Continuous Improvement Report

for the Construction Management Degree Program

Academic Year 2018-2019

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1. Scope

The Continuous Improvement Report is the implementation plan evaluation of the comprehensive assessment at the degree program level. This report explains the results of the review of the degree program goals and learning outcomes.

The report intends to inform the different stakeholders on the annual and continuous improvement activities in the Construction Management Program and the action items for improvement. This report can be shared internally at the university level and externally with other stakeholders and the public.

2. Assessment Report

This report describes the assessment results gathered during the 2018-2019 school year from our surveys and data sets related to the Construction Management Program Goals and the twenty American Council for Construction Education (ACCE) Student Learning Outcomes (SLOs). A new Assessment Implementation Guide was developed to assist the Department with maintaining consistency and outlining each assessment's types and cycles. This guide is included in Table (1) on the next page, and the year or semester of implementation is highlighted.

The types of assessments reviewed for this report are as follows:

1. Semester Assessments: SLO Direct Assessments, which includes class student work deliverables and their assessment scores, Seniors Exit Survey, and every other semester the program conducts an Industry Advisory Board (IAB)-led Seniors Exit Interview, in which all surveys are considered indirect assessment tools.
2. Annual Assessments: Employers Survey, Placement/Salary Survey
3. 3-Year Assessments: Alumni Survey

According to the new ACCE standards updates in 2016-2017, the Department decided to change the cycles for collecting direct assessment data for our 20 ACCE SLOs. We have been collecting assessments for all SLOs annually, starting with the 2018-2019 school year.

Our goal has been to assess 10 SLOs during the fall semester and the remaining 10 SLOs during the spring semesters.

The program goals and the learning outcomes assessment results are presented with their analyses and conclusions in the following sections. Additionally, the program implemented some action items and will implement others in the coming years.

Table (1) ASSESSMENT IMPLEMENTATION GUIDE

2017 - 2020

		SEMESTER ASSESSMENTS			ANNUAL ASSESSMENTS				3-YR ASSESSMENTS	
		DIRECT ASSESSMENT - SLOs	INDIRECT ASSESSMENT – SLOs SENIORS EXIT SURVEY		REVIEW OF PROGRAM OBJECTIVES & LEARNING OUTCOMES	EMPLOYERS SURVEY (INTERN EVALUATIONS)	PLACEMENT/SALARY SURVEY (PROVIDED BY UNIVERSITY)		ALUMNI SURVEY (PREVIOUS 5-YEAR GRADS)	IAB COURSE ASSESSMENTS REVIEW
AY 2017	Fall 2016									
	Spring 2017									
AY 2018	Fall 2017									
	Spring 2018		X						X	
AY 2019	Fall 2018	X	X			X	X			
	Spring 2019	X	X		X	X				
AY 2020	Fall 2019									
	Spring 2020									
AY 2021	Fall 2020									
	Spring 2021									

"X" mark inside the yellow color indicates the implementation of the assessment.

3. Part 1: Assessment of Program Objectives

The Construction Management Department has six program goals: Curriculum, Advising, Student Activity, Faculty Development, External Support, and Assessment and Planning. Of these six goals, three of them have been evaluated during the 2018-2019 academic year. The results are explained below:

3.1. Curriculum

"Offer globally competitive, technologically current programs that are recognized and respected for preparing students to enter the workforce."

A. Performance Criteria:

1) Assessing the ability to offer the expected learning content in the major required classes, the goal is to evaluate industry needs and the Industry Advisory Board (IAB) Committee's recommendations on which current courses to adjust or new courses to implement. The program will follow MnSCU's guidelines regarding the type of courses offered and evaluate the needed curriculum contents for students' success.
2) Assessing the number and the quality of technology and software packages, including the hardware units available to students; the goal is to maintain a computer lab with 24 seats for the different construction classes with the appropriate software packages that serve students in construction drawings, cost estimating, scheduling, and project management, and learning by utilizing more new technology used in the construction industry
3) Assessing the number of students who would engage in international opportunities; the goal is to offer one or more study abroad programs in the CM program and create exchanged programs with at least one or more global partners.
4) Assessing the ability to develop one or more partnership agreements with educational and professional entities; the goal is to complete one or more partnership agreements to offer competitive learning opportunities.

B. Assessment Method;

Students, alumni, employers, and/or IAB surveys, and the assessment of the reported qualitative and quantitative data will be collected and analyzed

C. Assessment Results:

Seniors Exit Survey

Through our Seniors Exit Survey's utilization, we asked students what knowledge they felt they needed. The survey showed that students mainly indicated a need for:

1) More estimating/cost control/accounting (30% of responses)
2) More scheduling/sequencing (19% of responses)
3) More plan reading/shop drawings (14% of responses)

In addition to the raw data collected from the Seniors Exit Survey, we asked Minnesota State University Mankato's Organizational Effectiveness Research Group (OERG) to review the survey and provide a report using their expertise and reporting methods. The relevant results are:

1) Regarding skills students felt they needed during their education, the OERG report showed that students' highest areas of concern were estimating, accounting, and scheduling, each being mentioned by five students.

2) In regards to classroom comfort, top comments by students included:
    a) "Everything was good" (26 similar comments)
    b) "Good Classroom Design" (10 similar comments)

3) Additional recommendations made by OERG based on student feedback were:
    a) To utilize the testing labs in Trafton Building for material testing.
    b) To make sure charging ports work.
    c) To adjust classroom temperatures.
    d) To rearrange tables to encourage a more cohesive and unified setting.
    e) To provide a work-shop area for hands-on work.
    f) To be aware of broken chairs or tables.

4) In regards to computer use and appropriateness of Construction Management software in the CM program, top comments made by students included:
    a) "Good" (15 similar comments)
    b) "Learn a variety of software programs to be more well-rounded" (6 similar comments)
    c) "Difficult to learn because each company uses a different software" (2 similar comments)
    d) "More training with Excel" (2 similar comments)

5) Other recommendations made by OERG based on student feedback were:
    a) To spend more time on takeoff software.
    b) To teach methods, not software.

c) To offer more detailed explanations.
d) To make software available for students on personal computers.

Seniors Exit Interview

Through the feedback received from our IAB-led Seniors Exit Interview, students were asked which one class they would suggest removing from the CM curriculum and why. When discussed in groups, the most proposed changes for removal or reformatting of current CM courses were as follows:

1) CM 492; comments were to have a more structured format and to make specific topics their own permanent course (Construction Cost Accounting, specifically).
2) ECON 207; comments were to remove this course from the major requirement as students were uncertain how it relates to CM.
3) CM 108, 111, and 297; comments were to combine these courses' content into one class.

Students were asked to suggest in class to add to the CM curriculum and why through the feedback received from our IAB-led Seniors Exit Interview. When discussed in groups, the most proposed changes for curriculum improvements:

1) Offer more electives or specialty tracks.
2) Utilize more project-based learning throughout the curriculum.
3) Make construction accounting a required course.
4) Utilize more 3D technology and BIM in different classes.
5) Include the business finance class FIN 362, a required course.
6) Expand more the plan reading materials and activities.

D. Actions Taken:

1) The faculty members have engaged in a curriculum redevelopment to improve student's learning experiences and reflect on the industry needs and changes. New classes were introduced, and other existing classes were modified. The changes will be submitted to the college curriculum committee for approval and process in fall 2021.
2) The computer lab will be updated with the new version of Revit, Bluebeam, Primavera, and Microsoft Project with the existing 24 seats. Additionally, the program provided all software packages access, including Procore, to all students to download on their computers for free.

3) One study abroad program with the Karlsruhe University of Applied Science in Germany is planned for spring 2020 through the seminar elective course.
4) The program engaged in partnership and collaboration activities with the Aggregate and Ready Mix Association of Minnesota. The goal is to provide concrete production and construction learning opportunities.

3.2. Advising

"Provide effective academic and career advising to foster a commitment to life-long learning."

E. Performance Criteria:
   1) Assessing the adequacy of faculty advising load to achieve a successful learning experience for students, the goal is to distribute the advising load equally among all full-time tenured and tenure-track faculty.
   2) The program will assess the students' satisfaction rate and feedback of their advising experience; the satisfaction rate will be maintained at 80% and above from survey feedback.

F. Assessment Method;

Students survey and the assessment of the reported qualitative and quantitative data will be collected and analyzed

G. Assessment Results:

Seniors Exit Survey

We asked students what the Department could do to provide better advising through our Seniors Exit Survey's utilization. The survey showed that students mostly indicate:

1) the availability/dependability/punctuality of the professors (37% of responses), and
2) receiving more helpful and consistent information during their advising meetings (26%)

In addition to the raw data collected from the Seniors Exit Survey, we asked Minnesota State University Mankato's Organizational Effectiveness Research Group (OERG) to review the survey and provide a report using their expertise and reporting methods. The relevant results are:

1) In regards to improvements to student advising, top comments from students were as follows:
    1) "Have advisors that show up to scheduled meetings and are punctual." (11 similar comments)
    2) "Be available more often." (7 similar comments)
    3) "Ensure that professors are accountable and get along with one another." (5 similar comments)
    4) "Demonstrate an interest in the job/care for the students." (3 similar comments)

2) Recommendations made by OERG based upon student feedback were:
    1) To improve the organization.
    2) To continue handing out the documents to outline a logical education path.
    3) To provide more site visits.
    4) To be upfront.
    5) To require students to meet with their advisors at least once a year.
    6) To allow overrides of courses/pre-requisites for transfer students.
    7) To have walk-in hours for all faculty members.
    8) To provide opportunities to work on real projects.
    9) To look at how classes could best be paired together. To explain the goal areas that each course meets.

D. <u>Actions Taken:</u>

1) The university will implement a new advising model for first-year students starting fall 2020. The program will evaluate the current practices in fall 2020, and further steps for improvement will be assessed and developed accordingly.
2) The faculty agreed to utilize the Booking Microsoft software to have one link for all faculty availabilities so that students can have multiple options on any day to meet any faculty member.
3) The program developed advising sheets and a plan of study flowchart posted on the department website and communicated more frequently with all students.
4) More advising activities will be included in the first freshmen classes.

5) The program developed advising notes to be discussed among the faculty to keep consistent advising information to all students and will be presented in four-group advising sessions every semester.

3.3. Student Activity

"Involve students in industry-sponsored events to facilitate students' professional development before graduation."

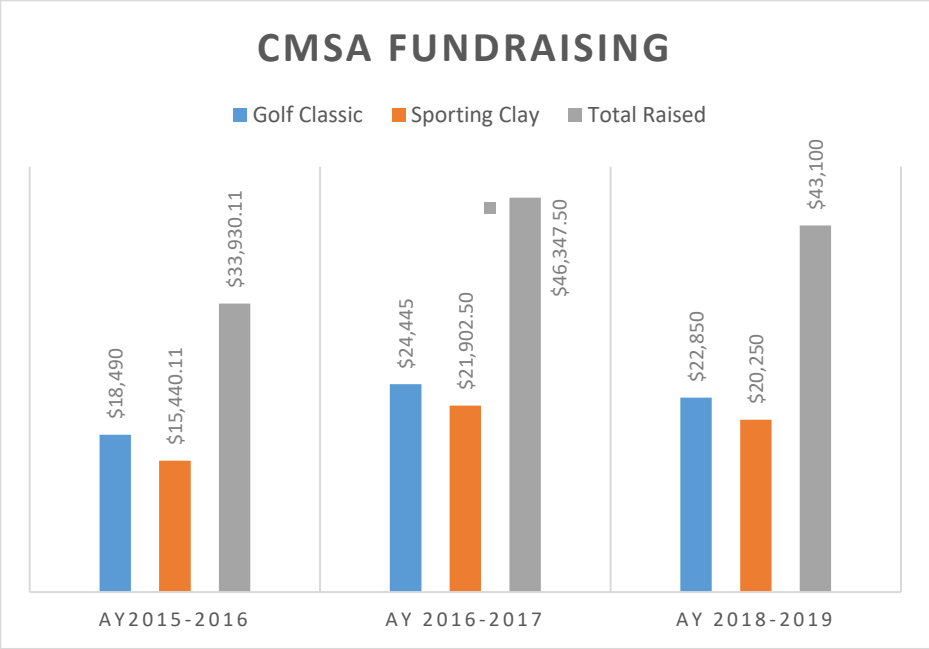
A. Performance Criteria:
   1) Assessing the number and success of industry-sponsored events each semester to support students' professional development.
   2) Assessing the appropriate number of students in teams to participate in competitions, the Construction Management Student Association (CMSA) officers with the program faculty agreed that at least one student competition and one team to participate should be maintained every year.
   3) The goal is to assess funding capacity availability to maintain at least ten thousand dollars every year to support student activities and networking opportunities.

B. Assessment Methods:
   1) Developing at least one event each semester for students to support their professional development.
   2) Supporting involving students in teams to participate in competitions, the CMSA officers with the program faculty agreed that at least one student competition and one team to participate should be maintained every year.
   3) Securing adequate funding for extra-curricular activities and projects, the CMSA officers with the program faculty agreed that at least ten thousand dollars should be raised every year to maintain students' activities and networking opportunities.

C. Assessment Results:
   1) Events:
      - Again, two main events were put on by CMSA this year; the Golf Classic in the fall semester and the Sporting Clay in the spring semester. These events bring industry professionals and students together and raise funds for CMSA-sponsored activities.
   2) Competitions:

a) Two teams competed at the ASC Region IV during the fall 2018 semester in Nebraska City, NE. The 6-person Civil team took 4th place, and the 6-person Commercial team took 3rd place.
b) A team of 5 students participated in and won the Roofing Alliance Construction Management Student Competition in Tennessee in February 2019.
c) A team of 5 students participated in the Pursuit Competition, taking 1st place among the nine competing teams from the Midwest region. This competition was held in April 2019.

3) Fundraising:
- Total money raised by the industry for CMSA activities is on par with previous Academic Years. See graph (1).



D. **Action Taken:** The faculty advised the student chapter officers to be more creative in developing new events that would support their funding efforts.

4. Part 2: Assessment of Student Learning Outcomes

4.1. SLO Direct Assessments

Each SLO is assessed in one of our required program courses. We asked the instructors of these courses to provide a sample of the assessment tool used (tests, presentations, projects, etc.), what the targeted performance criteria were, what the class average was, as well as the instructor's reflection on the assessment and plan of action moving forward. Below in Table (2) is a list of the 20 ACCE Student Learning Outcomes we assessed with those not meeting the performance criteria highlighted:

Table (2) Direct Assessment of SLOs Data

Student Learning Outcome	Assessed In	Assessment Method	Semester Assessed	Target %	Actual %
SLO #1 – Create written communications appropriate to the construction discipline.	CM 450	Professional Development Plan	Spring '19	70%	97%
SLO #2 – Create oral presentations appropriate to the construction discipline.	CM 410	Presentation	Fall '18	70%	79%
SLO #3 – Create a construction project safety plan.	**CM 300**	Term Project (Safety Plan)	**Spring '19**	**70%**	**64.7%**
SLO #4 – Create construction project cost estimates.	CM 410	Assignment	Fall '18	70%	80.3%
SLO #5 – Create construction project schedules.	CM 330	Term Project	Fall '18	70%	93.4%
SLO #6 – Analyze professional decisions based on ethical principles	CM 340	AGC Case Study Report	Spring '19	70%	86.4%

SLO #7 – Analyze construction documents for planning and management of construction processes.	CM 330	Term Project	Spring '19	70%	80.7%
SLO #8 – Analyze methods, materials, and equipment used to construct projects.	**CM 380**	**Test**	**Fall '18**	**70%**	**69%**
SLO #9 – Apply construction management skills as a member of a multidisciplinary team.	CM 497	Internship report	Fall '18	70%	96%
SLO #10 – Apply electronic-based technology to manage the construction process.	CM 340/CM 120	Procore Assignments	Fall '18	70%	93.1%
SLO #11 – Apply basic survey techniques for construction layout and control.	CM 271	All graded work & tests	Fall '18	70%	83%
SLO #12 – Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	CM 340	Exam #1 & Exam #2	Spring '19	70%	71.4%
SLO #13 – Understand construction risk management.	BLAW 476	Exam	Fall '18	70%	84.3%
SLO #14 – Understand construction accounting and cost control.	CM 410	Assignment & Test	Fall '18	70%	76%
SLO #15 – Understand construction quality assurance and control.	CM 340	Exam #1 & Exam #2	Spring '19	70%	71.4%
SLO #16 – Understand construction project control and processes.	CM 330	Assignment #5 & Assignment #6	Fall '18	70%	77.8%
SLO #17 – Understand the legal implications of contract, common, and regulatory law to manage a construction project.	BLAW 476	Exam	Fall '18	70%	80%
SLO #18 – Understand the basic principles of sustainable construction.	CM 350	Building Automation Paper	Fall '18	70%	90%
SLO #19 – Understand the basic principles of structural behavior.	CM 222	Test #2	Spring '19	70%	83%

SLO #20 – Understand the basic principles of mechanical, electrical, and piping systems.	CM 350	Plumbing Test, HVAC Test, & Electrical Test	Fall '18	70%	88%

In this report, we will only touch on the SLOs whose performance criteria were not met:

SLO #3 – Create a Construction Project Safety Plan

(Assessed in CM 300 Construction Safety, spring 2019)

Assessment Tool (s)	Type of Assessment	Performance Criteria (Target)	Outcomes (Actual)
Term Project	Direct	70%	64.65%

Instructor's reflection: "Students do not like to write about the plan in general. As feedback, even though I gave the page limit per section during the draft, many of them have not been revised nor updated. Many students feel safety itself is a boring subject, and it triggers the writing."

Instructor's Action Items: "Try different formats of the plan and make this course interesting. Bring more guest speakers."

SLO #8 – Analyze Methods, Materials, and Equipment Used to Construct Projects

(Assessed in CM 380 Construction Equipment Management, fall 2018)

Assessment Tool (s)	Type of Assessment	Performance Criteria (Target)	Outcomes (Actual)
Test	Direct	70%	69%

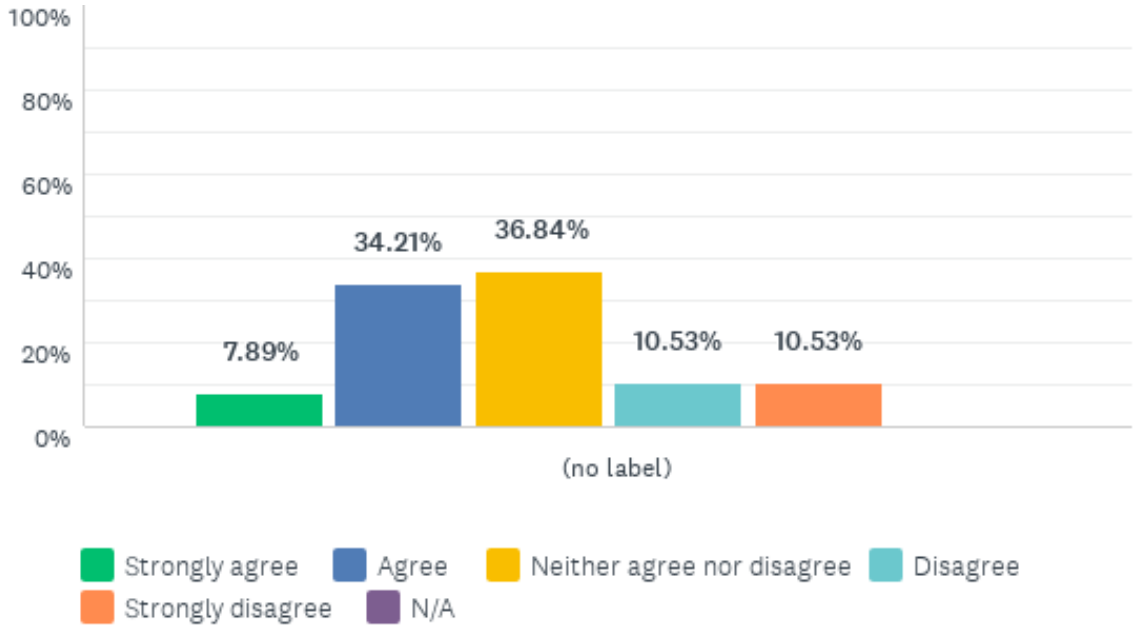
Instructor's reflection: "Many students are not familiar with interest rates, present, and future value, and annuity even though they are necessary for equipment management."

Instructor's Action Items: "Provide more practical examples in the class."

4.2. SLO Indirect Assessment: Seniors Exit Survey

Each semester we conduct our Seniors Exit Survey through our CM 450 class. In this survey, we ask how well students think they can perform each of our 20 ACCE Student Learning Outcomes after completing their education in our program. They can answer "Strongly Agree" (5), "Agree" (4), "Neither Agree nor Disagree" (3), "Disagree" (2), "Strongly Disagree" (1), or "N/A" (0). We considered the weighted average as the basis for overall student satisfaction. Having SLOs with a weighted average of 3.5 (70%) or higher was the satisfaction goal. For Academic Year 2019 (2018-2019), all Student Learning Outcomes had a weighted average of at least 3.5 (70%) or higher of surveyed students being satisfied besides the following:

SLO#3 - Create a Construction Project Safety Plan



	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE	N/A	TOTAL	WEIGHTED AVERAGE
(no label)	7.89% 3	34.21% 13	36.84% 14	10.53% 4	10.53% 4	0.00% 0	38	3.18

Survey Results: 64% satisfaction rate based upon the rated average.

Actions Taken: The Department changed instructors for our Construction Safety course beginning the fall 2018 semester. Students taking this course with the new

instructor will be seniors next academic year, and feedback regarding this SLO will be evaluated to see if there is an improvement in student satisfaction.

Conclusions: Based upon this data and the direct assessment data collected for the course this SLO is assessed in, students did not reach the performance criteria target either. It can be concluded that improvement needs to be made in order for students to have confidence in their ability to create a construction project safety plan after completing their degree in our program. Additionally, the instructor has been developing new materials for this class through professional industry support.

5. Part 3: Other Assessment Data

5.1. Indirect Assessment: Internship Employer Survey (data collected annually)

We receive employer evaluations about our student's performance and knowledge during the internship with their company through our required student internship course.

Fifty-two employer evaluations were returned to the Department out of 61 registered internships during Academic Year 2019. A review of these employer surveys submitted during AY2019 yielded an average ranking of 4.4 out of 5 for the 12 areas surveyed: overall competency of the intern, the complexity of duties given, understanding of construction process, knowledge of administrative procedures, quality of work, productivity, communications, leadership, personal appearance, initiative, interaction, and problem-solving. See Table (3) below.

Table (3) ACADEMIC YEAR 2019 INTERN EMPLOYER EVALUATIONS

SKILL, KNOWLEDGE, OR TRAIT EVALUATED	TOTALITY OF RATINGS	# OF STUDENTS	AVERAGE RATING
Overall Competency of Intern	210	48	4.4
Complexity of Issues	201.5	48	4.2

Construction Process	221.5	52	4.3
Administration Procedures	228	52	4.4
Quality of Work	224.5	52	4.3
Productivity	225.5	52	4.3
Communications	225.5	48	4.7
Leadership	211	51	4.1
Personal Appearance	227	50	4.5
Initiative	222.5	52	4.3
Interaction	227	52	4.4
Problem Solving	214	52	4.4
The totality of Average Ratings			52.3
÷ Number of Categories			12
Total Average Rating			**4.4**

Based on this feedback, it can be concluded that employers are overall delighted with the student interns from our program. No action is needed at this time.

5.2. Indirect Assessment: Placement-Salary Survey (data collected annually)

Minnesota State University Mankato's Instructional Research, Planning, and Assessment Office provides annual reports regarding retention, awards, demographics, student success, and post-graduation employment. During the 2018-2019 Academic Year, data was published through this Office for the previous Academic Year, which is what is shown below. Critical data relating to the success of our program and its students are as follows:

1) Program Declarations fall 2017 = 238
2) Demographics fall 2017:
    a. Ethnicity
        i. 11% Student of Color
        ii. 89% Not Student of Color
    b. Gender
        i. 5% Female
        ii. >94% Male
        iii. <1% Unknown
    c. Avg GPA = 2.88

3) Program Awards for 2016-2017 (AY 2017) = 71
4) Graduate Follow-Up Survey Self-Reported Data for 2016-2017 Graduates (AY 2017)
    a. Employment Status One Year Following Graduation
        i. 82% Employed in Related Field
        ii. 8% Status Unknown
        iii. 2% Continuing Education
        iv. 6% Available Unemployed
        v. 2% Employed Unrelated Field, Seeking Related

1. SLO Indirect Assessment: Alumni Survey (conducted every three years)

For our 3-Year Alumni survey, conducted in spring 2018 and reviewed by the Department during the fall 2018 semester, we worked with Minnesota State University Mankato's Organizational Effectiveness Research Group (OERG). OERG is an in-house consulting business within the Psychology Department that allows its students to work as associate consultants and gain real-world experience. Our Department decided to utilize the services they offer to conduct our Alumni survey.

The survey OERG composed gathered data from Construction Management Alumni about the following information:

1) Graduation Year
2) Current Job Title
3) Current Location
4) Industry
5) Industry Sector
6) Employer Type
7) Work Type
8) How the CM Program prepared them regarding our 20 Student Learning Outcomes
9) What did you learn through the CM Program that has been most helpful
10) Area for improvement within the CM Program
11) Updates in the Profession
12) Would they recommend our program and why
13) Demographics

The key takeaway from this survey per OERG are as follows:

1) Demographics:
    a) Predominantly white *(94.64%)*
    b) Predominantly Male *(83.93%)*
    c) Working in MN
    d) Office Work *(88.14%)*
    e) Predominantly 2008 graduates responded *(17.74%)*
2) Recommendations by OERG:

a) Keep focusing on developing teamwork and communication skills, as graduates find these very valuable skills.
b) Students feel that more fieldwork and an introduction to the details of project management and leadership would be a helpful addition.
c) Keeping up with technology and how digital work affects Construction Management is vital.
d) Focusing on preparing students on general rules of professionalism (communication, presentation, etc.) would be an opportunity for growth within the program.

Actions Taken (Student Learning Outcomes, direct and indirect assessment data):

1) In fall 2018, the program's full-time faculty member started to teach the safety class. He has updated class material and incorporated the ten-hour OSHA card instead of thirty hours. The changes also include incorporating teaching students to develop a project-specific safety plan.
2) More practical examples of materials and site visits were included in multiple classes to help students learn about different construction methods. More in-depth evaluations of all major courses and curriculum have been conducted to improve students learning.
3) A new technology seminar class will be offered in fall 2019 to enhance student technology learning experiences.
4) The program faculty recognized the need to evaluate new recruiting tools to attract female and minority students to join the program. Reaching out to high school populations with adequate marketing messages and engaging activities will be initiated in the coming years, emphasizing this career's value and opportunities.
5) The alumni responses were from alumni who graduated five years ago. The program implemented several technology tools in CM340, the project management course, and professional development activities in specific courses like CM297, professional practice course, communicated in the program newsletter, and industry advisory board members.