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EMGT 901: Total Quality Management Using Six Sigma Techniques

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EMGT 901: Total Quality Management Using Six Sigma Techniques
(A web-based fully online course)

A Peer Review of Teaching Project
Course Benchmark Portfolio
Spring 2019

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Abstract

Total Quality Management Using Six Sigma Techniques (EMGT 901) is an elective course in the Master of Engineering Management (MEM) Program at the University of Nebraska – Lincoln and serves as my Peer Review of Teaching Project (PRTP). This is an elective course in a fully online program. Students in this program have an earned undergraduate degree in engineering and are practicing engineers with at least two years of work experience. In this PRTP I will examine the development and delivery of the course based on pedagogical and backward design considerations and the framework proposed by Quality Matters®. I will, also, document several items, including: my motivation to participate in Peer Review of Teaching (PRT), relevant information about the course and the MEM program, my choice for course-level objectives, my choice for assessments to determine whether students achieve learning objectives, and my choice for course materials, activities, and technologies which facilitate learning and achievement of objectives. I will examine artifacts and assignments produced by students to determine whether course design, delivery, and teaching practices are effective. Findings reveal that objectives, assessments, and course activities and materials are in alignment with each other. Mid-term survey indicates students believe the course and learning materials and teaching practices are effective and helpful. There is concern about one learning objective (#3) as there is indication that a low percentage of students are meeting that objective. In conclusion, I will discuss what I have learned from this project, and areas for improvements in the course for future offerings.

Key words: Six sigma, total quality management, online learning, student surveys
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Introduction: Objectives of Peer Review Course Portfolio

In this section, I will describe the motivating factors for me to participate in the peer review of teaching project (PRTP) and I will provide a detailed description of the course that is the subject of my PRTP.

Motivation to Participate in Peer Review of Teaching Project (PRTP)

I am the director for the Master of Engineering Management (MEM) Program in the College of Engineering, which is a 100% online professional master’s degree. I joined UNL and the MEM program in August of 2017, but I have been in the teaching profession for 27 years and loving every minute of it. My students and their success have always been of the highest priority to me. My decision to join the PRTP stems from a quality improvement perspective.

• One of the subjects I teach in the classroom is quality management.
• I am the Education Chair on the board for the Nebraska Section 1302 of the American Society for Quality (ASQ).
• I have completed two certifications by Quality Matters, which is an organization dedicated to promoting best course design practices for online and blended courses.
• The first semester I joined UNL, I joined ARISE which emphasizes backward course design.
• The first summer that I was at UNL, I participated in the Summer Institute for Online Teaching (SIOT), which is a workshop dedicated to online course design and teaching.
• Since I have joined UNL, I have attended almost all symposia, lectures, events, and workshops on teaching & learning improvement.

Given the above, it is no wonder that I totally believe in continuous quality improvement. Teaching and pedagogy is no exception when it comes to subscribing to Total Quality philosophy. No matter how long one has been in the profession, there is always room for doing better and learning new knowledge to be more effective in the classroom, and that applies to both on-ground and online courses.

It is for this reason that I decided to join PRT. I would like to, continually, learn new ways to improve my courses and teaching practices, and to help students learn better and more authentically. Additionally, as the director of the MEM program, I would like to be a mentor to the faculty and lecturers who teach in the program so that our students will reap the benefit that could emerge from sound course design and alignment of objectives, activities, and assessments in MEM courses.

Context: Enrollment/Demographics

To successfully grapple with what my course is, I must first consider the academic program in which it resides, the students who pursue that program, and their motivation for
doing so. The Master of Engineering Management (MEM) is a professional graduate program in the College of Engineering. It is a graduate degree for working engineers who have earned at least a BS in engineering or STEM (Science, Technology, Engineering, Math) discipline, and have work experience (among other admission requirements). These are individuals who are in a technical track in their profession or are entering supervisory and/or management positions in their present job. MEM program demographic data appears in Exhibit 1.

### Exhibit 1: MEM Program Demographics (as of April 2019)

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Enrollment</th>
<th>Female</th>
<th>Male</th>
<th>Caucasian</th>
<th>African-American</th>
<th>Hispanic</th>
<th>Asian</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Enrollment</strong></td>
<td>72</td>
<td>8</td>
<td>64</td>
<td>53</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td><strong>3-Year Total Graduates</strong> (Fall 2015 – Fall 2018):</td>
<td>46</td>
<td>4</td>
<td>42</td>
<td>38</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Nebraska Residents</strong></td>
<td>37 (Lincoln/Omaha: 23; Elsewhere in Nebraska: 14)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-Nebraska Residents</strong></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The motivation for pursuing this degree varies for each student. It could range from earning a graduate degree for promotion and raise, to a sense of accomplishment and satisfaction for accomplishing a long-life dream of doing graduate studies, to the desire to learn how to be (or become) an effective manager and leader in a technical/engineering workplace, or to even become a better employee and a better engineer. The curriculum in most undergraduate degrees in engineering either mainly or entirely focus on transmitting STEM concepts, knowledge, and skill sets. While those are critical and required for a practicing engineer, engineering graduates end up in workplaces where they must be active members of work teams, and interact with superiors, coworkers, subordinates, internal and external groups, clients and customers, and other constituents. Generally, engineering UG curricula do not include or scantily include subjects that prepare students with skills and business acumen such as communicating, conflict management, teamwork, motivating and influencing others, managing time, scope, and quality of projects, negotiation and legal considerations in engineering projects, etc.

Students who pursue the MEM already have the technical knowledge due to their undergraduate engineering degree and ample work experience, which is a requirement for joining the program. Their main goal for pursuing the MEM is to learn the people skills, business acumen, and management and leadership skills, while also gaining new technical knowledge in such topics as decision and risk analysis, project management, financial management, or quality management.
My PRTP Course

For my PRT project, I have chosen EMGT 901 - *Total Quality Management using Six Sigma Techniques*. While the Graduate Bulletin does not list a specific pre-requisite course for this class, knowledge of probability and statistics is essential and by default is a pre-requisite because an admission requirement for the program is an undergraduate course in probability and statistics (200- or 300-level, depending on the institution where it was taken). EMGT 901 is an elective course in the MEM program. Students may take two engineering electives and two general graduate electives. EMGT 901 fulfills the requirement for either of those two types of electives.

Enrollment for Spring 2019 was low. Only six students were in this class. This is because when offered in Spring 2018, enrollment was 27 which is very high for an MEM elective and is 38% of the MEM population. So, those who wanted to take this elective, have probably taken it already.

A couple of students pursuing graduate work in other engineering programs and from the College of Business may enroll in EMGT 901, also as an elective class. Business students must have earned a BS in engineering.

EMGT 901 is not a pre-requisite for another class in the program. However, what students learn in this course and take away from it can be instrumental in success at their jobs, their ability to see the big picture, critically evaluating processes that produce goods and services, and being champions for making value-adding changes to work processes and work flows by understanding and acting upon the *Voice of the Customer*.

Here is why I chose EMGT 901 for my PRT project. Given that EMGT 901 has no pre-requisite course in the subject of quality management, it must be introductory as the students are gaining “formal” knowledge about quality. For example, the course must expose the students to something as simple as definitions of quality given various perspectives such as what it means to customers, what it means to the workforce, and what it means from a process perspective. However, at the same time, nearly all students who take this course are working professionals who have had plenty of on-the-job exposure to quality-related concerns and issues at their work place. Those experiences inform their attitude toward quality and management of it. Depending on who they are and their prior experiences, almost all come into the course with preconceived notions and attitudes on what quality means to them, how to manage it, the worth/value of having a quality management department in their work place, and the extent to which their own department must interface with the quality management department.

To overcome those preconceptions and to enable the student to internalize the subject, it is imperative to expose them to the teachings of the great philosophers in the field of quality management. I want them to learn and contemplate on the differences in teachings of Quality Gurus such as Juran, Crosby, and Deming. As graduate students, they must know the
evolutionary formation of the field of quality management, as it exists today. But, once they learn those various philosophies and the focus of each, they must reflect and contemplate with which philosophy their own views are aligned. This is important because one’s definition of quality and perspectives on the scope and reach of quality initiatives greatly influences the approach that one takes toward management of quality in the work place. As practicing professionals in engineering, the students’ work and career invariably includes decisions that directly or indirectly relate to quality of processes and products. This course must provide a balance between qualitative and quantitative topics in quality management.

Framework for the Study and Considerations in Syllabus Creation

The merits of backward course design is well documented in teaching and learning literature and emphasizes that effective course design would include the following: a) identify desired results, b) plan learning experiences and instruction, and c) determine acceptable evidence that students have achieved those results. While this pedagogical perspective is valid and necessary for both online and face-to-face learning, an online course must also meet certain criteria to ensure high potential for student learning. Online courses must respond to several social, motivational, and technological issues from perspectives of both learners and faculty. Therefore, sound course design, development, and delivery remain of utmost importance to ensure student success in achieving learning outcomes.

Quality Matters (QM) is an organization devoted to online and blended course design. In evaluating a course, QM uses a rubric which includes eight general standards and 42 specific review standards. In 2017, I completed two QM certifications in, a) applying the QM rubric, and b) evaluating online courses with that rubric. It was stunning to learn of the vast amount of overlap between the pedagogy I had applied over the years, and what QM promotes.

Exhibit 2 is a graphical representation of the relationship between QM rubric standards. Although QM is dedicated to online and blended courses, the sound pedagogical framework applied by QM transcends all delivery formats and mirrors backward design which is promoted by ARISE, SIOT, and PRT, all of which are faculty workshops and projects at the University of Nebraska – Lincoln, dedicated to the topic of teaching & learning.

As Exhibit 2 illustrates, learning objectives form the foundational support for the rest of the course and for student learning. They describe what students must be able to do when the course ends. Learning objectives must be SMART:

- Specific, clearly stated, and consistent with the curriculum
- Measurable so that data can be collected to evaluate student learning
• Appropriate for the course level (e.g., graduate v. undergraduate, major v. non-major, theory v. laboratory, etc.)
• Realistic, doable objectives
• Tailored so that important course topics are captured

Exhibit 2: House of Quality for Course Design

Source: Adapted from Quality Matters®

The three pillars that support and hold up quality in online courses are depicted in Exhibit 2 as instructional materials, learning activities, and course tools and technologies. Planning and use of instructional materials must be carefully done as it paves the path for students to achieve course objectives. Learners must know and understand how course materials will help them in achieving course objectives. A variety of instructional materials must be used in the course, commensurate with various learning objectives, to ensure those objectives are achieved.

Learning activities must support interactions and engagement of the students with each other, with content, with faculty. This is an incredibly important part of design for online courses and must be considered as an important element in design for my PRTP course. Online instructors must clearly state and carefully explain their plan for interacting with the students and their role, visibility, and online presence in the course.

Technologies used must support student learning and achievement of course objectives by promoting engagement and active learning. It is highly recommended to use a variety of
technology tools in online courses to facilitate the learning process. Most Learning Management Systems (LMS) contain a number of tools, functions, and capabilities that are helpful in this respect. When used properly, these technology tools can foster collaborative and engaging interactions in the course and among learners. The most obvious is the Discussion Board where students interact electronically with their peers and professor. Additionally, the online grade center in most LMS provide a wealth of technology to help students in their learning journey. For example, in Canvas LMS, instructors are not only able to draw on, write on, highlight, and annotate submissions by students to provide feedback, but they are also able to provide audio and video comments straight from the Grade Center, and they can even email targeted messages to student groups based on their grades, performance on assignments, or participation level.

In designing any course, but particularly in an online course, one must treat assessments as an integral part of the learning process. Grading policy and specific criteria for evaluating students’ work must be clearly communicated to them from the start of the course. Graded assignments should be carefully developed and aligned with learning objectives to facilitate measurement and analysis. Learners must understand whether and how each assessment relates to the learning objectives. Choice of assessments must be commensurate with the objective level. For example it is unlikely that a multiple-choice quiz which contains questions to assess the student’s ability to “remember” and “understand” key words and basic concepts would be an appropriate choice for assessing the student’s ability to “evaluate” or “synthesize”.

**Teaching Methods, Materials, Course Activities & Interactions**

Given this is an online course in a fully online program, there is no residential component (i.e., no face-to-face or inside the classroom meetings). Therefore, both the class-activities and what would normally be outside class activities all take place outside of the classroom, during the times that the student allocates to studying and learning. This is a challenge of online format and learning environment. Transmission of knowledge must take place at a distance and not in a face-to-face setting.

Compared to a face-to-face class, generally a more varied number of teaching methods are used in an online environment. The subjective and qualitative content is better conveyed through readings for the course and open discussion where students express and exchange their views, opinions, and experiences on a subject in the discussion area. I would also use other videos that are available on the internet to present some qualitative course content. For instance, videos on Quality Gurus such as Deming or Crosby in which they present their own perspectives and philosophies on quality management and continuous improvement, rather than someone else (me) verbalizing where they stood and the relevance of their positions. Some of the discussion are graded, but still during the course of it, key points and elements of the topic of study will surface which will be helpful to the students to reflect upon, discuss, and comprehend.
For quantitative content, I prepare instructional videos that are essentially like a lecture that I would present in a classroom, so that students who cannot comprehend the content from reading the book, will have guidance and pathway to success. I use a tablet, stylus, and a headphone/mic to create the videos using screen-capture technology such as Camtasia by TechSmith or VidGrid. For the quantitative materials, I would provide solutions to some problems from the book and the problems that I demo in the videos. Students would be able to study them on their own to hone in on the details of the various methods of analysis and ask questions in the discussion area if they require additional explanation or discussion.

I carefully considered the issues discussed in sections 1 and 2 related to the online nature of the course, background of students, course level, prerequisite topics, and integrating pedagogical backward design practices. All of those were instrumental in development of EMGT 901, resulted in the syllabus which appears in Appendix A, and identified five learning objectives, which are shown in Exhibit 3.

### Exhibit 3: Course Learning Objectives for EMGT 901

<table>
<thead>
<tr>
<th>Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Explain the longitudinal and evolutionary definitions and perspectives of quality as offered by historical figures and quality Gurus, evaluate propensity and inclination of oneself to a particular philosophy, and reflect and explain the reasons for that propensity</td>
</tr>
<tr>
<td>2.</td>
<td>Outline and discuss principles of total quality management and continuous improvement</td>
</tr>
<tr>
<td>3.</td>
<td>Differentiate between costs of quality, and the overall impact of each on business</td>
</tr>
<tr>
<td>4.</td>
<td>Apply quality control tools and techniques for detection, root-cause analysis, prevention, and elimination of quality-related issues and problems</td>
</tr>
<tr>
<td>5.</td>
<td>Explain the DMAIC methodology of Six Sigma and use its tools and techniques for process improvement</td>
</tr>
</tbody>
</table>

#### Course Rubrics

Several rubrics were used for the different types of assignments in this course. Appendix B depicts the rubric for each type of assignment. In developing the rubrics, I tried to capture the essence of how students must perform, while not specifically telling them exactly how to do the assignment.

#### Teaching Methods and Course Materials

Given course content, online nature, and prerequisites for EMGT 901, select methods are used to provide a meaningful learning experience to the students. I prepared Exhibit 4, which encapsulates the relationship among all the components in the House of Quality. Starting with learning objectives, I identified types of assessments that would indicate whether objectives are achieved, and subsequently I chose, created, or found materials, activities, and tools for students’ use.

#### Probability & Statistics Prerequisite

As previously mentioned, the only prerequisite to EMGT 901 is one of the MEM program admission requirements, which is an undergraduate course in probability and statistics (generally 300-level). For most students in the program, several years have lapsed from
when they took that course until they enroll in EMGT 901. Therefore, it is important to provide refresher resources with prompts so that students are able to review and be ready for course material. I provide instructional videos that I have prepared, as well as some found from the Internet, as course resources, which students may review, as needed.

Exhibit 4: Alignment of Learning Objectives, Assessments, Activities, and Resources

What learners will be able to do; must be commensurate with course level
- Explain and discuss history and principles of quality management
- Differentiate costs of quality and assess their impact on business
- Apply quality control tools and techniques
- Use DMAIC methodology and Six Sigma tools for process improvement

What do I look for to know that learning has occurred
- Discussions & M.C. homework: Look for key words, ideas, relationships
- Exam Problem: Identify costs of quality & their impact on business
- Case and homework problem: Choose proper tools; apply to manage quality
- Course project: Apply DMAIC methodology and six sigma at work
- Learning journal entries and related discussion post
- Student Surveys

Course materials must help learners achieve stated learning objectives
- Choice of book, commensurate with course level and learning objectives
- Instructional videos prepared by me to supplement quantitative topics
- Refresher probability & statistics resources for prerequisite topics
- Excel templates; solutions to selected problems; readings & articles
- Videos, TED talks, documentaries on the web to reinforce concepts/content

Activities facilitate & support student interactions & engagements
- Student to faculty: Discussions, assignment feedback from instructor, optional Zoom sessions, instructional videos
- Student to content: Readings, journal entries, practice problem solving
- Student to student (large group): Introductions; content-related discussions & replies; course project video-presentation & replies
- Student to student (small group): Case

Course technologies must support learner’s achievement of objectives
Discussion area; use of video technology in introductions and course project presentation; instructional and documentary videos; Canvas Grade Center; Use of Excel software and templates
First Course in Quality Management

Although a graduate course, EMGT 901 is the students’ first formal education in total quality management and Six Sigma. While most have had exposure to it at work or have heard about it, few have actually studied it or have had any formal practice with it. But, while the course is introductory in nature, it must be taught at a graduate level for the types of students who are working professionals and have joined the program for a chance to apply what they learn. The course project is the capstone activity for EMGT 901 to assess objective 5, in Exhibit 3.

While full-scale Six Sigma projects may take several months to several years to complete, this course activity is on a small scale, yet it provides a meaningful experience as the student must go through each of the phases of the DMAIC methodology (see Exhibit 5) for a job-related problem they choose to analyze and solve.

Resources and Teaching Methods for Quantitative Content

Approximately half of the course content is quantitative in nature. To help students learn this content, I prepare instructional videos by screen capture technology. The videos may contain one or more of the following: PPT lecture, solve problems by writing on the screen of my tablet computer with a stylus, demonstrate use of software and Excel templates, demonstrate applets or simulations, and use a digital calculator emulator to demonstrate problem solutions. I also conduct Zoom sessions, with optional attendance by students to ask questions. Problem solving is a key to success in this course and part of weekly assignments is just that. While homework is graded, students know they must practice problem solving (which is not graded) prior to attempting the graded homework and exam.

Resources and Teaching Methods for Qualitative Content

For the other half of course content which is qualitative in nature, I provide resources that would put the material in context. For example, when learning about Quality Gurus, their definition of quality, and their philosophy and principles for managing quality, it is much more powerful to watch a video of them explaining what quality means to them, rather than an instructor tell students about the Gurus and how they built the foundations of quality management and improvement as a discipline. Therefore, in EMGT 901 I provide many links to videos, documentaries, TED Talks, and websites to solidify theory and concepts that students learn from the textbook and readings. In fact, when I emailed the Canvas ITS at UNL to retrieve some data analytics from the course
for my PRTP, the Instructional Designer who replied, volunteered the following comment about my course: “Btw I love how you design your course and it’s an information-rich course.” Exhibit 6 shows the content pages in a typical module in my EMGT 901. The consent form was the document students had to sign to allow use of their data in this project.

Exhibit 6: Typical Canvas Module and Content Pages for EMGT 901

Teaching Strategies to Build a Community of Engaged Learners

EMGT 901 is a fully online course and a first rule in designing such a course is for the faculty to build a sense of community and connectedness for students so that they are engaged and active in the course. Online instructors must establish and maintain presence in their courses by being visible, accessible, and willing to respond in a timely manner to questions and concerns from their students.

The first thing I did intentionally in designing this course was to avoid instruction by email. I have built different discussion areas to account for almost all forms of Q/A that may arise in a course like this. If students do not have a venue to post their concerns and questions, they will resort to emailing. However, I arranged to answer all questions through the LMS course site, unless the communication is personal and sensitive in nature, which would require privacy. There are a few reasons for this strategy:

a. For every student who has a question or concern, there are at least 2 others with the same type of question; posting them to the discussion area will avail the Q/A to all students
b. My ability to manage my time will be greatly impeded to engage in separate email conversations with each student

c. Allowing students to respond to questions from their peers contributes to building community as they help and support each other.

The following are the activities and assignments that I have integrated in the course to develop and promote interactions between students, with me, and with course content.

Tour de Class Video

Without investing too much time and effort, students must learn quickly the layout or map of the course, how to navigate it, and the instructor’s expectation. I created a 10-minute screen capture video demo of the course to save students exploration time, to guide them in navigating the course, to give an overview of the syllabus and course requirements, to specify guidelines for interactions, discussions, and communication, and to explain how to locate, retrieve, and submit assignments.

Introductions Discussion Area

For introducing myself to class, I created a short video while sitting in my living room where they can see me on the screen, as well as my background, a picture of my family, and my contact information. In the video, I told them about my hobbies, my family, and a couple of fun facts about myself. I did this to present a friendly and approachable side of me so they feel comfortable and open to ask questions. In the video I also told them how they can contact me (video conference, course discussion boards, email, phone, Zoom, etc).

One of the first required activities in the course is for the student to post a similar video message that is not text-based. I respond to each student with a personal video message.

Graded Discussion

I built six graded discussion activities in EMGT 901. In most of those discussions, I presented students with two or more questions and they had to pick one to answer. I chose this method to put the students in control of designing their learning experience to fit their needs. Rather than mandating response to one question, I gave them the option to pick one that interests them the most and they find more beneficial to their jobs. Appendix C contains the graded discussion assignment from module 6.

Online Office (Professor’s Corner) Discussion

This is a discussion area for non-content related questions, which deal with administrative concerns and issues. For example, students may have questions about due dates, course links not working, files not opening, etc. This discussion area is dedicated to such matters and promotes interaction not only with me, but also among students, as some will respond to others in a helpful, supportive manner.

Weekly Ungraded Discussion

As students study the material in a module, they will have questions about the content, which must be answered so that they can complete assignments and deliverables. I designed EMGT 901 with that in mind. I have created a forum for each module where content-related questioning takes place. An ungraded discussion area dedicated to
content questions is helpful for the students to get clarification and move on to the next activity. It facilitates supporting students in their learning endeavors in a timely manner, without having to wait for the weekly video-conference session, which may be days after they come up with their question. I use a variety of methods in this forum to interact with students, and to respond and clarify their questions. Some of those are: text-based messages, audio messages, instructional video tutorials, images, drawings, file uploads, etc. Everyone in class is encouraged to participate and respond, if they know the answer to a posted question.

All-Class and Targeted Communication

Communicating frequently with students assures them that I am interested in their learning and dedicated to their success. I frequently used all-class messages such as email, discussion board, or Canvas messaging function. These were any form of communication such as reminders, encouraging notes, websites or resources related to the topic for a module, or hints on assignments.

Timely Response and Feedback

In an online class, students must regularly be apprised of their progress in the course, with a reasonable amount of time from when the assignment is due until grades are issued. Similarly, they must get a response to their communications in a reasonable amount of time since, unlike a residential class, they don’t see their professor several times per week. My syllabus states that assignments are graded within 7 days of due-date, and I respond to communication from students within 48 hours. Although my response is generally within an hour!

Mid-Term Surveys

Student evaluations of the course and teaching are effective in making modifications to the course to make it better the next time I teach it. But, they are always too late to make improvements that positively impact experience of the students who wrote the evaluations. I used a mid-term survey to enable students co-create and impact their own learning process. Recommendations made in the mid-term survey can be implemented as long as they facilitate learning without adversely impacting achievement of learning objectives. An example would be sliding due dates to Sunday, instead of Friday, to allow students to complete the assignment during weekend. The mid-term survey I used in this course was anonymous and instructions assured students of that. I shared the results of the survey with class.

Analysis of Student Learning and Performance on Assignments

In this section, I will review performance of students on a few of a sample of assignments, as well as the mid-term survey results. There were only six students in class. Therefore, the analysis will be qualitative in nature.
Discussions

A few key findings from the discussion activity in the course will be discussed below.

Active and Passive Student Engagement

In one of our last PRT meetings, an instructional designer spoke about Canvas Analytics and various charts and reports that Canvas ITS staff are able to create related to student performance. We were told that faculty are not able to create those graphs and reports and that we must put in our request through Canvas ITS. I requested a few of those for EMGT 901, but the Canvas ITS team only presented me with one, shown in Exhibit 7.

Exhibit 7: Student Engagement Chart - Discussion Analytics
Active Engagement (X-axis) & Passive Engagement (Y-axis)

Exhibit 7 was created with course-level analytics. The chart indicates that student grades and their engagement level in the course are strongly positively associated, and that their grade aligns with their level of interaction and activity within the course and discussion area. Please note that the chart was created by ITS (signature is in red circle) and it only displayed the bubbles. I hand-drew the broken line on the chart. The graph quality was as it appears in Exhibit 7, when I received it.

I learned from the ITS staff who created the chart that UNL is leading this type of research with data collected by, and retrieved from, Canvas courses. This form of analysis is proprietary to UNL and at this point in time, individual faculty cannot generate analytic charts for their courses. They can only be requested from ITS.

Average Participation per Student

Perhaps indicative of the findings in the above section is the average participation in graded discussion areas. I had one student in class who was not participating in the course much and
ultimately received a grade of F (fail). But, the remaining 5 were quite active and engaged. In fact the average number of messages posted to the discussions was slightly higher than 4, whereas minimum requirement was only 3 (one original message and two replies).

**Students’ Reflection on What They Learned**

An ungraded assignment in this course was a set of Reflection Journals that the student had to complete at the end of each module (each week). Although these were not graded, students knew their journals would be the basis for the last discussion in the course. Appendix D contains instructions for that assignment and messages posted to it. The assignment asked students to identify the top 2 or 3 items they learned in EMGT 901, which are of value or significance to them. I was happy to see that messages indicated both quantitative and qualitative take-away that they found significant in their learning.

**Course objectives 1 and 2** deal with understanding the historical perspective and significance of quality management and quality principles. Messages posted by students included topics directly linked to objectives 1 and 2, such as: Process benchmarking, quality mindset, design review and product development process, Crosby’s “Zero Defects”, voice of the customer, quality gurus and their philosophies.

**Course objectives 4 and 5** deal with quantitative tools of quality management and six sigma. To this end, students have mentioned the following: Mean time to failure, mean time between failures, process capacity index and calculation, control charting, statistical analysis, ANOVA, and DMAIC methodology of six sigma.

Overall analysis of discussion forum entries dedicated to reflecting on what students gained and learned from the course is very encouraging and it appears students are able to identify how the course added value to their knowledge and skills.

**Applying Tools of Quality**

Course objective #4 states: Apply quality control tools and techniques for detection, root-cause analysis, prevention, and elimination of quality-related issues and problems. One of the discussion topics required students to differentiate between the various quality control tools. Appendix E contains the assignment and responses from each student. This was a scenario-based assignment.

Exhibit 8 documents each scenario, correct answer, the number and percentage of students who responded correctly to each scenario. Clearly, performance was sub-optimal on a few of these scenarios and will be discussed in the last section of this document as reflections about the course and future plans for improvement.
<table>
<thead>
<tr>
<th>Scenario</th>
<th>Correct (expected) answer on choice of quality tool</th>
<th># of Correct responses</th>
<th>% Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Flow chart or Process Map</td>
<td>4</td>
<td>67%</td>
</tr>
<tr>
<td>B</td>
<td>Cause and effect diagram</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>C</td>
<td>Use check sheet first, then use Pareto chart.</td>
<td>1</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Either one was accepted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Use process map first, the use Pareto chart.</td>
<td>2</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>Either was accepted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Use a survey to map visitors. Also could use demographic data to compute percentages.</td>
<td>5</td>
<td>83%</td>
</tr>
<tr>
<td>F</td>
<td>Scatter diagram and/or correlation analysis</td>
<td>4</td>
<td>67%</td>
</tr>
<tr>
<td>G</td>
<td>Run chart</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Regression analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mid-term Survey
A short mid-term survey was developed and distributed. The survey was anonymous and all six students participated. Questions on the mid-term survey and a summary of responses are shown in Exhibit 9.

Exhibit 9: Mid-term Survey Questions and Summary of Responses

<table>
<thead>
<tr>
<th>Mid-term Survey Question</th>
<th>Summary of Responses</th>
</tr>
</thead>
</table>
| 1 How is the pace of the course? Is it too slow, just right, or too fast? Please comment.| One said “too fast”  
Five said “just right”                                                                 |
| 2 Does the coursework, resources, videos, etc. help you understand and apply the subject matter? Please comment. | Everyone said, yes.  
Mentioned: Book, Discussions, Videos, Resources                                          |
| 3 Is the amount of coursework reasonable for what you are expected to learn, or not enough, or too much? Please comment. | Everyone said, just right.                                                          |
| 4 Is the amount of discussion appropriate, or too little, or too much? Please comment.  | Everyone said amount and depth of interaction and discussion is right.               |
| 5 List three things that you consider are going well in this class.                      | Resources provided by me  
Feedback from me  
Course discussions and interactions  
Homework  
Course content is applicable to work  
Final project is useful  
The whole course is going well |
| 6 List three things that need improvement in this class.                                | 4 said no improvements are needed  
1 said lecture by faculty  
1 said bigger class would have been good for more discussion activity |
| 7 Please tell me if there is anything I should do differently to help you succeed.    | 8 weeks is short for doing course project  
Students to write Qs for faculty to answer  
Insert Qs from videos in the weekly homework |

Appendix F has verbatim responses from students. As is surmised from the results, students were satisfied with the course, its pace, resources, teaching, amount and depth of discussions, and learning that occurred in the course. A couple of suggestions were made that could not be implemented in this term. But, I plan to incorporate them in the course the next time I teach this class. Those are discussed in the last section of this document as reflections about the course and future plans for improvement.
Exam Results

Given that this is an 8-week course, to optimize use of time, I administered only one exam during week 7, which was worth 100 points. It contained 79 items in total, 76 of which were multiple-choice, but included both conceptual questions and several small problems to solve. One item was short answer essay; one question was a large problem to solve; one question was a problem to solve and discuss findings.

Exhibit 10 was retrieved from Canvas and shows summary statistics for the exam. Minimum score was 68% and maximum score was 96%, with an average score of 82%. Standard deviation was 8.34 and is somewhat high, but is representative of the wide range in exam scores and the amount of variance that exists between students’ grades.

Exhibit 10: Exam Summary Scores

Since only six students were in class, I defined “good-performance” on a question to be: At most one person answers the question incorrectly. In other words, if 5 or 6 students (i.e., 83% or 100% of class) answers a question correctly, then that is defined to be good-performance on the question by the whole class. Exhibit 11 shows the results for the 76 multiple-choice questions.

Exhibit 11: Class Performance on Exam

<table>
<thead>
<tr>
<th>Class performance</th>
<th># of questions (out of 76)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No one missed the question (i.e. all students answered it correctly)</td>
<td>57</td>
</tr>
<tr>
<td>One students missed the question (i.e., 83% answered it correctly)</td>
<td>7</td>
</tr>
<tr>
<td>Two students missed the question (i.e., 67% answered it correctly)</td>
<td>8</td>
</tr>
<tr>
<td>Three students missed the question (i.e., 50% answered it correctly)</td>
<td>3</td>
</tr>
<tr>
<td>Four students missed the question (i.e., 33% answered it correctly)</td>
<td>1</td>
</tr>
<tr>
<td>Five students missed the question (i.e., 17% answered it correctly)</td>
<td>0</td>
</tr>
<tr>
<td>Six students missed the question (i.e., no one answered it correctly)</td>
<td>0</td>
</tr>
</tbody>
</table>
The top two rows show 57 exam questions were answered correctly by all students in class, while 7 questions were answered correctly by 5 (out of 6) students. The bottom rows in Exhibit 11 are colored red to indicate a total of 12 exam questions did not meet the “good-performance” standard I have set for evaluating class performance. Canvas quiz analytics identified those 12 questions as number 4, 5, 7, 8, 9, 12, 50, 52, 57, 64, 67, and 72. They are shown in Appendix G.

In Exhibit 12, I linked each exam question to a course objective (see column 2). The 12 exam questions that did not meet the good-performance standard are listed in Column 3. For example, the last row in Exhibit 12 indicates that exam questions 63-76 are linked to objective 5. That means 14 exam questions relate to objective 5. Of those questions, three (numbers 64, 67, and 72) did not meet the good-performance standard. Three out of the 14 questions represents 21% of questions related to objective 5 did not meet the good-performance standard. Please note that not all exam questions were used in the following analysis because some questions were general in nature and not directly related to any of the five objectives.

Exhibit 12 shows concerns about learning objective #3, and will be discussed in the last section in this report.

### Exhibit 12: Analysis of Missed Exam Questions Relative to Course Learning objectives

<table>
<thead>
<tr>
<th>Objective</th>
<th>Exam question number that relates to each learning objective</th>
<th>Questions that failed the good-performance standard</th>
<th>Count of Exam Questions for each Objective</th>
<th>Count of Qs that missed the good-performance standard</th>
<th>% of Qs that missed the good-performance standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7, 10, 11, 17, 19 - 23</td>
<td>7</td>
<td>9</td>
<td>1</td>
<td>11%</td>
</tr>
<tr>
<td>2</td>
<td>1 – 6, 12, 13, 24 - 40</td>
<td>4, 5, 12</td>
<td>22</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>3</td>
<td>8, 9, 77</td>
<td>8, 9</td>
<td>3</td>
<td>2</td>
<td>67%</td>
</tr>
<tr>
<td>4</td>
<td>48 - 62</td>
<td>50, 52, 57</td>
<td>15</td>
<td>3</td>
<td>20%</td>
</tr>
<tr>
<td>5</td>
<td>63 - 76</td>
<td>64, 67, 72</td>
<td>14</td>
<td>3</td>
<td>21%</td>
</tr>
</tbody>
</table>

### Course Project

The final assignment in EMGT 901 is a course project and students have an option of choosing one of two types of activity. One option is to prepare a case study of a company that has used Six Sigma and to report findings. I encouraged students to choose the other alternative, which is to identify a problem at their place of work and apply the DMAIC principles and methodology to solve that problem. Each student prepared a video and presented their project to class. Exhibit 13 has links to projects done by 3 of the students.

### Exhibit 13: Video Presentations of Course Projects

<table>
<thead>
<tr>
<th>Student</th>
<th>Link to Project Video</th>
</tr>
</thead>
</table>

22
Projects were evaluated on a rubric (see Appendix B). While presentations may have had some minor delivery issues, the content was good and students followed the DMAIC methodology of define the problem, measure and collect data, analyze the data, implement solution to realize improvements, and control to continuously improve.

Given the 8-week nature of the course, students were very limited with what they could do. Six Sigma projects often require months (if not years) from start to finish. In spite of this, the course projects were actually quite good and reflective of how students are able to use course content in their jobs. Several included estimates of cost savings that they expect to realize and discussed plans to share their project with upper management to go full-scale with what they started in the course project.

Case

Students completed one case in teams (two teams of 3 persons, each). The case needed analysis relating directly to objective 4. Case submissions are in Appendix H, and were graded on a rubric. The two teams scored 90% and 98% on the case. This is evidence that based on this assignment, objective 4 is achieved by learners.

Homework

Students completed six homework assignments which were linked to the various course objectives. Each homework was worth 25 points. Overall, students performed very well and demonstrated achievement of course objectives, as indicated by the homework. Exhibit 14 summarizes performance on homework as indicated by average score earned (reported as percent). Minimum score earned by anyone was 22 points (88%). The highest standard deviation on any homework was 1.07. Both of these statistics indicate that performance on homework was very high and consistent among all students.

**Exhibit 14: Average Homework Grades Expressed as % of 25 Points Possible**
Reflection on the Course

I am very happy to have participated in the Peer Review of Teaching Project. This was a very useful process to me. Reflecting on the impact of decisions that may seemingly be unimportant, but in truth contribute greatly to the design and delivery of the course, and to accomplishment of course objectives by learners, provides valuable insights into the course and plans to modify it in the future.

Summary of findings

I believe that as a whole, the course was successful. I say that because of the overall performance of students on the various assignments, the level of activity in the course and discussion areas, and the mid-term survey results. Exhibit 15 documents all course assessments and a short description of course objectives. An X placed in a cell indicates whether an assessment was used in measuring achievement of an objective. The red cells point to possible areas of concern based on evidence from analysis performed. Although the scenario-based discussion assignment indicated sub-optimal performance on objective 4, the assessments indicate achievement of objective 4. Homework and case grades were high, and only 3 out of 15 (20%) of the exam questions related to this objective did not meet the good-performance standard.

Exhibit 15: Assessments used to Measure Learning Objectives

<table>
<thead>
<tr>
<th>Objective</th>
<th>Discussions</th>
<th>Homework</th>
<th>Exam</th>
<th>Project</th>
<th>Case</th>
<th>Indication &amp; Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Quality Philosophy &amp; History</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>All types of assessment indicate achievement of this objective</td>
</tr>
<tr>
<td>Objective</td>
<td>Type 1</td>
<td>Type 2</td>
<td>Type 3</td>
<td>Type 4</td>
<td>Teacher Feedback</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>2: Quality Principles</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>All types of assessment indicate achievement of this objective</td>
<td></td>
</tr>
<tr>
<td>3: Costs of Quality</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td>Make changes related to Objective 3 next time the course is offered</td>
<td></td>
</tr>
<tr>
<td>4: Quality Control tools</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>3 out of 4 types of assessment indicate achievement of this objective</td>
<td></td>
</tr>
<tr>
<td>5: DMAIC and 6-Sigma</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>All types of assessment indicate achievement of this objective</td>
<td></td>
</tr>
</tbody>
</table>
Objective 3

Objective 3 is of greatest concern to me. Exhibit 12 showed that only 3 exam questions were dedicated to this objective. Perhaps if more questions were included, the law of averages would kick in and a rosier picture might have been formed. Clearly this is one learning objective which is in dire need of attention. I plan to do the following to improve students’ performance as it relates to this objective.

I must re-examine and re-evaluate my teaching practices for Learning Objective 3. I must create better instructional video(s) and look online for supplemental resources. I should include more problems and questions about this topic on the homework and in formative assessments. I could even design a course activity where the student must collect data from their work and perform an analysis to discuss how poor quality drives up various costs and how it affects bottom line.

Allocating more time and resources to this objective is definitely warranted when I teach the course next time. Also, more exam questions should be devoted to that objective. Three questions is not enough.

Objective 4

In evaluating results of the scenario-based discussion, it may appear that course objective 4 is not fully achieved by all students. Of course, the scenarios are short and do not reveal much details to use in making the call on which quality tool best fit them. This may have contributed to incorrect responses by some students. Also, one may make the case (with proper explanation and assumptions) that more than one tool could be used to address a scenario. However, students did not elaborate on such detail when presenting their answers because instructions did not require them to do so. In the future, I will expand on the instructions for this discussion assignment to enable students to provide the proper context in support of their choices.

In looking back at the homework for that module, I see that I have included very few questions directly relating to tools for quality improvement and control. Additionally, there are few course resources which are dedicated to this topic. The American Society for Quality (ASQ) has a Resource page with templates and examples of each of the tools of quality. The next time I teach this course, I must be very deliberate in integrating some of those resources as activities in the course to better familiarize students with those tools and to improve the outcomes.

I still maintain that based on the varied types of assignments related to this objective (as evidenced in Exhibit 14), this learning outcome is not of great concern. However, including better instructions and deliberately including targeted course resources and more focused instruction will help improve the outcomes for learning objective 4.
Other findings

In the mid-term survey, one student commented that the course is only reading the book and no lectures from me! This is clearly contradictory to what others have indicated, as I prepare and share several video lectures in each module, as well as other resources from the web, articles, TED talks, etc. Perhaps this student skipped over all those resources. This may be because I don’t have a quiz or homework over all of it.

Another student in the mid-term survey commented that perhaps I should have a couple of homework questions related to my videos in each module. My original reason for not making the videos mandatory was to give the students some freedom in choosing the content with which they interact. However, in light of the comment, the next time I teach this course, I plan to include a couple of homework questions about some detail covered in one or more of my instructional videos in each module.

Final Thoughts

This PRTP was quite eye opening for me. Given my level of confidence in course design and good teaching practices, as summarized graphically with the House of Quality shown here (Exhibit 2 is replicated), in proper place: materials, activities, quite a long time and a material to fully explore the assessments and course, and to instructional materials, tools/technologies are students achieve the can say is that I wish I each and every course teach from now on. I realistically possible. However, each time a small portion of a course can be examined to gradually make it better and better over time.
Appendices
Appendix A: Syllabus
University of Nebraska - Lincoln
College of Engineering

Syllabus: ENGR 901 (sec. 911)
Total Quality Management Using Six Sigma

Spring-A 2019 Mini Session (Jan. 7 – Mar. 1)
8 weeks/ 3 credit hours/Fully Online Course

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Dr. Jena Shafai Asgarpoor (a.k.a.: Dr. J.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Location</td>
<td>My office is in Omaha, but I live in Lincoln and work from here almost entirely. If you need to see me, please make prior arrangements.</td>
</tr>
<tr>
<td>Office Phone #</td>
<td>402.554.2089 (Will go to my cell if I don’t answer)</td>
</tr>
<tr>
<td>Cell Phone #</td>
<td>402.440.2626</td>
</tr>
<tr>
<td>Email address</td>
<td><a href="mailto:jshafai@unl.edu">jshafai@unl.edu</a></td>
</tr>
<tr>
<td>Office Hours</td>
<td>By appointment</td>
</tr>
<tr>
<td>Phone call or Zoom</td>
<td>If your questions are not addressed in the discussion area and you would like to speak or visit with me, we can speak on the phone or a Zoom video conference. Email me and we can schedule.</td>
</tr>
<tr>
<td>Home Page</td>
<td><a href="https://engineering.unl.edu/durhamschool/faculty/jena-shafai-asgarpoor/">https://engineering.unl.edu/durhamschool/faculty/jena-shafai-asgarpoor/</a></td>
</tr>
</tbody>
</table>

Prerequisite
Graduate Standing and successful completion of Probability & Statistics (MECH 321 or equivalent)

Program and Course Philosophy
Undergraduate education ensures learning primarily through teaching and transmission. The Master of Engineering Management (MEM) program is for career professionals with work experience. It assumes andragogy, which postulates that the adult learner is a self-directed, autonomous, and internally motivated individual who draws on their own existing knowledge and past life & work experiences, actively interacts with peers at work and in class, and contemplates questions and controversies to discover facts, relationships, and new knowledge. This is a course in the MEM program and subscribes to the same Program philosophy.

Course Description/Purpose
Statistical quality control and improvement is more than an engineering concern. Quality management is a major business strategy for increasing productivity and gaining competitive advantage in all industries and types of organizations. This course covers differing perspectives and definitions of quality; tools and techniques for managing quality and continuous improvement; statistical methods; creation and interpretation of variable and attribute control charts; and Six Sigma tools for detection and isolation of sources of variation, process control, and capability analysis. The goal is to develop an operational use and familiarity with contemporary methods that are effective in managing quality, including Six Sigma.
This is a graduate online elective course that can be used for degree completion in the MEM program. Class duration is 8 weeks. The course is 100% web-based and fully online (no residential component).

**Learning Objectives**

1. Explain the longitudinal and evolutionary definitions and perspectives of quality as offered by historical figures and quality Gurus, evaluate propensity and inclination of oneself to a particular philosophy, and reflect and explain the reasons for that propensity.
2. Outline and discuss principles of total quality management and continuous improvement.
3. Differentiate between costs of quality, and the overall impact of each on business.
4. Apply quality control tools and techniques for detection, root-cause analysis, prevention, and elimination of quality-related issues and problems.
5. Explain the DMAIC methodology of Six Sigma and use its tools and techniques for process improvement.

**Course Outline**

i. What is quality? Definition, history, quality in manufacturing vs. service industries.
iii. Quality perspectives: Customer, employee, process.
iv. Statistical tools and techniques for managing quality: probability distributions, descriptive and inferential statistical applications, regression and correlation.
v. Design considerations in product and process quality: Product and concept development, detailed design, design for: reliability, optimization, and verification.
vi. Measuring and controlling quality: Repeatability & reproducibility, control charting, process variation, process capability measurement and analysis.
vii. Using Six Sigma for process improvement: Deming Cycle; DMAIC; evolution, principles, and statistical basis of Six Sigma; process improvement tools.

**Textbook:**

However, you may choose to rent or use an e-book version.


I will notify the UNL bookstore of my book choice for this class so that you may purchase it from them, if you wish. However, I believe you may be able to find a used copy at a more reasonable price by searching popular booksellers of your choice:

- VitalSource: [https://www.vitalsource.com/](https://www.vitalsource.com/)
Canvas Learning Management System (LMS)
Canvas is our virtual classroom where course content, grades, and communication will reside and discussion will take place in this course.

- The URL to access Canvas is: http://canvas.unl.edu
- For Canvas, passwords, or any other computer-related technical support, please contact the IT Help Center (Phone: 402-472-3970; Submit a support ticket: mysupport@unl.edu)

Academic Integrity Policy
UNL is committed to academic excellence. Academic honesty from all University members is essential in achieving that objective. Academic honesty includes adherence to guidelines established by the instructor in a particular course. It prohibits representing the work of others to be one’s own (plagiarism*); tampering with library, computer or student materials; or facilitating dishonesty by others. Penalties for academic dishonesty may range from a grade of “F” on the work in question or for the course, to expulsion from the University. The Student Handbook provides detailed information pertaining to academic dishonesty, including procedures for determining disciplinary action.

*Plagiarism is defined as appropriation of the words, ideas, or creations of another without crediting the source.

UNL Academic Integrity Policy: http://www.unl.edu/gradstudies/current/integrity
UNL Student Code of Conduct: http://stuafs.unl.edu/dos/code

Withdrawal Statement
If you wish to discontinue participation in class, you must contact the MEM program coordinator to inquire about options, deadlines, and possible repercussions.

ADA Information
The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can discuss options privately. To establish reasonable accommodations, I may request that you register with Services for Students with Disabilities (SSD). If you are eligible for services and register with their office, make arrangements with me as soon as possible to discuss your accommodations so they can be implemented in a timely manner. SSD contact information: 232 Canfield Admin Bldg.; 402-472-3787. You may also visit this site for more information: http://www.unl.edu/ssd/

Instructor Expectations:
1. The instructor will respond to students’ questions within 48 hours, excluding weekends and holidays.
2. Feedback on assignments will be given weekly.
3. If the instructor is unable to meet the above expectations, he/she will notify the students.
4. The final grade is determined using the weighed percentage points accumulated.
5. Final course grades will be submitted to the Registrar’s office within the time permitted by that office for instructors to process grades.
Student Expectations

1. This is an Online Class, not a Self-Study Distant Education class. Unless your inquiry is personal in nature and demands privacy (such as discussing grade, standing in class, etc.), all course-related and content-related questions must be posted to the Discussion area in Canvas. My response to your inquiries will quite likely benefit others in class. Therefore, please reserve email communication for only private/personal matters that are not appropriate for Canvas Discussion. If you email me with a request that is appropriate to be posted to the Discussion area, I will direct you to do so, and then I will respond in there.

2. Students will prepare for and actively participate in the discussion boards.

3. Students are expected to respond to, verify, challenge, or otherwise expand upon fellow student’s comments each week throughout the course.

4. Students are expected to fully participate in their team and for all team assignments and make quality and timely contributions to the team in support of completion of group assignments. If a team member does not participate in the manner described, it is the responsibility of the team members to exclude his/her name from the submission. Also, the team must designate an individual to “email the professor” and report the incident.

5. All assignments are due by the prescribed date. Should a student request additional time to complete assignments, due to unforeseen circumstances, written request and justification must be provided. Permission is not guaranteed and is at the discretion of instructor.

6. Class courtesy: All students have a right to express their opinion in a courteous and professional manner. Each student shall respect this right and allow other students to express their opinion in the DBs and in-group discussion areas.

Assignment Types

1. **Read and Review Course Resources**
   - Reading assigned pages in the book
   - Reading any articles that may be helpful in completing assignments
   - Watching any videos that may be helpful in understanding the material and completing assignments

2. **Discussion and Replies**
   - DB activity (original posts & responses as specified) graded on a rubric determine weekly DB grades.
   - Read section “Class Discussion Board (DB) Activity and Expectations”, later in this syllabus.

3. **NOT GRADED – Learning Journals**
   This assignment helps you reflect on the readings so that you may put in perspective how quality issues/topics are addressed in your job or at your company. Although not submitted (not graded) you must complete the assignment because a discussion in the final module is based on your journal entries.

4. **NOT GRADED – Practice Problem Solving**
   To successfully complete the course and the exam you must practice problem solving on a regular basis for the modules which cover quantitative content. The end-of-chapter problems are good for this purpose and for every chapter, solutions to a few of the problems will be provided in Canvas. You must attempt solving those problems on your own prior to reviewing the solutions provided.

5. **Homework**
   - Although not a quiz, homework is administered using the Quiz function of Canvas. It is NOT a quiz because it is not timed. You will have access to homework early on Monday of each module. You must submit your answers on the last day of the module. You may open the homework and review it during the module as you study, then submit your answers when you are finished.
• Homework is objective in nature and in multiple-choice format. Items on the homework could be conceptual questions or problems to solve. You must pick the best answer which is closest to your own answer, among several options provided.

6. **Group Case**
   You must complete one case in a team environment. You will be given an extra week to collaborate and prepare your submission.

7. **Project**
   In Module 8, you must submit your project. In the spirit of full-transparency, please read the following so you are not caught off guard. You should start thinking about the project and start planning for it early. We are covering chapters 6 - 9 in the first half of the course so that you will have time to plan and complete the project by the due date in last module.
   You must prepare and submit a video in which you present your project’s deliverables and outcomes, using PPT slides. The video can be 10 – 15 minutes long. You may use VidGrid technology to prepare the video. It is free and instructions are in our Canvas course.
   A. The project descriptions and guidelines are purposefully not rigid or prescriptive so you may have some leeway and flexibility to make this a helpful and relevant assignment to your job, education, and learning process. The following are two project options from which you may choose. **I highly encourage you to choose option A, if at all possible.**
      Identify an important problem at your place of work. Apply the DMAIC process to develop an improved solution. You must either use existing data or collect relevant data to perform appropriate analysis and use the results to justify your findings and recommendations. Use whatever process improvement tools (discussed in chapter 9) that are appropriate. You may also use the tools discussed in chapters 6 - 8. If possible, report financial implications and estimated/projected cost savings.
   B. Locate a company that is using Six Sigma or lean principles. Prepare a case study of their experiences. Focus on: problems they chose to address; the specifics of their implementation; challenges they faced during the implementation process; outcomes of the process; success and/or failures; cost savings, ROI, financial implications, etc.; impact of the initiative on the employees, customers, and organization, in general; any other relevant information that you believe is important to report.

8. **Final Exam**
   • You will have several days to complete the exam (i.e., it is not given under timed setting).
   • It will contain multiple-choice questions, similar in design to the weekly multiple-choice homework. Some may be problems to solve and others may be conceptual in nature.
   • The exam may also include a few problems to solve and submit answer files.
   • The format of the exam will be similar to weekly HW.

**Class Discussion Board (DB) Activity and Expectations**

• During each week of this course, students will be asked to participate in the electronic discussion boards by posting:
  o **ONE** original message
  o **TWO** replies in the form of substantive comments, questions, or responses to messages posted by peers
• The purpose is to create an interactive dialogue that draws from the experience of the entire class, to create a body of knowledge that has value to everybody.
• Students must fully engage in discussions of pertinent topics for each week.
• Your original message is due by midnight on Thursday of each week
• Your two replies to other students are due by Sunday of each week at midnight
• Note: Due dates are different in module 8 (last week of class) since Friday is official last day.
• Messages must be substantive. A reply such as “I agree” will not meet the assignment criteria, and is not credit-worthy.
• As much as possible, you must integrate the readings and resources into you messages. I encourage you to reference the reading materials and resources in your messages and replies. When appropriate, cite your sources.
• State and support your position when:
  o Posting original messages.
  o Responding to your classmates’ messages.
• You are encouraged to draw upon experiences, interactions, and dynamics from your professional life, and apply course concepts – at a personal level – to your job.
• Discussion is graded using a rubric, which emphasizes attentiveness, courtesy, quality of contribution, depth of thought, and ability to articulate information from readings and assessments.

Grade Policy

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>94 to &lt; 97%</td>
<td>25%</td>
</tr>
<tr>
<td>A-</td>
<td>90 to &lt; 94%</td>
<td>25%</td>
</tr>
<tr>
<td>B+</td>
<td>87 to &lt; 90%</td>
<td>25%</td>
</tr>
<tr>
<td>B</td>
<td>84 to &lt; 87%</td>
<td>25%</td>
</tr>
<tr>
<td>B-</td>
<td>80 to &lt; 84%</td>
<td>25%</td>
</tr>
<tr>
<td>C+</td>
<td>77 to &lt; 80%</td>
<td>25%</td>
</tr>
<tr>
<td>C</td>
<td>74 to &lt; 77%</td>
<td>25%</td>
</tr>
<tr>
<td>C-</td>
<td>70 to &lt; 74%</td>
<td>25%</td>
</tr>
<tr>
<td>D+</td>
<td>67 to &lt; 70%</td>
<td>25%</td>
</tr>
<tr>
<td>D</td>
<td>64 to &lt; 67%</td>
<td>25%</td>
</tr>
<tr>
<td>D-</td>
<td>60 to &lt; 64%</td>
<td>25%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60%</td>
<td>25%</td>
</tr>
</tbody>
</table>

This is a graduate-only, online class. To pass, C or higher is required (C- is not passing).
• Please be advised that a minimum 3.00 GPA is required in each semester.
• Example: A student who earned a C in Fall A, must earn an A in Fall B to maintain the minimum 3.00 semester GPA for the fall semester.

Late Assignments:

All assignment due times are in Central Standard time (CST).

This is an 8-week, fast-paced class. Please stay current with assignments, readings, and studies.

Unless approved by the instructor in advance and for good reason, late assignments are not accepted and will receive a grade of zero. This includes discussion board activity.

Grade Components & Weights

<table>
<thead>
<tr>
<th>Type</th>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Discussion Activity (all equally weighed)</td>
<td>25%</td>
</tr>
<tr>
<td>Individual</td>
<td>Learning Journals (Not submitted and Not graded)</td>
<td>0% (N/A)</td>
</tr>
<tr>
<td>Group</td>
<td>One group case</td>
<td>10%</td>
</tr>
<tr>
<td>Individual</td>
<td>6 Homework – multiple choice (equally weighed)</td>
<td>25%</td>
</tr>
<tr>
<td>Individual</td>
<td>Course project: Video Presentation (must use PPT slides)</td>
<td>20%</td>
</tr>
<tr>
<td>Individual</td>
<td>Exam: Take @ home, Wed. – Sun</td>
<td>20%</td>
</tr>
</tbody>
</table>

Total   100%
Message to Students from UNL Writing Center

Are you working on writing projects in any of your classes this semester? Would you like to talk with someone online about your writing?

You can meet with a consultant online via Skype and Google Docs. To learn more about details and times, and to sign up for appointments, please visit http://www.unl.edu/writing/online-writing-center-services.

The Writing Center works with writers at all levels, from all disciplines, at all stages of the writing process. Whether you need help brainstorming, organizing your ideas, or polishing a final draft, we’re here to support you. We look forward to talking with you online about your writing!

Overview of Weekly Readings and Assignments

<table>
<thead>
<tr>
<th>Module</th>
<th>Date (2019)</th>
<th>Chapter</th>
<th>DB</th>
<th>Homework</th>
<th>Group Case</th>
<th>Exam</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/7 – 1/13</td>
<td>6 &amp; supplemental</td>
<td>X</td>
<td>X (ch. 6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1/14 – 1/20</td>
<td>7</td>
<td>X</td>
<td>X (ch. 7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1/21 – 1/27</td>
<td>8 &amp; supplemental</td>
<td>X (ch. 8)</td>
<td>Module 3 Case is due on Sunday of Module 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1/28 – 2/3</td>
<td>9 &amp; supplemental</td>
<td>X</td>
<td>X (ch. 9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2/4 – 2/10</td>
<td>1 &amp; 2</td>
<td>X</td>
<td>X (ch. 1 to 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2/11 – 2/17</td>
<td>3 &amp; 4</td>
<td>X</td>
<td>X (ch. 1 to 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2/18 – 2/24</td>
<td>5</td>
<td></td>
<td>X (all chs.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2/25 – 3/1</td>
<td>X</td>
<td></td>
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</tr>
</tbody>
</table>

Notes:
1. All due dates are in Central Standard Time (CST).
2. For modules 1 – 7
✓ Original DB Message: Due Thursdays at 11:59 p.m.
✓ DB Replies, Case, Homework, and Exam: Due Sunday at 11:59 p.m.
3. Module 8
✓ Module 8 is the last week of class. The official UNL calendar designates Friday of this week as the last day for this term. So that I am in compliance with the University policy, assignments in this module cannot be due on Sunday.
✓ In this module, you will: a) submit to the discussion board your video presentation and then will review & reply to other projects posted, and b) submit a DB message on the journal entries you have made, and reply to at least one classmate..
✓ Deadlines in this week are staggered throughout the week. Please consult due dates which appear in the Syllabus area of Canvas.
✓ I prefer and encourage everyone to complete all assignments by the end of Friday, which is the last day of the term. However, I will leave the DB open for those who need the extra time for making replies.
Appendix B: Course Rubrics for 3 Assignments

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Ratings</th>
<th>Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking</strong></td>
<td>2 pts Clear/logical statements. Shows insight. Engages in analysis. Refutes bias.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 pts Substantial information. Thought, insight, analysis has taken place. Detects bias.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 pts Generally competent. Information is thin and commonplace.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 pts Rudimentary/superficial. No analysis or insight. Confusing. Lacks explanation of reasoning.</td>
<td>2 pts</td>
</tr>
<tr>
<td><strong>Evidence/Argument Construction</strong></td>
<td>2 pts Uses reliable evidence when constructing arguments.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 pts Uses reliable evidence, but may be out of context or unrelated.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 pts Uses some evidence, although it may not be sufficient to support the argument.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 pts Uses no evidence or unreliable, biased, or misleading evidence.</td>
<td></td>
</tr>
<tr>
<td><strong>Uniqueness</strong></td>
<td>2 pts New ideas or examples. Connections made with depth and detail.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 pts New ideas or connections. Lacks depth and/or detail.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 pts Few, if any, new ideas connections. Refresh or summarize other postings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 pts No new ideas. No solid explanation to support statements</td>
<td></td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td>2 pts Completes all required postings on time. Participates early in discussion and throughout the discussion. Responses to peer/instructor follow-up questions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 pts All required postings are made. But, some are not timely enough for others to read/respond.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 pts All required postings are made. Most at the last minute without allowing for response time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 pts Some, or all, required postings are missing. Fails to respond to follow up questions.</td>
<td></td>
</tr>
<tr>
<td><strong>Stylistic</strong></td>
<td>2 pts Few to no grammatical or stylistic errors. Hence, work is easy to read and comprehend.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 pts Several grammatical or stylistic errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 pts Obvious grammatical or stylistic errors. Errors interfere with content.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 pts Obvious grammatical or stylistic errors. Makes understanding difficult.</td>
<td></td>
</tr>
</tbody>
</table>

Total Points: 10
### Case Rubric

You've already rated students with this rubric. Any major changes could affect their assessment results.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Ratings</th>
<th>Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analysis &amp; Evidence</strong></td>
<td>4.0 to &gt; 3.0 pts Choice of analysis tools is appropriate. Analysis is correct and comprehensive.</td>
<td>4.0 pts</td>
</tr>
<tr>
<td></td>
<td>3.0 to &gt; 2.0 pts Choice of analysis tools is appropriate. But analysis is not comprehensive or lacks accuracy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 to &gt; 0.0 pts Choice of analysis tools is not appropriate. However analysis performed is accurate for the tools chosen.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0 pts Choice of analysis tools is not appropriate. Analysis is inaccurate for the the analytical tools applied.</td>
<td></td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td>4.0 to &gt; 3.0 pts Communicates succinctly the answers to all questions. Communicates effectively by referencing supporting evidence and details of findings from analysis performed. Results from analysis are presented well and in a meaningful way.</td>
<td>4.0 pts</td>
</tr>
<tr>
<td></td>
<td>3.0 to &gt; 2.0 pts Communicates correct answers to all questions using evidence from analysis. But results are not presented effectively and efficiently in a readily meaningful way.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 to &gt; 0.0 pts Attempt is made to answer most of the questions by referring to results from analysis. Some answers are wrong. Summary of results is not presented efficiently and effectively for maximum impact.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0 pts Does not answer all questions. Communication is ineffective. No reference is made to analysis to justify answers. Summary of results is presented poorly.</td>
<td></td>
</tr>
<tr>
<td><strong>Stylistic</strong></td>
<td>2.0 to &gt; 1.5 pts Few to no grammatical or stylistic errors. Hence, work is easy to read, follow, and comprehend</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 to &gt; 1.0 pts Several grammatical or stylistic errors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.0 to &gt; 0.0 pts Obvious grammatical or stylistic errors. Errors interfere with content</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0 pts Obvious grammatical or stylistic errors. Makes understanding difficult</td>
<td>2.0 pts</td>
</tr>
</tbody>
</table>

**Total Points: 10.0**
### Project with Video Rubric

You've already rated students with this rubric. Any major changes could affect their assessment results.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Ratings</th>
<th>Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization Building a case and seamlessly presenting it along with your findings and proposals</td>
<td>10 to &gt;7 pts Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.</td>
<td>10 pts</td>
</tr>
<tr>
<td></td>
<td>7 to &gt;5 pts Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.</td>
<td></td>
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<tr>
<td></td>
<td>5 to &gt;2 pts Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 to &gt;0 pts Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.</td>
<td></td>
</tr>
<tr>
<td>Interpretation of Knowledge Relating course content, readings, and resources to the project and study under consideration</td>
<td>30 to &gt;20 pts Synthesizes detailed information from relevant sources and presents an argument or conclusion as a logical extrapolation of several sources and points of view</td>
<td>30 pts</td>
</tr>
<tr>
<td></td>
<td>20 to &gt;13 pts Presents adequate information from relevant sources and provides an argument or conclusion arising specifically from a relevant source</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 to &gt;7 pts Presents relevant but limited information from relevant sources with minimal awareness of the need for argument or conclusion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 to &gt;0 pts Presents information from irrelevant sources representing limited approaches to an issue, and if a conclusion or argument is present, it is unsupported</td>
<td></td>
</tr>
<tr>
<td>Delivery (relates to oral presentation component in the video)</td>
<td>15 to &gt;10 pts Delivery techniques (posture, gesture, eye contact, and vocal expressiveness, recording environment, lighting, background, sound quality) make the presentation compelling, and speaker appears polished and confident.</td>
<td>15 pts</td>
</tr>
<tr>
<td></td>
<td>10 to &gt;7 pts Delivery techniques (posture, gesture, eye contact, and vocal expressiveness, recording environment, lighting, background, sound quality) make the presentation interesting, and speaker appears comfortable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 to &gt;2 pts Delivery techniques (posture, gesture, eye contact, and vocal expressiveness, recording environment, lighting, background, sound quality) make the presentation understandable, and speaker appears tentative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 to &gt;0 pts Delivery techniques (posture, gesture, eye contact, and vocal expressiveness, recording environment, lighting, background, sound quality) detract from the understandability of the presentation, and speaker appears uncomfortable</td>
<td></td>
</tr>
</tbody>
</table>
## Project Rubric (continued)

<table>
<thead>
<tr>
<th>Supporting Methods &amp; Material Tools applied for perform analysis and types of analysis performed are relevant to the problem under study.</th>
<th>30 to &gt; 20 pts A variety of types of supporting materials (explanations, examples, illustrations, statistics, quotations from relevant authorities etc.) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter’s credibility/authority on the topic</th>
<th>20 to &gt; 13 pts Supporting materials (explanations, examples, illustrations, statistics, quotations from relevant authorities etc.) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter’s credibility/authority on the topic</th>
<th>13 to &gt; 7 pts Supporting materials (explanations, examples, illustrations, statistics, quotations from relevant authorities etc.) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter’s credibility/authority on the topic</th>
<th>7 to &gt; 0 pts Insufficient supporting materials (explanations, examples, illustrations, statistics, quotations from relevant authorities etc.) make reference to information or analysis that minimally supports the presentation or establishes the presenter’s credibility/authority on the topic</th>
<th>30 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Statement Description of why the problem is important; Context and background information; justification for choosing project topic.</td>
<td>15 to &gt; 10 pts Central message is compelling (precisely stated, appropriately repeated, justified, strongly supported.) Problem is clearly stated. Compelling justification is given for importance to solve. Context/background provided is rich and comprehensive.</td>
<td>10 to &gt; 7 pts Central message is clear and consistent with the supporting material.</td>
<td>7 to &gt; 2 pts Central message can be deduced, but is not explicitly stated in the presentation.</td>
<td>2 to &gt; 0 pts Central message is not present Problem statement is missing. Not possible to deduce why the project was selected or its importance.</td>
<td>15 pts</td>
</tr>
</tbody>
</table>

Total Points: 100
Appendix C: Sample Graded Discussion Assignment (Module 6)

Module 6 DB activity

Please be familiar with section in the syllabus, which describes DB activity expectations. In 200 -300 words to answer ONE of the following questions. Include the text of the question that you answer at the top of your message. This will not be included in the word count.

1. Watch the videos provided in this module for chapter 4.
   A) Select two statements (themes) made by the presenters; one with which you agree, and one with which you disagree. If you would like to include more than two in your post, please do so.
   B) List each point specifically as presented in the video.
   C) Clearly identify which video it comes from: a) Employee Involvement, b) The Perfect Boss, c) Holacracy
   D) State whether you agree or disagree with it, state the reason why, and give examples of experiences that you have had which fuel your stand on the issue.

2. Thinking of the Kano model, should organizations pay the most attention to dissatisfiers, satisfiers, or the exciters/delighters? Defend your choice with appropriate examples. Would this depend on the type of industry or environment in which an organization competes? What is your choice for your organization and WHY?

3. What is your reaction to the quote about Toyota in the opening paragraph of chapter 4? Would such an observation be true of your organizations? Is it really true that competitors cannot copy the human resources of an organization? Why or why not?

4. Refer to the article that you read this week at this site: https://www.americanexpress.com/us/small-business/openforum/articles/how-to-get-your-staff-to-go-the-extra-mile/?linknav=us-openforum-search-article-link2 (Links to an external site.) Share your reactions to the article. Do you agree? Discuss how your experiences at your present (or past) employers align with them. Please elaborate and provide examples, as relevant.

5. Research a company that is known for its high-performance work culture. Report your findings in the form of a few specific practices that they have used to achieve employee engagement, involvement, and satisfaction, and to sustain that culture. If at all possible, relate to topics that are discussed in our book. Give proper citation for your sources.

Post replies to your peers in the DB. Due: Sunday of this week at midnight.

Post at least two reply messages in this week’s DB area (each reply 150 – 200 words). Please be familiar with section in the syllabus which describes DB activity expectations.
Appendix D: Sample Students’ Work – Students’ Reflection on What They Learned

Module 8 DB: Reflection

Post an original DB message.

300 - 400 words

Review the learning journals that you have prepared so far in this class. Collectively examine the content and describe the top 2 or 3 items that you learned in this class which are of most value or significance to you. This could be due to applications in your work; or knowledge and perspective you gained (from readings, discussions, cases, project, etc.) which you did not possess previously; or it could be because of how you plan to do things differently or initiatives that you plan to start in your work, which could relate to how you do YOUR job, or changes that you plan to make because you are in a position within your company/job that enables you to affect how others do their job.

Post replies to your peers in the DB.

Post at least ONE reply message to this discussion (150 - 200 words).
I encourage you to reply more than the minimum requirement.

Message 1:

Before taking this course, I felt I had a fair understanding of quality concepts and quality tools and in my work capacity, what I do directly influence or impact quality of our products in one way or another. So I really thought this course is a good one to take and I am very happy that I did. I feel all the materials we have covered in the last 8 weeks were very useful and relevant to what I do. If I have to choose top 2-3 items that are most significance to me, I would say the design for reliability, the system capability indexes, and the control charts.

Design for reliability section of the textbook covers MTTF and MTBF calculations which are very basic statistics, easily to calculate and are very useful. Part of my job is predictive analysis of machine failures, and system failures and I feel that this newly acquired knowledge is extremely useful and I am planning to utilize and apply it in the near future. The section also covers the system reliability calculation on both series and parallel system. We have several production processes that have 2-3 machinery and automation hooked up together in series. I think the concept of this statistical calculation can be applied to figure out the expected system throughput (good quality parts). A simplified example of this is a system with a molding machine and an offset printer in an in-line production. I can easily calculate the expected production parts coming out of molding machine and the printer. Let’s say molding machine has 1.5% defect rate and the printer has 1.2% defect rate. The combined reliability (quality) of the system can be calculated as 0.985 x 0.988 = 0.973. I know the parallel math cannot be
applied in the same manner but the point is that with some understanding of statistics, most of the concepts learned can be applied to other things as well.

Process capability index calculation. We have our production software that already track and report the CP and Cpk of molding machines. However the system doesn’t track and report Cpk for the system (machine + printer or machine + robot). Most of our production lines are series of machinery and automation, with the new knowledge and understanding for process capability calculation, I now can figure out the true capability of our process and not just a capability of an individual equipment reported by our software.

Control charts, again our molding machines do have control charts built-in so we can monitor the machine parameters if they are in control or drifting away from the intended settings. I do utilize the control charts a lot when we have quality issues but I never constructed one myself. Many of the equipment do not have the built-in control charts so we didn’t have to ability to closely monitor it like we can on the molding machines. Now that I know how to construct a control charts for both variable and attribute data, I am planning to apply this knowledge on so many things in our production process that I feel needed to be monitored and controlled. Much of the needed data is already being recorded and available to me, all I need to do is to decide the sample size, the interval, and start constructing and utilizing more of the control charts to help us monitor the processes.

**Message 2**

Overall, this class has been pretty eye opening to me in a lot of ways. While I did not consider myself a quality expert by any means, I did feel like I had a pretty good understanding of quality in general based on my experiences that I have had in my workplace over the past 3 years I have been there. I really could not have been more wrong about that. I think there are a couple things that really stuck out to me, and will really stick with me moving forward.

The first item is just the pure technical knowledge that I was able to gain in the course, particularly chapters 6-9. I really invested in trying to learn the charts, the reasons for them, and the statistics behind them. Statistics wasn’t necessarily something that I felt overly confident in talking about when it first came to looking at the charts, but now I feel like I have a much better understanding of them. I will be able to use that knowledge to contribute much more within my organization moving forward into the future, and hopefully use that to make some changes for the better as well. I have already been talking to the quality department about which types of charts they are using in our daily setups, monitoring, and reporting, and I am hoping to help us make sure we are using the right tools in the right places.
The second item is less technical, but is more about the quality mindset. Reading the philosophies of Deming, Juran, and Crosby, I could draw on certain points of all of them that I agree with. I think the culture and mindset is key to success in an organization, and it is no different with quality. I will work to bring this mindset to my organization, and use my knowledge to help push us in the correct direction moving forward. As our plant continues to move areas from ISO90001 to IATF16949, I feel like I can help use this knowledge to really push us in the correct direction.

Overall, I’m very happy that I was to take this class, as I feel that it provides me with a great base to continue learning more in the future in regards to Quality and Quality Management.

**Message 3**

The most shocking concept I learned about is on Page 15 in the textbook and talks about how perception of a product by the workers actually affected the overall “quality” as perceived by the customers. I believe this to be true based on what I’ve seen at my current job. When a team focuses on the final product, their work tends to be more meaningful than the team who focuses on fixing immediate issues and sticking to a rigid process. Quality work is only achieved when workers think in terms of, “How will this affect my customer?” At work, we were always encouraged to pretend we were in the customer’s shoes and imagine the things they would want to see as a direct result of our work. Going forward, it’s important to have a customer focus to ensure I am producing quality work for both internal and external customers.

The most useful tools I have learned about are the X-Bar and R charts. Both of these process control charts were extremely helpful in visualizing issues and patterns within data sets. Scatter charts only tell half the story and give information that relates to raw data, but X-Bar and R charts tell if you have quality issues. A process isn’t useful if its outputs repeatedly fail to fall within specification. These charts would be helpful in a Development setting since this would allow me to interpret data and determine which course of action would be appropriate for an unknown quantity. I actually used these charts in my Final Project and will be showcasing an example with regards to a Contamination Study.

The most useful concept I have learned about is Process Benchmarking. This involves looking at other groups and seeing how they conduct business that is similar to your own. In my current job, I run a weekly meeting where we teardown axles and review components. I’ve focused much of my MEM studies on this weekly review and so far have received fantastic results! However, the process is still far from perfect and does
have some drawbacks. I’m hoping to benchmark my review meeting against other departments and see if I can borrow ideas to make my own meeting more efficient.

**Message 4**

In reviewing my journal entries throughout the class, I think that the three most significant topics that I learned about include the DMAIC approach to problem solving, the use of design reviews in the product development process to facilitate an effective design from start to finish, and the use of ANOVA studies to compare the means of multiple populations. The first item, DMAIC, is very commonly applied in my workplace. The quality manager drives problem solving using this process and even requires a formal write up for all major systemic problems solved in the department using this DMAIC outline. When I first entered the organization, I was not very familiar with the structure. Through the readings, homework, and final project, I am now much more affluent in the topic and will be able to handle this type of problem solving approach much more effectively in the future. The second significant topic that I learned about in this class includes the use of structure design reviews at set stages in the product development cycle to facilitate an effective design from start to finish. I was first introduced to this structured design review process and how it can positively influence the product development process in my first position right out of school. After moving into a new position at Motorola, I now see the opposite end of the spectrum. I have personally experienced how the absence of these design reviews can negatively affect the success of a new product launch. Through the readings, I am now much more familiar with the proper way to structure these reviews and will use this knowledge to drive change in my organization. The last significant topic that I learned in this class is the use of ANOVA studies to compare the means of multiple populations. It is very common that I run a DOE at work to standardize a process, and previously I was not aware of this ANOVA study and it’s true capability. It is so much easier to analyze data and recommend standard parameters using this tool instead of comparing process means individually. It truly takes the guesswork out of certain types of analyses that I perform on a frequent basis. This has already shown great benefit in my daily work as it seems to be a much more effective tool to present recommendations to management after a study is performed. I will continue to use these three significant topics in my everyday work to drive change and improve operational efficiency which I would not have been able to do as quickly or effectively without taking this course in total quality management.

**Message 5**

I think the biggest part I am going to take away from this class is a new way of thinking. It added a whole deeper element behind management and techniques that I can use to make my management style stronger. I truly enjoyed learning from all of you and hearing about your experiences in an industry different than my own.

There are two lessons that really stood out to me. The first item is something I want to adopt into my own personal life as well as professionally. At first, I thought Crosby’s
belief of Zero Defects as a performance standard was too strict and unrealistic. However, after some thought, it is the type of thinking and mentality that everyone should have. If you don’t strive to have a perfect first attempt, then (as Crosby mentioned) you anticipate error. This thinking lowers your personal standards and let’s you become lackadaisical in your work. After this lesson, I started catching myself being okay with someone else fixing my errors at work. For this reason, I want to change my way of thinking and strive for zero “defects”. If there are less (or zero) defects after the first attempt, then there are less errors to fix later.

The second lesson that also stood out to me was chapter 3. This chapter was extremely insightful on how to get to the root need of your customer and maintain that relationship. It provided several tools and strategies that I can bring to my company for us to nail down the wants of our clients. My industry is based on relationships because relationships bring in our business. For the most part, all civil engineering firms can design functioning and sustainable products. Therefore, when a client is deciding what firm to hire for a project, it essentially comes down to the firm whom they have the strongest relationship with. Therefore, I think my company should start creating an effective customer satisfaction measurement system. The best part about this was when I read Portland benchmarks the results of their satisfaction survey against six other cities. If they don’t meet their standards, then they begin to adjust. The second tool I think my company should use is an affinity diagram to visualize and pinpoint our customer’s needs. We are reviewing our values and mission statement as a company right now. If we focus on our customer’s needs, I think it would help direct our decisions.

Appendix E: Sample Students’ Work - Applying Tools of Quality Management

**Discussion Assignment**

**What to do:** Seven problems are listed at the bottom of this page. What would be the most appropriate tool to use to attack each of the problems.

**Instructions:** Of course, you could classify the problems into various types such as conformance, structured, efficiency, etc. and recommend the "type" of analysis that would fit best. For example, Conformance problems are best addressed by Six Sigma tools.

However, for the purposes of this assignment, I'd like you to be specific about the actual tool that you recommend. Choose from among those we have studied so far, including but not limited to the following:

- Check sheet
- Process map
- Histogram
• Pareto chart
• Scatter diagram
• Correlation analysis
• Statistical summaries (which one?)
• Cause & effect diagram
• etc.

Cut/paste the problems list in the message box. Then insert your recommendation under each scenario. Limit to one tool per scenario. **Pick what you believe is the best tool for each scenario.**

**The following are the problems.**

A) A copy machine suffers frequent paper jams and users are often confused as to how to fix the problem.

B) The publication team for an engineering department wants to improve the accuracy of its user documentation but is unsure of why documents are not error-free.

C) A rental car agency is getting numerous complaints about the length of time that customers have to wait to obtain a car. They need to get a better handle on the factors that relate to the wait time.

D) A kitchen in a restaurant always seems to be getting orders mixed up and plated incorrectly.

E) A local zoo wants to understand where its guests come from in order to better target marketing efforts.

F) A contracting agency wants to investigate why they had so many changes in their contracts. They believe that the number of changes may be related to the dollar value of the original contract or the days between the request for proposal and the contract award.

G) A travel agency is interested in gaining a better understanding of how call volume varies by time of year in order to adjust staffing schedules.

**Message 1:**

A) A copy machine suffers frequent paper jams and users are often confused as to how to fix the problem.
For this problem, I would use a process flow chart to show each person how one goes about fixing the printer. It could be mounted above the printer.

**B) The publication team for an engineering department wants to improve the accuracy of its user documentation but is unsure of why documents are not error-free.**

I would use a cause and effect diagram to help the team understand all the possibilities why there could be errors in the documents. This can help compile a list pretty quickly and really look at all areas and their root causes.

**C) A rental car agency is getting numerous complaints about the length of time that customers have to wait to obtain a car. They need to get a better handle on the factors that relate to the wait time.**

I would use a Pareto a diagram to track what the most common complaints are about. This will help the staff determine where they need to focus the efforts of improvement to drive the issues away quickly.

**D) A kitchen in a restaurant always seems to be getting orders mixed up and plated incorrectly.**

I would use a process map to map out how orders are received from the customer all the way to being delivered to the customers. This will help to understand where the errors could be occurring.

**E) A local zoo wants to understand where its guests come from in order to better target marketing efforts.**

You could use a Histogram to gather information and then display it to show where the bulk of the people come from. This would be a visual representation and would be easy to track by state, region, and country—however the zoo wishes to break it down.

**F) A contracting agency wants to investigate why they had so many changes in their contracts. They believe that the number of changes may be related to the dollar value of the original contract or the days between the request for proposal and the contract award.**

I would use a correlation analysis to see how the changes relate to the dollar value of the contracts as well as the days in between the request for proposal and the contract award. This analysis will paint a clear picture (or not clear) if they relate or not.
G) A travel agency is interested in gaining a better understanding of how call volume varies by time of year in order to adjust staffing schedules.

I would use a scatter diagram that tracks the number of calls per day as the data point. This would show if it is in fact cyclical or not.

Message 2

A) A copy machine suffers frequent paper jams and users are often confused as to how to fix the problem.

The staff should create process flow charts to explain how to fix/use the copy machine. It would lay out the process step by step for new users.

B) The publication team for an engineering department wants to improve the accuracy of its user documentation but is unsure of why documents are not error-free.

The publication team should conduct a root cause analysis to determine the ‘root cause’ to why their documents are not error-free. They could use a DFMEA to identify the causes.

C) A rental car agency is getting numerous complaints about the length of time that customers have to wait to obtain a car. They need to get a better handle on the factors that relate to the wait time.

The rental car agency should create a cause and effect diagram to effectively brainstorm problem factors that relate to a large wait time for customers.

D) A kitchen in a restaurant always seems to be getting orders mixed up and plated incorrectly.

Again, I would recommend using a cause and effect diagram. It would initiate brainstorming among the kitchen to improve their process and determine solutions to eliminate this issue.

E) A local zoo wants to understand where its guests come from in order to better target marketing efforts.

The marketing team could use the zip codes you can get from credit cards and plot the areas on a scatter plot. This would visualize where the zoo obtains its guests.

F) A contracting agency wants to investigate why they had so many changes in their
contracts. They believe that the number of changes may be related to the dollar value of the original contract or the days between the request for proposal and the contract award. To verify their assumption, they should perform a correlation analysis to evaluate the strength of relation between the dollar value of the original contract or the days between a request for proposal and the contract award and the number of changes to a contract.

**G) A travel agency is interested in gaining a better understanding of how call volume varies by time of year in order to adjust staffing schedules.**

The travel agency could use a run chart to plot the call volume over time.

**Message 3**

1. **A)** A copy machine suffers frequent paper jams and users are often confused as to how to fix the problem.

   - A cause and effect diagram would be best because it would allow the users to possibly troubleshoot the problem and it could also allow the company to determine why the problem is occurring in the first place.

2. **B)** The publication team for an engineering department wants to improve the accuracy of its user documentation but is unsure of why documents are not error-free.

   - A check sheet needs to be deployed to identify particular areas in the documents where mistakes are most commonly being made.

3. **C)** A rental car agency is getting numerous complaints about the length of time that customers have to wait to obtain a car. They need to get a better handle on the factors that relate to the wait time.

   - A cause and effect diagram would be best to identify the causes of the wait time.

4. **D)** A kitchen in a restaurant always seems to be getting orders mixed up and plated incorrectly.

   - A cause and effect diagram would be best in this situation because it would allow the restaurant to identify the issue(s) causing the mix up.

5. **E)** A local zoo wants to understand where its guests come from in order to better target marketing efforts.
- A pareto chart would be best because it categorizes the general neighborhoods that guests reside in.

**F)** A contracting agency wants to investigate why they had so many changes in their contracts. They believe that the number of changes may be related to the dollar value of the original contract or the days between the request for proposal and the contract award.

- A histogram needs to be constructed with the number of changes on the Y axis. Dollar value and number of days should be plotted on the X axis to see the relationship between the inputs and output.

**G)** A travel agency is interested in gaining a better understanding of how call volume varies by time of year in order to adjust staffing schedules.

- A run chart would be best because it plots the call volume against time.

**Message 4**

**A)** A copy machine suffers frequent paper jams and users are often confused as to how to fix the problem.

Tool: Process Map – This will allow people to troubleshoot any issues with the copier by following a simple step-by-step process that has “Yes” or “No” designations for actions.

**B)** The publication team for an engineering department wants to improve the accuracy of its user documentation but is unsure of why documents are not error-free.

Tool: Cause and Effect Diagram – The department would need to reevaluate the documentation process from top to bottom. Problems and possible causes would need to be identified in order to achieve an error-free document.

**C)** A rental car agency is getting numerous complaints about the length of time that customers have to wait to obtain a car. They need to get a better handle on the factors that relate to the wait time.

Tool: Correlation Analysis – This analysis will help determine which factors impact waiting time the most. Factors such as number of salespeople, weather, time of day, holidays, and car availability can all be quantified into usable data and compared to see which factor is the most impactful.

**D)** A kitchen in a restaurant always seems to be getting orders mixed up and plated incorrectly.
Tool: A3 Report – This report evaluates the current conditions and works towards an implementation plan that will correct the issue. Once the plan is in place, Follow-Up actions will ensure the issue has been corrected at a satisfactory level.

E) A local zoo wants to understand where its guests come from in order to better target marketing efforts.

Tool: Histogram – A histogram would show the distribution of park patrons in an easy format. The zoo could group patrons by a city’s county and find out which county residents visit the zoo the most.

F) A contracting agency wants to investigate why they had so many changes in their contracts. They believe that the number of changes may be related to the dollar value of the original contract or the days between the request for proposal and the contract award.

Tool: Pareto Diagram – Start at the top with “which contract had the most changes?” and narrow down the issues to “average days between proposal and award” or “contract rewrite”.

G) A travel agency is interested in gaining a better understanding of how call volume varies by time of year in order to adjust staffing schedules.

Tool: Scatter Diagram – The agency would want to plot out data from previous years and analyze the data for seasonal trends. Then a seasonal forecast could be made to help assist with future staffing schedules.

**Message 5**

a. Cause and effect diagram. It is a simple diagram to show the relationship between cause and effect. It may help to ensure the problem and the most possible cause.

b. Flowchart. It could help the publication team to understand the any process of creating documents and how it works.

c. Cause and effect diagram. There might be many factors to cause the customers need to wait for a long time.

d. Flow chart. To understand every step and identify the orders and plated.

e. Histogram. It is a simple QC tool to understand the amount of the guests is coming from.
f. Scatter diagram. It may show the association between the variable and the amount of change because it is a diagram for regression analysis.

g. Run chart. The travel agency could easily understand the call volume variation of the schedule issues by the diagram is showing data of period of time.

Message 6

A) A copy machine suffers frequent paper jams and users are often confused as to how to fix the problem.
This is “efficiency problem” Simple task that are not perform efficiently. The process map can be created to help trouble shoot a paper jam issue. Users can quickly follow the troubleshooting process which is not just limited to paper jam.

B) The publication team for an engineering department wants to improve the accuracy of its user documentation but is unsure of why documents are not error-free.
This, in my opinion, is the “unstructured performance problem” processes are not well specified or understood. I feel DMAIC is an appropriate tool for solving this particular problem that is not yet defined. DMAIC, as its name, will help define, measure, analyze, improve and control.

C) A rental car agency is getting numerous complaints about the length of time that customers have to wait to obtain a car. They need to get a better handle on the factors that relate to the wait time.
This is a “conformance problem” with unsatisfied customers. Process capability analysis tool such as X bar and R chart can be utilized to identify the average amount of time it takes for customer to get a car, the variation of the time. Identify the special causes and correct them.

D) A kitchen in a restaurant always seems to be getting orders mixed up and plated incorrectly.
Check sheet can be used to collect ordering data, it is easily interpreted without additional processing. Correct orders on check sheet should help kitchen crew get order plated correctly.

E) A local zoo wants to understand where its guests come from in order to better target marketing efforts.
Pareto chart is a good tool to help identify where zoo goers are coming from.

F) A contracting agency wants to investigate why they had so many changes in their contracts. They believe that the number of changes may be related to the
Correlation analysis is a good tool to help contracting agency validate or invalidate their hypothesis that the number of changes relate to the dollar value or the days between RFP and contract award.

G) A travel agency is interested in gaining a better understanding of how call volume varies by time of year in order to adjust staffing schedules. A histogram tools is a great graphical tool that displays call volumes by the time of year. It is also very easy to use.
Appendix F: Results of Mid-term Survey

1. **How is the pace of the course? Is it too slow, just right, or too fast? Please comment.**
   
   1. It’s a little too fast.
   2. I feel as though it is just right. I don’t feel crammed with information, but I feel as though as I’m learning a lot each week.
   3. It is just right for me.
   4. Pace is just right, I have a solid work/life/school balancing going at the moment. This class is insightful but hasn’t been as grueling as some previous courses.
   5. I think the pace of the course is just right for working professionals. Any faster would be too much to handle with all of the other things that we have going on.
   6. I think the pace of the course is good. If anything, a little on the fast side, but it has been alot of information to comprehend and read in chapters 6, 7, and 8.Â By the time I brushed off my statistics and really dove in, the course was moving along well. I would say no changes necessary.

2. **Does the coursework, resources, videos, etc. help you understand and apply the subject matter? Please comment.**
   
   1. Yes, they helped me a lot.
   2. Reading the book and the discussion posts have been the most helpful to me. I have not utilized the additional resources as much as I probably should.
   3. Absolutely. The videos do help a lot. I actually prefer them over reading the book.
   4. Absolutely! I really like our textbook but do worry a little when a homework question is not explicitly talked about in the book. Usually that forces me to look at the extra materials (Word documents, PDFs, etc) because those custom references typically contain information about the “stranger” questions.
   5. Yes. Personally I have learned alot from the readings each week. The supplemental materials are also helpful and relevant if I get stuck on a certain part.
   6. I think this part has been very good. As everything is relatively new to me, all the extra resources really help to paint the picture and give me a better understanding of it.

3. **Is the amount of coursework reasonable for what you are expected to learn, or not enough, or too much? Please comment**
   
   1. Yes, it is reasonable.
   2. I feel as though it is just the right amount. I start the week off with the homework so I get a good sense of the material, and then I work on the discussion board. Your feedback has really helped me think more critically about the material too. (so thank you).
   3. Good for me.
   4. Yes, very reasonable.
   5. I think the amount of coursework is reasonable. Any more would be a bit much to complete each week, especially if you are taking more than one class at a time.
<p>| | |</p>
<table>
<thead>
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<th></th>
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</thead>
<tbody>
<tr>
<td>6.</td>
<td>I feel like the course work is about right. The quizzes are really encompassing and make sure I am doing the reading.</td>
</tr>
<tr>
<td>4.</td>
<td>Is the amount of discussion appropriate, or too little, or too much? Please comment.</td>
</tr>
<tr>
<td>1.</td>
<td>Most of them is appropriate till now.</td>
</tr>
<tr>
<td>2.</td>
<td>I think it's just the right amount, but I liked the last week's discussion where we had situations and we had to use the material we just read to solve them. I helped me understand the material better.</td>
</tr>
<tr>
<td>3.</td>
<td>I think it is appropriate and relevant to the course work. I can learn from other’s experience as well as expanding my view points.</td>
</tr>
<tr>
<td>4.</td>
<td>I feel it's appropriate. I don't like doing Group Case studies but one for this class seems appropriate, anymore would be too much.</td>
</tr>
<tr>
<td>5.</td>
<td>I think the discussion boards are sufficient. In the beginning I thought the discussions would not be helpful since there are only six people in the class but most students seem to post above and beyond the minimum requirement which is a plus.</td>
</tr>
<tr>
<td>6.</td>
<td>The discussion is good. Definitely on the more in depth side of discussion boards I have been on, but that is ok in my opinion. It benefits the class much more.</td>
</tr>
<tr>
<td>5.</td>
<td>List three things that you consider are going well in this class.</td>
</tr>
<tr>
<td>1.</td>
<td>A) The additional resources which Dr. Jena provides; B) The examples in the powerpoint.</td>
</tr>
<tr>
<td>2.</td>
<td>A) The discussions have been insightful and more importantly have forced me to really think about the material and how it's applicable in my work place. I have already had discussions with other employers about this material. B) Homework. C) Your feedback</td>
</tr>
<tr>
<td>3.</td>
<td>A) course contents, B) Application of TQM, C) Pace</td>
</tr>
<tr>
<td>4.</td>
<td>A) I'm actually ahead on assignments for the first time in this program, B) Other students are actually in my line of work so it's a little easier to relate to some of the discussion board examples/stories, C) I believe my final project will be relatively smooth since this material is applicable to my job.</td>
</tr>
<tr>
<td>5.</td>
<td>I think that the group case, weekly readings, and discussion boards are working well.</td>
</tr>
<tr>
<td>6.</td>
<td>I think the class as a whole is going well. I have been able to keep up and understand, the group project is going well, and my final project has started and is progressing nicely.</td>
</tr>
<tr>
<td>6.</td>
<td>List three things that need improvement in this class.</td>
</tr>
<tr>
<td>1.</td>
<td>None</td>
</tr>
<tr>
<td>2.</td>
<td>Nothing</td>
</tr>
<tr>
<td>3.</td>
<td>N/A</td>
</tr>
<tr>
<td>4.</td>
<td>A) Admittedly, I don't want to do the Case Study, but only having to do one instead of multiple is fine by me, B) I can't think of anything else. (I originally had my video question idea in this space but then</td>
</tr>
<tr>
<td>7</td>
<td>Please tell me if there is anything I should do differently to help you succeed.</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.</td>
<td>I think I should take more time to understand the discussion case. I know it only has eight weeks to finish the class so it will have lots of information to get in a short time.</td>
</tr>
<tr>
<td>2.</td>
<td>I think your comments are very helpful at the end of the week. If you wanted it might be helpful to require us to write a question about the material in your discussion boards, so we can see your feedback and it'll seem more like a class too. Plus I know that everyone would at least have one question.</td>
</tr>
<tr>
<td>3.</td>
<td>N/A</td>
</tr>
<tr>
<td>4.</td>
<td>I think it'd be kind of neat if we had one homework question (1-2 points) a week that pertained to a short video (5 min or less) just to kind of help reinforce a certain subject. This might help some people who are more visual learners than just reading the textbook.</td>
</tr>
<tr>
<td>5.</td>
<td>More professor engagement in weekly discussion boards.</td>
</tr>
</tbody>
</table>
Appendix G: 12 Exam Questions that did not meet good-performance standard

Exam Q4 appears below

Attempts: 6 out of 6

"We must identify methods, materials, and resources which are instrumental in improving organization's key activities". The preceding statement is a practice that is "most" aligned with and supports ________. approach/principle to managing quality.

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factual decision making</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Leadership</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Process</td>
<td>4</td>
<td>67</td>
</tr>
<tr>
<td>Continual improvement</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>People Involvement</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Discrimination Index: +0.43

Exam Q5 appears below

Attempts: 6 out of 6

"At my company, people understand roles that everyone plays and their responsibilities. There is almost no cross-functional barrier in our quality efforts." The preceding statement is a practice that is "best" aligned with and supports ________. approach/principle to managing quality.

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer focus</td>
<td>2</td>
<td>33</td>
</tr>
<tr>
<td>People</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Process</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>System</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>Leadership</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Discrimination Index: -0.12

Exam Q7 appears below

Attempts: 6 out of 6

Crosby's "Zero Defects" performance standard stems from his belief that

<table>
<thead>
<tr>
<th>Statement</th>
<th>Respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorly designed systems cause errors</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Employees must be attentive to work they do</td>
<td>4</td>
<td>67</td>
</tr>
<tr>
<td>Knowledge leads to zero defects</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All of the above are correct</td>
<td>2</td>
<td>33</td>
</tr>
</tbody>
</table>

Discrimination Index: +0.62

Exam Q8 appears below
Exam Q9 appears below

Attempts: 6 out of 6

Which of the following is not true of costs of quality?

- Internal failure costs are easiest to collect: 0%
- A major cost contributor to total cost of quality is prevention cost: 0%
- Product recalls and warranty claims accurately measure external failure costs: 17%
- A and C are true: 17%
- A, B, and C are true: 0%
- None of the above are true: 67%

Exam Q12 appears below

Attempts: 6 out of 6

The quality assurance team in a firm is only partly responsible for ensuring that the products produced meet the required quality specifications.

- True: 4 respondents (67%)
- False: 2 respondents (33%)

Exam Q50 appears below
Exam Q52 appears below

The diameter of a disc used in an industrial manufacturing application is 13.25 inches. Assume this random variable is normally distributed and that 91% of the disc diameters are between 13.15 and 13.35 inches. What is the standard deviation of the discs? Round off to two decimals. Choose the option that is closest to what your answer.

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
<th>Corrected Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10</td>
<td>17%</td>
<td>0%</td>
</tr>
<tr>
<td>0.09</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>0.12</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>0.06 inches</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Exam Q57 appears below

Crusty’s pizza company orders cheese from two different companies. Mary’s mozzarella provides 45% of the cheese and Mel’s mozzarella provides the rest. Historically, 98% of the cheese from Mary’s passes inspection while 99% of the cheese from Mel’s passes inspection. A randomly selected batch of cheese doesn’t pass inspection. What is the probability that the bad cheese came from Mary’s?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
<th>Corrected Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.457</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>0.015</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>0.022</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>0.621</td>
<td>67%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Exam Q64 appears below

Which of the following activities of the design for six sigma (DFSS) seeks to refine designs to identify and eliminate potential failures, achieve high reliability, and ensure that it can be easily manufactured, assembled, or delivered in an environmentally-responsible manner?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
<th>Corrected Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed design</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Design verification</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Concept development</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>Design optimization</td>
<td>67%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Exam Q67 appears below

\( x \)-charts are used for:

- averages of variables data: 67%
- individual attributes data: 0%
- individual variables data: 33%
- averages of attributes data: 0%
A delivery company defines a "defect" as a package delivered later than the promised delivery time. Management wants to monitor the proportion of such defect packages per week and plans to sample 120 packages every week. The appropriate control chart is a(n):

| X-bar chart | 1 respondents | 17% |
| R chart | 0% |
| p-chart | 3 respondents | 50% |
| np-chart | 2 respondents | 33% |

Exam Q72 appears below

Attempts: 6 out of 6

Suppose the cost to repair an automobile radiator is $200. Tolerance is 6 mm ± 0.5 mm. Compute the cost incurred as a result of deviation from the target if the value of the quality characteristic is 8.2.

| $800 | 1 respondents | 17% |
| $1,760 | 0% |
| $968 | 1 respondents | 17% |
| $3,872 | 4 respondents | 67% |
| $540 | 0% |
Appendix H: Case Submissions by Two Teams

These are annotated files and include my comments

Group 1_Case.pdf

Group 2_Case.pdf