allowing them to fully integrate and contextualize their content.

Exit Survey

Measuring the change in engagement, interest, and competency in written composition was the purpose of the exit survey. Similar to the intake survey, the Qualtrics online software was used to administer the exit survey. The exit survey was administered on the last day of class for each semester. The same question-statements were asked from the intake survey. The short response questions were the same with the exception to the last two, which were

changed to ask the student to name something specific they had learned in Composition and Materials and Methods. Three question were added to the exit survey that asked,

- “Name something specific you learned about the connections between communication and the construction industry through the Learning Community?”
- “Based on your experiences in the Learning Community, what worked well?”
- “Based on your experiences in the Learning Community, what could be improved?”

Results

From this small pilot study data set, paired samples t-test revealed a significantly higher ($p = 0.010$) mean score at exit ($M = 6.33$, $SD = 1.41$) than at intake ($M = 4.83$, $SD = 1.62$) on the item “I consider myself a strong writer,” indicating that student writers perceived their writing abilities to have increased significantly during the course of the semester. It is also worthwhile to note that the mean for this item crossed the neutral point on the 10-point Likert scale, meaning that students’ perceptions shifted a perspective of deficiency to one of competency.

All other quantitative results were more favorable at exit, although not statistically significant at the $p < 0.05$ level, due in part to the small sample size. The same results from a larger sample would have been significant. The trend of all items moving toward a favorable response at exit, even though not statistically significant, suggests that the Learning Community intervention had positive impacts on student learning and self-perceptions of writing competencies.

From the qualitative results, students at exit often provided a response very similar to their intake response. In particular, perceptions of the factors that make good writing and good writers often did not shift much over the fifteen-week intervention. In half of the cases, students essentially reiterated their intake response at exit. For example, in response to “What do you think is most important about good writing?” intake and exit survey responses went from “having a good message” to “having a clear and understandable message.” In another case, “making the reader understand what they are reading” became “being able to get a message across to someone or something.” A pattern of consistent responses from intake to exit was observed across the other qualitative items as well. This suggests the limitations of the intervention to create a transformation of students’ preformed perceptions of writers and writing. The data suggest the unexpected durability of student attitudes and perceptions about writing.

In the intake writing prompt (Why is written communication important to being successful in your career? Give specific examples or scenarios where you expect to see written communication in action in the construction industry.), we see that students were well aware of the importance of written communication. They were all able to identify relevant written documents or activities, citing cut lists, invoices, bids, emails, change orders, building plans, and project management documentation. This awareness at intake is presumably the result of previous contact with the construction industry (through summer jobs or family connections) and is a strong advantage in preparing students to be effective communicators in the field. Generally, incoming freshman have a very narrow knowledge of professional genres and writing practices, limited to email communication and report writing. Construction management students demonstrate an increased connection with and awareness of the field, which brings them to the composition classroom more prepared, even while their attitudes towards writing classes in the past have been middling ($M = 4.39$, $SD = 1.51$). This pilot reveals an opportunity not previously recognized: the opportunity to leverage incoming students’ industry awareness against their ambivalence for writing. From its design, this pilot Learning Community model did not assume the level of initial awareness of genres and the level of respect for the role of written communication in the workplace. Coupled with the fact that students disagreed with the statement that they chose construction to avoid writing ($M = 3.67$, $SD = 2.24$), we see that incoming students were, in fact, more aware of the importance of written communication. Whether this asset is widespread among construction management students is something that merits further investigation.

Discussion

The positive results of the data from this small pilot encourages the continued investigation of the Learning Community model with larger sample sizes and control groups to more precisely determine the efficacy of the intervention. The preliminary data reveals refinements that can be made to the assessment measures to more meaningfully measure students' attitudes about their own writing. For example, the data from holistic perceptions of a student's strength as a writer can be complemented with an open-ended prompt in which the student describes a specific instance of a writing activity or a description of their writing process on a specific task that supports their self-perception. In the pilot study, the prompt asked students to describe what is important to make a good writer, but failed to make the personal connection that would provide further insight into his/her self-perception. The introduction of a control group will create opportunities to determine whether a Learning Community section of composition is, in fact, more effective at developing certain core writing competencies. The experiences of the pilot encourage outreach to expand the scope of the model, involving the first-year writing committee as well as construction management faculty. First-year writing committees are generally deeply invested in assessment of the efficacy of the composition curriculum and will therefore have instruments and data that will lend themselves to establish a robust comparison of construction management student writers to other populations on campus. Future work on the pilot study will involve more collaborators to determine the best practices for deploying learning communities and to measure their efficacy at preparing competent communicators for the industry.

Conclusion

The opportunity for deep cross-disciplinary collaboration is promoted by the success of the pilot experiences. Students respond favorably to feeling greater coherence between their major program and general education requirements. And the instructors felt great support in their individual teaching owing to the intense collaboration. Challenges to the model of a team-taught Learning Community remain unsolved, namely the challenge of managing an instructor's presence in the paired class, which will typically not be accommodated in his/her standard teaching load. Despite the challenges for integrating courses, the benefits for students and instructors are many. The students gained a greater appreciation for written, professional communication and were generally engaged in the content and the association of coursework. Though not specifically measured in this study, students may gain a greater knowledge and understanding of the technical content as the written assignments emphasize study and context of the technical aspects of the joint course. Future studies should consider measuring those potential outcomes. For the instructors, the multidisciplinary approach to teaching provides an opportunity to develop teaching skills, observe other instructors, and explore non-traditional methods of teaching. From this perspective, the conclusion is uniformly a benefit and should be encouraged to be explored in other disciplines.

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