Overcoming the Writing Challenges of Students in a Distance Delivery Technology Master of Science Program

Mr. Mark Shaurette, Purdue University, West Lafayette

Dr. Mark Shaurette has a MS in Civil Engineering from the Massachusetts Institute of Technology and a PhD in Technology from Purdue University. He is a Fulbright Scholar with work experience that includes 30+ years of senior construction management practice and work as a research engineer for the National Association of Home Builders Research Foundation. He currently holds the position of chair for the Master of Science program for the Purdue Department of Building Construction Management in West Lafayette, Indiana, USA. He is active in research, education and community outreach in the areas of building retrofit for energy conservation, sustainable construction practices, management of the demolition process, material reuse and recycling, as well as instructional design in construction management education.

Dr. Randy R. Rapp, Purdue Building Construction Management Dept.

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Abstract

Purdue University offers a Master of Science in Construction Management (CM) through distance delivery that includes a course only plan of study culminating in a capstone writing project. Students enter the program after completing traditional engineering, architecture, and construction management undergraduate degrees from a diversity of universities around the globe. Entering students are required to have five or more years of experience working in the construction industry. As is common in many engineering or technology graduate programs, the writing proficiency of entering students is frequently inadequate to meet the demands of graduate level scholarly writing. Because much of the scholarly writing that is done by graduate students is supervised by faculty who may not have strong mentoring skills in technical writing, these students often struggle to communicate their graduate research in an effective manner. As a result, some supervisors experience more challenges guiding the writing process than the research. At degree completion, these MS in CM students frequently produce satisfactory research but still have poorly crafted writing for the publication submission required by the final capstone project. Because of the writing challenges, some have failed to complete the degree altogether.

This paper presents a brief summary of the literature describing university experiences and responses to the limited preparation of graduate students for scholarly writing. In addition, a description is provided of the Purdue Department of Building Construction Management's experience with graduate student writing and the introduction of required writing courses as part of the MS plan of study. Both student feedback and preliminary test results are presented as evidence of the successes and shortcomings that have accrued from introducing writing guidance in the plan of study.

Introduction

During the 2006-2007 academic year the Purdue University Department of Building Construction management (BCM) introduced a MS degree in construction management delivered through a distance learning platform. This BCM distance MS program was the result of support from the Associated General Contractors (AGC) of America, a national trade association comprised of more than 33,000 firms. As stated in their request for proposal, which was initiated to advance graduate CM programs, the AGC expressed an interest in partial funding and advertised support for up to four programs. The AGC stated: *"The need for senior executives to secure a masters is apparent from two perspectives. First, they will benefit from learning newly evolved construction techniques and management methods. Second, their experience is needed on campus as instructors"* [1]. In the BCM distance MS program that developed from AGC initial support, there were 13 enrolled in the first cohort of students. The program quickly grew to an enrollment between 17 and 23 students. Total enrollment has been limited to 24 students in order to maintain the student-faculty contact level as well as to prevent the limitations of the distance delivery platform from degrading the audio and video clarity of online class delivery.

Today the MS in Building Construction Management is a department administered MS program within the Purdue Graduate School. It offers both a thesis based on-campus MS program as well as the non-thesis distance delivery option described above. The two programs combined typical operate with an enrollment of between 40 and 50 students. Although this paper is specifically targeted toward the challenges of the distance delivery program, some courses and challenges are shared by the on-campus and distance delivery programs.

It was predicted as early as the late 1990s that advances in Internet based communication technology would provide flexibility in terms of course delivery as well as access to academic source material. The predictions posited that technology aided instruction would allow professional students unprecedented opportunity for study without interrupting their work environment[2]. As distance learning has evolved, some verification has come to light that affirms the effectiveness of online delivery when compared to more traditional face-to-face learning environments[3, 4]. When establishing the BCM distance MS program many options existed for delivery including self-paced independent study, asynchronous interactive learning, synchronous learning, and a combination of online and in-person delivery. Evidence supporting the advantages of interaction between learners[5] and synchronous interaction between students and faculty[6] guided the faculty to select real-time class delivery. The synchronously delivered classes meet two evenings each week in 3 hour time blocks. The synchronous delivery platform used is Adobe Connect (previously known as Macromedia Breeze).

As an alternative to a strictly course-only MS degree, the Department of Building Construction Management initially offered the non-thesis option using a directed project rather than a thesis for their distance MS degree. The directed project requires students to participate in problem solving and research activities that are not provided by most course-only MS degrees. The directed project is less formal than a thesis with the objective to engage the student in an industry based study culminating in a report. The topic is generally more practical than a thesis and is expected to be completed in one semester[7]. A total of three credit hours are included in the student's plan of study for a directed project as opposed to the six credit hours for a thesis. The directed project was intended as an applied research project that was more extensive than a graduate-level independent study but less rigorous than a Master's thesis. Because of the regular student contact made available by the synchronous delivery platform, the use of a typical committee based student advising process was initially maintained.

The paper is organized to explain the specific example of writing challenges experienced in the relatively new BCM MS program offered through distance delivery as well as initial outcomes after changes were introduced. The first section describes both the program structure and writing challenges of the program. Program challenges are included in this description because it is likely that the program's improvement in degree completion rate is a result of both the improved writing instruction and the program's structure changes. The balance of the paper deals with changes to improve student writing skills. Included are a review of the literature on the subject of writing in engineering and technology, a description of writing courses based on the Effective Army Writing program added to enhance student success, and some indicators of success in improving students' writing skills. This material should be helpful for others working to improve graduate student success.

Challenges Experienced

The initial years of the BCM distance MS proved to be challenging for the students. In the first three cohorts of the program only 30% of the students finished in five semesters. Just over half of this group of students (53.3%) finished within six semesters. All of the students finished the required coursework within the five semesters. In every case it was the uncompleted directed project that prevented students from graduating on time. Another negative trend observed was that once students completed their coursework they took a break from the directed project. After the break, they had a difficult time restarting the directed project. Table 1 shows the Completion of Directed Project statistics for the students entering the program in 2006 or 2007 who had finished their coursework. The program was initially designed for full-time students to complete in 5 semesters including one summer semester. By December of 2010, in excess of 6 semesters would have passed for even the last students in this group to enroll.

Table 1 - Completion of the Directed Project

| Program Start Date | Total | Students Who Have Completed the Directed Project | | | | | |
| | | Within 5 Semesters | | Within 6 Semesters | | Total as of December 2010 | |
		Number	%	Number	%	Number	%
8/06	13	3	23.1%	5	38.5%	8	61.5%
8/07	7	3	42.9%	5	71.4%	4	57.1%
8/08	10	3	30.0%	6	60.0%	5	50.0%
Total	**30**	**9**	**30.0%**	**16**	**53.3%**	**17**	**56.7%**

Although students struggled to finish their directed projects, there has not been a similar trend in failure to complete individual courses. It is likely that the synchronous nature of the coursework helps to pace the student's work which in turn leads to course completion. On the other hand, the directed project is a self-paced independent project without a pacing mechanism. The students enrolled in the distance MS program have family and career obligations competing for their time. After four semesters of intense coursework the students see the directed project as an obligation without a firm deadline. Distance education appeals to busy people. However, the burden can be overwhelming. "*Distance-education students tend to leave us because they are very busy, their lives are crammed full of things, and suddenly they find themselves in a situation of having to rethink their priorities*," says Jacquelyn B. Tulloch, the executive dean of distance education and college services at the LeCroy center. "*Very often, for better or for worse, education is the easiest thing to let go of.*"[8]

Initial Corrective Actions

The Department of Building Construction Management Graduate Committee examined the situation in search of changes that might increase the program's completion rate without diminishing the rigor of the degree. As a result, the Graduate Committee decided to make the Distance Masters program a six semester program and to discontinued the use of the directed project. The added sixth (summer) semester is dedicated to a capstone writing project course in place of the directed project requirement. This gives students both the time and the structure to

complete the research and writing component of their degree. The Capstone Writing Course requires students to submit their writing to a construction management related journal.

As a part of this change, the Graduate Committee also eliminated the use of the three person directed project advisory committee. To support the new journal paper requirement, each student works with a single faculty advisor who has an appropriate background to guide the research. This change simplifies the meeting coordination that is complicated by the geographic distance between the students and faculty. No change in program status was required with these program modifications because the directed project has historically been considered by the Purdue Graduate School to be a non-thesis option. The capstone article, as a scholarly applied academic writing project, enhances the students' career aspirations through an emphasis on construction industry problem solving and uses the journal review requirements as a benchmark for the writing expectations.

Literature Review of Student Writing Skills

The Graduate Committee recognized that this program structure change, while helpful, would not completely solve the problems encountered by students as they completed the academic writing requirements of the MS degree. The challenge that remained was the limited writing skills of students in the program. Weakness in writing preparation in construction management, as well as technology or engineering programs in general, has been noted by many. Through the 1980s and 1990s both industry and academic encouragement for increased writing coursework in construction management undergraduate programs appeared in the literature[9, 10, 11]. In the most recent decade, much of the emphasis on writing in CM programs has concentrated on technical writing to support direct construction management activities. Common classroom writing activities emphasize routine written communications such as business letters, memos, requests for information, reports, proposals, emails, schedule of value documents or field notes[12, 13, 14, 15].

In some cases undergraduate writing activities depend on courses or teaching support from the English departments rather than from within the discipline. It is common for writing instructional support to be offered through university level writing programs, campus level workshops, and writing centers. Faculty development in writing instruction and guidance to help faculty better mentor their students in the writing process is also common. These university level programs, often referred to as writing across the curriculum (WAC), have shown considerable growth in the last 20 years. Results from a university survey of over 1000 institutions in 1987 showed that 38% of the respondents had WAC programs. By 2010 respondents to a similar survey showed that the level had risen to over 50%[16]. Because this approach often means that the specific context of the discipline is not present in the writing instruction, more project-based and discipline centered writing instruction has been advocated. By integrating writing assignments into class projects, disciplinary content knowledge can enhance problem-solving. It can also reduce the occurrence of muddled thinking often demonstrated by students who are attempting to apply writing skills in a context different from where the skills were originally learned[15].

Most of the CM writing instruction reported on in the literature is specifically targeted to the undergraduate technical writing rather than the scholarly writing required in most graduate education. Nevertheless, writing shortcomings similar to those experienced by graduate

educators have been noted by faculty in undergraduate programs. Phillip Dunn reports that undergraduate students have a difficulty maintaining a logical order of discussion, often misrepresent factual detail, have weak grammatical skills, and frequently leave out important details in their technical writing[14]. Scholarly writing is a different kind of writing, requiring analysis, synthesis, and proper support of any proposition put forward. In addition, scholarly writing seeks to underpin the creation of new knowledge[17]. If students struggle with clarity in simple technical writing as noted by Professor Dunn, how can students be expected to meet the requirements of scholarly writing?

Writing instruction in higher education has been a major point of discussion for many disciplines including technology and engineering education. The extent of literature on the subject is overwhelming. A search of the ASEE conference proceedings since 1996 returned over 150 papers dealing with writing. Using a common academic database, Wiley Online Library of Journals, an article title search for the same period which was restricted to writing, graduate education, and engineering returned over 100 journal articles. While a full review of this literature is beyond the scope of this paper, a few reoccurring themes can be noted. There is a general lack of academic writing experience at the undergraduate level, compounded by the growth of students who are entering graduate programs in technology and engineering where English is a second language[17, 18].

The scholarly writing problems experienced by graduate students are similar to those found in technical writing at the undergraduate level. These problems can be classified into several broad groups. The first is writing mechanics. Mechanical errors can include grammar, format, failure to provide proper citations for source material, inadequate detail, lack of logical support for conclusions, improper tone or voice as well as failure to recognize the appropriate audience for the writing[17]. A second major category has been described as errors in use of rhetorical functions. Use of rhetorical functions has to do with the manner and sequence in which information is presented as the writing unfolds[19]. Much as a story moves forward gradually adding new information as appropriate to provide understanding and meaning, scholarly writing has a characteristic content and sequence. Scholarly writing will typically identify the problem, establish the significance of the problem, providing detail about how the problem will be researched, present results, detail the analysis, and finally state conclusions based on the results and analysis. Unlike academics and experienced engineering practitioners, students often follow an irregular path as they make their rhetorical moves through the writing. These irregular rhetorical moves cause great difficulty for their readers as they seek an understanding of the writer's meaning[19]. When combined, these mechanical and rhetorical errors render student writing inadequate to convey precise communication.

Differences in writing expectation are not limited to academic writing. Engineering practitioners also exhibit a more integrated view of writing and practice than students[19]. Most notable is the need for precision and lack of ambiguity in writing for engineering and technology applications. Students often utilize complex sentences and multi-syllable words to convey sophistication whereas industry practitioners seek simpler language to more quickly and accurately convey meaning[20]. To overcome these differences, student require heightened recognition of their need for writing support, practice writing, and feedback on their writing[21, 22, 23]. Unfortunately there are many obstacles to accomplishing the goal of improved recognition for writing skills when

utilizing the traditional approach to graduate mentoring. Many graduate faculty members are not prepared to teach writing skills and do not have the time required to provide feedback on content as well as writing mechanics. As a result faculty often fail to adequately reinforce graduate student writing skills because the time required can conflict with their research productivity or other workload comitments[17, 24, 25].

The literature offers numerous suggestions to help alleviate the writing deficiencies of graduate students in engineering and technology programs. As mentioned previously, it is necessary that a consistent message is sent to graduate students about the importance of writing[25]. Increased writing confidence can also be beneficial. It has been demonstrated that student self report of writing confidence can be improved through writing coursework where students iteratively hone their writing skills through practice with feedback from faculty and their peers[24]. Writing workshops have also been suggested as an alternative to one-on-one guidance for writing[21]. Online writing systems can be used to assist in writing instruction. One example is the ETS Criterion Online Writing Evaluation which provides quick diagnostic feedback. Criterion allows students to review and revise their writing frequently[26]. The cost of subscriptions for student to access these systems may be an impediment for some, limiting their implementation. Some universities have attempted to create web-based writing resources that are specific to the needs of their institution or discipline. *The Coach*, a collaborative, NSF-funded project at the University of Alabama, the University of Texas at Tyler, and Bevill State Community College is one such example. *The Coach* utilizes instructional modules to help students improve writing intended for engineering audiences. As of 2013, preliminary analysis appears to show improvement in students' writing quality through use of *The Coach*[27].

Writing Courses to Support Distance Delivery MS in CM Program

The distance MS degree faculty had noted before 2011 that a number of the students did not write as effectively as desirable. Many appeared to struggle with the organization and structure of their written work. What some expressed in writing was sometimes disconnected and non-linear in presentation, and their documents failed to communicate as well as might be expected of masters of their professions. Some students stated that they found it difficult just to begin writing a longer written product. It seemed that the final project written requirement might be deterring some distance students from completing their master's program. The program needed mechanisms to improve student written work and help them organize their efforts.

Methodology of Program Writing Instruction

One gets better at an applied skill by applying that skill with guidance and coaching to continually improve. This principle underlies the MS writing instruction: Students prepare written products of progressively more challenging difficulty as they advance through the three courses stressing the development of writing skills. In the first course, completed their first semester of the MS program, they apply principles of effective academic writing to their personal situations. In the second course, taken their third semester, they apply writing skills to summarize a business strategy article, and then synthesize those concepts into strategic recommendations for their organizations. These two courses prepare them for their third writing requirement, the Capstone Writing Course. In the Capstone, they summarize many articles in

their literature review, and then synthesize the ideas to support their project purpose. This provides a logical sequence for increasingly complex application of their writing skills and critical reasoning. Detailed, personalized feedback is provided for all submittals.

Applied Parts of Effective Army Writing Program

One large organization, which greatly depends on written communication to meet its many requirements, realized that its mid-level leaders often did not communicate as effectively as is desirable. To remedy shortcomings, the Effective Army Writing program (hereafter, Effective Writing Program or EWP) instruction was distilled from much experience to improve the quality of written communication. The program has guided tens of thousands of practitioners to improve their writing effectiveness. Previous experience with the program lends confidence that, except for correspondence formats, much of the program content can satisfy needs for the distance MS degree program. The framework and substantial parts of the instruction in the distance MS program is drawn from relevant parts of the EWP as could be publicly accessed in the public domain from the U. S. Army Command and General Staff College (CGSC) website in June 2011. These topics are delivered during the brief resident phase of the first course of the Distance Master's Program:

I. Critical reasoning and creative thinking.
   A. Critical reasoning: purpose, problem to be solved, point of view, ideation, assumptions, inferences, and implications.
   B. Creative thinking: principles, common biases.
   C. Standards: clarity, accuracy, precision, relevance, depth, breadth, significance, logic.
II. Steps to effective communication.
   A. The research process: research question, purpose, hypotheses, plan of action, data, and audience.
   B. The planning process: outlining, drafting, and revising.
III. Principles of style.
   A. Stylistic principles: accuracy, brevity, clarity, coherence, and unity.
   B. Main idea as the lead: purpose and thesis.
   C. Clear, concise, meaningful sentences: one thought per sentence, proper modifiers and pronouns, and parallel structure.
   D. Organized paragraphs: appropriate internal structure and logical arrangement.

Academic Writing I

During the first year they were used, some additional CGSC-derived notes were combined with American Psychological Association (APA) Style Manual guidance for a short overview of writing mechanics. However, to allow more time for the first three topic areas of the EWP, the faculty later removed mechanics from the resident attendance portion of Academic Writing I. Instead, students review the summary slides about writing mechanics in their own time, as they feel necessary. Writing mechanics is not included on the graded test, although students may opt to take a self-evaluation of 30 multiple-choice questions to determine if their skills in that area

need more attention. The faculty members apply the summarized standards of the CGSC and the Purdue Online Writing Laboratory (OWL) APA guidelines to evaluate students' written products, so the rules and principles for effective academic writing and writing mechanics are routinely reinforced.

Student understanding of these principles of effective academic writing taught during the residence phase of the course is tested with the Effective Writing Principles test, a multiple choice instrument of 33 questions, which are answered with open book and notes. Students access the test asynchronously on the Blackboard course management system within two weeks of the resident writing instruction, which is delivered during the first week of the semester. Once a student begins the test, they have two uninterrupted hours to complete it, and their performance is automatically graded. The questions were originally drawn from practical exercises on the CGSC web site, but some questions were modified to remove any arcane military terms or references. An example question from the graded examination follows:

> What does clarity in writing demand?
> > a. Elimination of verbiage that only a few would understand.
> > b. Readers understand the writer's intent.
> > c. Explanations, illustrations, and examples are given, as needed.
> > d. All of the above. (Correct answer)

After testing their comprehension of effective writing principles, the students submit two products for evaluation in Academic Writing I:
- A detailed, well-structured outline compiled as prescribed by the CGSC program.
- A 1,000 to 1,200-word paper written from the outline.

The subject of the submittals is the specific courses and activities of the MS program that will enable each student to improve his or her management knowledge and skills. They must review the curriculum to find at least three courses or activities that should materially assist their professional management development. Then they elaborate on the expected value of the courses or activities for addressing their personal needs.

Students have about one month per requirement to successively prepare the submittals. Unless it is late, the critiqued outline is returned at least two weeks before the paper deadline. Students may repeatedly resubmit their work until the time it is due; no submittals are graded before the due date. Some request a "courtesy" review, which draws a few broad comments from the instructor but no detailed evaluation. The outline and paper are 90% of the course grade.

The content of a paper varies with individual needs, but as long as the selected program elements are discussed effectively, a student tends to earn high grades. Critical points of evaluation are (a) adherence to the prescribed outline format and (b) linear development of the paper from the outline and feedback about the outline. A number of students say that the rigor of outlining their paper and writing their paper from an outline is novel.

Results of the scored item data for the 18 distance master's students who completed all Academic Writing I requirements and who have a Graduate Record Examination (GRE) Verbal score are tabulated in Table 2.

Table 2 - Academic Writing I, Scored Item Data, 18 Students				
Items	**Mean**	**Median**	**Minimum**	**Maximum**
GRE Verbal Test Score	316	159	138	630
Writing Principles Test Score	80	84.5	67	94
Personal Improvement Needs Outline Score	92	92	75	100
Personal Improvement Needs Paper Score	93	94.5	85	99
Correlation, GRE-Principles	0.440			
Correlation, GRE-Outline	0.058			
Correlation, GRE-Paper	0.588			
Correlation, Principles-Outline	0.231			
Correlation, Principles-Paper	0.564			

Grades on the personal improvement needs paper correlate very well with both the GRE and the Writing Principles test. The GRE and Writing Principles test scores correlate well, too. However, the correlation of outline scores with both the GRE and the Writing Principles test are noticeably weaker. One surmises that the novelty of the outline requirement demands application of skills not tested accurately by the GRE or the Writing Principles instruments.

Academic Writing II

The Academic Writing II course is also 1 credit-hour but requires 2.5 contact-hours in residence. During the first year of the revised courses, to get all students exposed to the new writing program, the second year students shared some instruction with the first-year graduate students. The thrust of the second year resident phase is to reinforce the progressive production of a journal article, the focus of the Capstone Writing Course. Students must submit a credible article for possible publication to an industry periodical or academic journal to culminate their graduate studies. Belcher's *Writing Your Journal Article in Twelve Weeks* serves as the basis for the second year of resident writing instruction[28]. To complement this objective, the second year writing course also seeks improvement of student ability to condense information from a longer article and, then, to integrate and synthesize ideas for a paper from shorter but related publications. The graduate faculty had noted that many students often summarized and synthesized referenced concepts less adeptly than deemed necessary for their written Directed Projects.

Two exercises comprise the evaluation for the course:
- Three 250-word executive summaries (EXSUMs) of business strategy articles of many pages.
- One 1,000 to 1,200-word paper to integrate the gist of their EXSUMs into a recommended business strategy tailored for the top managers of their respective companies.

Table 3 - Academic Writing II, Scored Item Data, 18 Students				
Items	**Mean**	**Median**	**Minimum**	**Maximum**
GRE Verbal Test Score	316	159	138	630
Acad. Writing I, Writing Principles Test Score	80	84.5	67	94
Executive Summaries (EXSUMs) Score	92	94	75	100
Strategic Recommendation Paper Score	91	90	75	100
Correlation, GRE-EXSUM, 8 students only	-0.217			
Correlation, GRE-Paper, 8 students only	-0.325			
Correlation, Principles-EXSUMs	0.057			
Correlation, Principles-Paper	-0.142			
Correlation, EXSUMs-Paper	0.413			

Curiously, the scores earned by the reduced sample of students on their EXSUMs and papers correlate negatively with the scores they earned on their GRE. Neither is there strong positive correlation of Writing Principles scores with the EXSUMs and strategy paper scores of the larger sample of 18. Although scant, the evidence calls into question GRE and Writing Principles reliability for forecasting distance MS program student effectiveness in summarizing, integrating, and synthesizing the thought of complex publications. At least for the small sample, one cannot help but question the value of the two test scores to predict the quality of higher level cognition and ability to communicate its results, as required for the advanced writing exercises. More data is required to be confident of any inferences. The faculty remains cautiously optimistic about the apparent value of the Academic Writing I and II courses as they are currently delivered for improvement of the writing skills of distance MS program students.

Feedback from the students who have completed all Academic Writing I and II requirements has been very positive overall. Three of the students wished for more critique after outlines have been returned and papers were due, while others seemed satisfied with the amount of instruction and interaction. All submittals provide detailed review and suggestions for improvement. Other students cited faculty responsiveness to their queries as prompt and sufficient; this is especially important for distance learning courses. Numerous email and some telephone exchanges throughout the courses, especially during Academic Writing I, confirm ready accessibility of assistance. Such communication seems particularly critical for the writing success of some students for whom the more linear development of written products is less familiar. The future Academic Writing I course structure may include an optional distance meeting at some time between return of reviewed outlines and submission of resulting papers.

Capstone Writing Course

Each student in the distance MS program completes their degree requirements with a pass/fail course based research and scholarly writing activity. The Capstone Writing Course is a guided independent study course that requires the student to write and submit an article for publication in a construction management academic journal or trade journal. Each student works with one faculty advisor. The student completes the published paper requirement when the faculty

member gives final approval and the paper has been submitted to the journal for review. The student does not need to wait on journal acceptance before receiving his/her degree because the review and acceptance process can take several months. The faculty advisor has the responsibility to work with the recent graduate to incorporate the journal reviewer's comments and to resubmit for publication. Unfortunately, to date most of the students have lost interest in publishing the paper once they receive their degree and they do not revise and resubmit.

This course consists of a series of written assignments that culminates in the submitted paper. The starting point for the journal paper is a proposal prepared during the Analysis of Research in Construction course completed during the third semester (summer) of the program. Upon completion of the journal article proposal, the student contacts a potential faculty member to ask him/her to serve as the faculty advisor for the capstone course. During the fourth and fifth semester (fall and spring) the student gathers the final information for the paper. This data gathering to date has included surveys, interviews, case studies, and intensive literature reviews. The course structure adds the necessary guidance needed to keep the distance delivery students moving forward to completion. There are twelve detailed assignments for preparing the final journal paper. These assignments are based on the book, *Writing Your Journal Article in Twelve Weeks: A Guide to Academic Publishing Success*, by Wendy Laura Belcher[28]. The students submit one assignment at a time. At a minimum they must submit at least one assignment per week. The faculty advisor provides timely comments throughout the semester.

The following is a summary list of the semester's activities for the Capstone Writing Course:
- Select the appropriate journal for submission
- Revise each section of the proposal to meet journal writing guidelines
- Add results and conclusions sections
- Complete a plagiarism check
- Write cover letter & submit

To date, the Capstone Writing Course has been offered for two cohorts of students. Although one student required an additional semester to complete the writing activity, all full-time students in this two year period have successfully completed the course.

Conclusion

The synchronous internet delivery of courses has worked well for the Building Construction Management graduate program for both traditional students in the physical classroom as well as professional students geographically dispersed. The experience with distance education for active construction managers has shown a need for academic writing requirements that are not too open-ended and have relevance to construction industry practice. The additional writing instruction, practice, and feedback along with the structured writing guidance for the capstone writing process that was added to the initial program structure has allowed the Purdue BCM distance MS program to reach a nearly 100% completion rate for the last two cohorts of students.

A current shortcoming of the Capstone Writing Course is a failure to create adequate interest on the part of graduating students to pursue journal article revisions. As would be expected, the journal paper submissions that result from the course are seldom adequate to meet peer review

acceptance without at least some revision. After two years of combined daily activity to meet career demands and course requirements, students are happy to accept their diploma. Because these students will typically continue to advance their career outside of the academic community, having a successful journal paper publication does not appear to be adequate incentive for them to invest the time required for revisions.

As this program continues, it will be necessary to continually assess the impact of both the writing instruction and writing output of the students. Even though there is some early evidence of success, the sample size is small. The positive program completion outcome of the last two years may indeed be a function of the student character and study habits of these two cohorts or the faculty involved in their guidance. It is important that the graduate faculty continue to see student writing quality that allows them to mentor students on the content of the writing without the need to spend an inordinate amount of time on the mechanics of the writing.

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