The Use of Peer Teaching Quality Managers to Improve Student Learning in a Construction Project Management Course

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The objective of this study was to measure the impact of a special form of peer-teaching that utilizes a group of students as peer teachers for another larger group of students enrolled in the same Construction Project Management course. A peer-teaching methodology was implemented, that made use of Quality Managers (QM) as instructional guides. According to Jeager *et al.* (2013), a QM is a student or students who are enrolled in a course and serve as instructional and supportive extensions of their professor in lab and class settings. The students are recruited and guided by the course instructor and serve for only one assignment or lecture per semester. Jeager *et al.* (2013) stated that the use of QMs provide higher-level classroom and lab experiences in situations where the learning experience would otherwise need to be scaled back, or possibly eliminated, due to limitations of larger classes. In this study a QM peer-teaching methodology was used, in which a group of students (four) were selected to lead a scheduling software lecture. Amongst the group of four, one student was identified as the QM, in which they knew the scheduling software (Microsoft Project) and the remaining three had no experience with the software. The teaching group had approximately 12 weeks to learn Microsoft Project, develop a lecture, and present it to the remaining students enrolled in the class during one lecture period. The teaching group was primarily reliant on learning Microsoft Project from the embedded QM. The peer-teaching methodology was validated in two ways; i) in-course surveys, to asses student learning perceptions, submitted to both the teaching group and the remaining students, and ii) objective grade comparison from the student-led lecture and a professor-led lecture teaching a similar scheduling software package (Primavera). This entire process was completed in the Spring 2016 semester and again in the Spring 2017 semester, with comparable class size and demographics. Data collected via student surveys indicated that the student-led group enjoyed teaching the topic and their perception of learning the software increased. The survey also revealed that the teaching group benefited from the expertise of the QM and that the remaining students preferred the student-led lecture. The homework grade average of the two comparative lectures showed a higher average grade for the student-led lecture (94%) over the professor-led lecture (88%) in Spring 2016. The Spring 2017 semester showed similar results, in which the student-led lecture (95%) had higher average grades than the professor-led lecture (85%). It can be concluded that the course was not adversely affected by the peer-teaching methodology, but also that peer teaching may have contributed to improved student learning in this course.

1. Introduction

Student success within and after completing a degree program is important to the mission of emerging research universities. Peer-to-Peer teaching and Quality Managers (QMs) are two effective techniques or pedagogies that researchers find helpful to bridge a learning gaps between complex, technology-based curricula and engineering technology students. According to Jaeger *et al.* (2013) a Quality Manager (QM) is a student or students who are enrolled in a course of interest and serve as instructional and supportive extensions of their professor in lab and class settings. Research indicates that when scaffolding

methods are used, such as QMs, the QM students accept and process the presented curricula better and they show metacognition gains and deeper understanding aspects of learning. The QM students are recruited and guided by the course instructor and serve in this role for only one assignment or lecture per semester.

Construction project management is an application of project management for construction projects that include residential, commercial, industrial and heavy civil scopes of work. The role of a project manager is to determine scope, interpret and guide plans and specifications, specify goals and objectives, maximize resource efficiency, build and follow budgets and schedules and implement all operations pertaining to the project. In the architectural, engineering and construction (A/E/C) industry, increased difficulty in scope and tighter budgetary and scheduling parameters force teams to utilize computer software to help them manage the information and data. Utilization of scheduling and budgetary software not only assists with information coming in from the project, but also is a valuable asset as a project deliverable. Construction project management scheduling software can optimize resources, enhance visibility due to data entry and tracking, allow forecasting, improve collaboration and other advantages. While there are a multitude of construction project management software programs available, Microsoft Project and Primavera are the most used scheduling software in the construction industry and are taught in the construction project management class highlighted in this study.

Microsoft Project is a project management software program developed and sold by Microsoft, which is designed to assist a project manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analyzing workload. (Microsoft, 2016) Primavera (also known as Primavera P6, or simply P6) is a competitor to Microsoft Project with the same capabilities as Microsoft Project. The main difference between the two scheduling packages, other than the interface, is that Primavera is an "enterprise" software package. An enterprise software package allows users to access the software and files produced with the software at the same time and from any computer on the network. This feature may be useful to larger companies working on large and complex schedules in which information needs to be extracted by many personnel simultaneously. Other than the enterprise ability of Primavera, the two scheduling software packages are very similar.

In this study, peer teaching and QMs were used to teach Microsoft Project in a construction project management course and was compared to a professor led lecture of Primavera. Two iterations of this study took place in the Spring 2016 and Spring 2017 semesters at Texas State University in a Masters level construction project management course in which 21 students were enrolled (3 females; 18 males) in the Spring 2017 semester and 16 students (16 males) in the Spring 2017 semester. Prior to the first day of class the professor sought out and identified a student registered in the class who had prior experience with Microsoft Project. This individual was identified as the QM who would facilitate the peer teaching through the professor. On the first day of the course, the professor identified three other students, who had no prior experience with Microsoft Project. The four selected students (including the QM) were then referred to as the

"teaching team". The teaching team was then required to lead a one-time lecture covering Microsoft Project to be given near the end of the semester. The professor provided guidelines of what content was to be taught and what topics were to be covered. The teaching group then had approximately 12 weeks to learn, prepare, and become the expert, in order to teach the software package. The teaching group was primarily reliant on the embedded QM to learn Microsoft Project.

This peer teaching methodology uses two layers of peer teaching; one layer in which the QM is a peer teacher to the remaining three students in the teaching group and the second layer coming from when the teaching group teaches Microsoft Project to the remaining students enrolled in the course. In a general sense, requiring students to teach and become the expert of a topic reinforces the student's understanding and absorption of a topic (Topping & Ehly, 1998). However, through this structured teaching and group peer teaching, the learning and comprehension of not only the QM, but also the three other students can be bolstered. Previous studies that require students to first learn then teach a topic generally require the students to prep and learn the material from scratch with minimal assistance from the professor. This study aims to strengthen that experience by adding a QM to the teaching group such that there is someone with experience to teach Microsoft Project within the teaching group. This procedure exemplifies the construct of a QM, in which a QM is an extension of the professor's knowledge and tutelage.

The peer-teaching methodology was assessed through in-course surveys submitted to both the teaching group and the remaining students, objective grade comparison from the student-led lecture and a professor-led lecture teaching a similar scheduling software package (Primavera).

2. Literature Review

Studies conducted in the past 10 years indicate more and more benefits to peer teaching, peer scaffolding and other teaching techniques. The report by Velez *et al.* (2011) discusses the impact of peer teaching and peer-to-peer learning, and the effects on the students and classroom environment. The authors used a qualitative study to explore student perceptions on peer teaching using three aspects of peer teaching. The study was divided into research outcomes (RO), which are as follows: RO 1: Describe the psychological aspects of peer teaching, RO 2: Describe the power relationships and classroom roles of students engaged in peer teaching course, and RO 3: Describe changes to the students' sense of belonging or engagement as a result of peer teaching. The participant population included students enrolled in a single course offered on two different college campuses (main and branch). The content, material and planning were controlled, but each course had a different instructor. The participants were paired in groups of two or three students and asked to assume the leadership in preparing and conducting one 50- minute class session and at week 5 of the 10-week semester, began their peer teaching. The peer teachers taught their class the material and then the course instructor would conclude with content clarity, conclusions, thoughts, question and answers. The peer teachers were asked to remain in the classroom to reflect on their experience and the effectiveness of the peer teaching method. To analyze the data, the

researchers (authors) used the following: data triangulation and multiple analysis, discourse analysis, textual analysis, individual interviews and focus group interviews. Students commented that it was an important discovery to get a 'feel' for the field of study early on. Additional data from interviews showed that participants felt that the dynamic involvement encouraged engagement and interest due to the hands on teaching approach versus the traditional lecture style where students were receiving information only. The researchers concluded that peer teaching was enjoyed by students as compared to the traditional lecture style classroom learning process. The data showed that it promoted increased metacognition and career formation, coursework engagement, class participation and a sense of belonging. Recommendations on further research are to highlight specific cognitive aspects of peer teaching.

Kim *et al.* (2014) were interested in understanding the impact of peer teaching on student learning in a theory based and laboratory Electric Circuits course. Their case study is designed to allow teams of two student Peer Assistants (PAs) to prepare and present course materials for the week they are assigned. Each week a different team presents and by the end of the course each student has become a PA. The authors start the report with introducing the concept of peer teaching, defining it and describing different ideas of thought developed by peer teaching researchers Vassay, Jaeger, Goldschmid and Goldschmid. These researchers have shown that when there are complex lesson objectives or improving technology in the classroom, peer scaffolding can be used. Like instructional scaffolding, the addition of supporting tools to help students through new use of technology or difficult concepts, peer scaffolding attempts to do the same except from a peer to peer stand point. Jaeger *et al.* (2014) showed that a peer Quality Manager (QM) was effective in bridging the gap between fundamental course work from the instructor and student learning, supporting the students as the course moves along. These QMs are trained or are already knowledgeable with the technology so they can be a guide to their peers throughout the learning process. The case study presented involves peer teaching used in a laboratory section of a first year electrical engineering course at the University of San Diego Shiley-Marcos School of Engineering. Students enrolled in this course were asked to act as PAs on a rotating basis taking the lead on teaching the course and lab work. A pair of PAs were assigned to each lab experiment for the electrical circuits course, meeting with the instructor prior to the experiment. The PAs were instructed on their assigned week's upcoming experiment, theoretical foundation, relevant calculations, computer simulation techniques and results and instrumentation. Due to the significance of introducing fundamental electrical theories and instruments to the class, the course instructor taught the first couple of classes. The PAs are evaluated, but by whom is not detailed in the report. Each member of the peer teaching team completes before and after surveys. The report reviews the survey data, which showed results based on questions about the students' knowledge of the material. A final survey specifically asking opinions about the peer teaching experience showed a modestly average score for those who agreed with the outcome of different peer teaching aspects. The participants were not sure about the effective use of peer teaching in this experience contradicting the overall benefit the peer teachers felt the experience provided them.

The work by Jaeger *et al.* (2013) provides insight to a specific vehicle for peer teaching called Quality Managers (QMs). Quality Managers are peers that support the instructor during classes and serve as a bridge for gaps that in some cases are created due to higher-level classroom and lab experiences where students need attention. As Teacher-Student ratios (TSR) decline, causing less direct interaction during classroom time, Jaeger *et al*. (2013) hypothesize that QMs are an answer to the challenge. Despite the decreasing TSR, students are still expected to grasp difficult concepts and to understand and use the increasingly improved technologies utilized for classroom instruction or as their topic of learning. In higher education, facilities space and instructional resources are not being made available to reduce the classroom size and increase the TSR, so QMs also provide a monetary solution, which is attractive to the system. QMs are not only shown as beneficial to the teacher-student gap, but there are research findings that the QMs are experiencing valuable individual personal and educational growth. This perspective is a cornerstone for Jaeger's *et al.* (2013) research because they want to prove that the QM process is a success on both sides. Their compiled design and data collection of QMs' experiences are outlined in a model that can be adopted and applied throughout university level engineering disciplines. Data collection was taken from a mixed-format survey given to Industrial Engineering students who participated as QMs in their third, fourth and fifth years of undergraduate study. Additionally, the survey was designed for two tracks: one time QMs and multiple time QMs. The survey questions were aimed at understanding how the QM became a "more able" peer to be able to provide peer scaffolding. Peer scaffolding is a term used to describe a skilled peer supporting the instructional gap between the educator and student during class or lab experience. Jaeger *et al.* (2013) depicts the QMs position organized into four stages: Stage 1) Sign-Up and Selection, Stage 2) Orientation and Preparation, Stage 3) Lab/class Time and Stage 4) After-class Time and Reflection. The researchers provide survey questions about each stage. The statistics and content analysis from these surveys provide convincing support for the value of the QM experience. The message to educators from the work presented by Jaeger *et al.* (2013) is that when QMs are used properly and in the right environment, it is a win-win situation for all. Activities that may have fallen off the overall course load can be saved. Instructors can be relieved of the challenge of mass managing their students and focus on overall comprehension. It gives back the overall goal to both the teacher and student to learn, teach, guide, motivate, and remain motivated and engaged with the subject. Future improvements to the QM protocol include: decreasing implied peer pressure among groups to become a QM, course material experience opportunities, providing QMs with challenging opportunities, increased QM usefulness and interaction with the instructor and more transparency with QM evaluations from the students and the instructor.

3. Problem Statement and Significance

The use of software tools in industry is ubiquitous and ever-changing, therefore, it is vital for students entering the workforce to prepare themselves for jobs requiring the use of their field specific software. This study has considered the current need for knowledge of the software programs-*Microsoft Project* and *Primavera* that are being utilized as a construction project management tool globally in several industries. The issue that higher

education degree programs have is when and how to integrate software into the curriculum. Peer teaching methodology has been used in the past to help students learn these software programs. This study continues that tradition but attempts to strengthen the process by using QM and peer teaching within the designated teaching group. The success of this study can have significant impacts to student learning and comprehension of not only Microsoft Project and Primavera but of other application software by demonstrating a superior pedagogical technique.

4. Methodology

The methods of this study first consisted of identifying a QM and three other students to comprise the teaching team, which would then instruct the remaining students on how to create a schedule using Microsoft Project. The QM was identified prior to the first day of class by sending an email out to all students registered for the class, asking for anyone with experience in Microsoft Project. Meetings were then arranged to discuss the student's experience with Microsoft Project, to gauge whether they were suitable to teach the remaining students in the teaching group. The remaining students to form the teaching group were identified by volunteering on the first day of the class. On the same day guidelines were provided, which described the required topics and other necessary information, such that the student-led lecture and the professor-led lecture were comparable. Throughout the semester, the teaching group was instructed to meet as needed to learn Microsoft Project and use the designated QM as their guide. At these meetings, the lectures, handouts, and/or slides were developed for their forthcoming lecture in class. The students were instructed to have one student control the computer, one discuss the slides, and the remaining two students were tasked to "roam" the class room to help students as needed such that the lecture was not interrupted. This process was completed in the same class two different semesters – first in Spring 2016 and again in Spring 2017. To assess the effectiveness of the implemented peer teaching pedagogy a pre and post questionnaire was submitted to just the teaching group (Table 1) to determine the effectiveness of the QM on the remaining teaching group. Secondly, the remaining students in the class that received the student-led lecture were provided with a questionnaire (Table 2) following the lecture to assess their feelings toward the peer teaching method used. Lastly, a direct (objective) measure comparing student homework grades from the student-led lecture versus the professor-led lecture is provided.

Table 1 shows, the pre and post questionnaire questions administered to the teaching group students. The questions were administered before the students began learning Microsoft Project and after both lectures. The questionnaire used a 5 point Likert scale in which 5 was highest.

Table 1: Pre and post questionnaire questions for the teaching group

A. Learning
1. I prefer to figure things out on my own.
2. I prefer to learn from a professor/instructor.
3. I prefer to learn from my peers.
B. Teamwork
4. I prefer to be a leader and give direction.
5. I expect to be able to work effectively in a team environment.
6. I prefer to be a valuable team member as opposed to a leader.
C. Microsoft Project
7. I am very knowledgeable with Microsoft Project and can produce a schedule using the software.
8. I know how to use scheduling software other than Microsoft Project.
9. This topic is very valuable to my career.

Additionally, the remaining students that received the lecture were given a post lecture questionnaire also using a 5-point Likert scale, which can be seen in Table 2:

Table 2: Remaining student post lecture questionnaire questions

Presentation Questionnaire
1. Instructor explanations were clear and carefully explained.
2. The instructor(s) was knowledgeable in the subject matter.
3. The use of a "roaming" lecturer helped me learn the software.
4. This topic is very important to my career.
5. I preferred the use of peer teachers to learn Microsoft Project.

5. Results and Analysis

Data collected from the pre and post questionnaires show that there was a large increase in preference of peer teaching over more traditional learning. In general all questions demonstrated an improvement after the intervention of the peer teaching methodology. Table 3 and Figure 1 summarize the results of the teaching group pre and post questionnaire.

Table 3: Teaching group pre and post questionnaire results of this study.

	2016		2017	
	Pre Results	Post Results	Pre Results	Post Results
A. Learning				
A. Learning				
1. I prefer to figure things out on my own.	3.1	3.2	2.9	3.5
2. I prefer to learn from a professor/instructor.	3.3	3.5	3.8	3.8
3. I prefer to learn from my peers.	3.4	4.1	3.2	4.2
B. Teamwork				
4. I prefer to be a leader and give direction.	2.8	3.1	2.5	2.9
5. I expect to be able to work effectively in a team environment.	4.1	4.2	4.2	4.4
6. I prefer to be a valuable team member as opposed to a leader.	3.8	3.8	4.1	4.2
C. Microsoft Project				
7. I am very knowledgeable with Microsoft Project and can produce a schedule using the software.	2.1	4.8	1.7	4.7
8. I know how to use scheduling software other than Microsoft Project.	2.2	3.1	2.4	2.6
9. This topic is very valuable to my career.	4.8	5	4.7	4.9

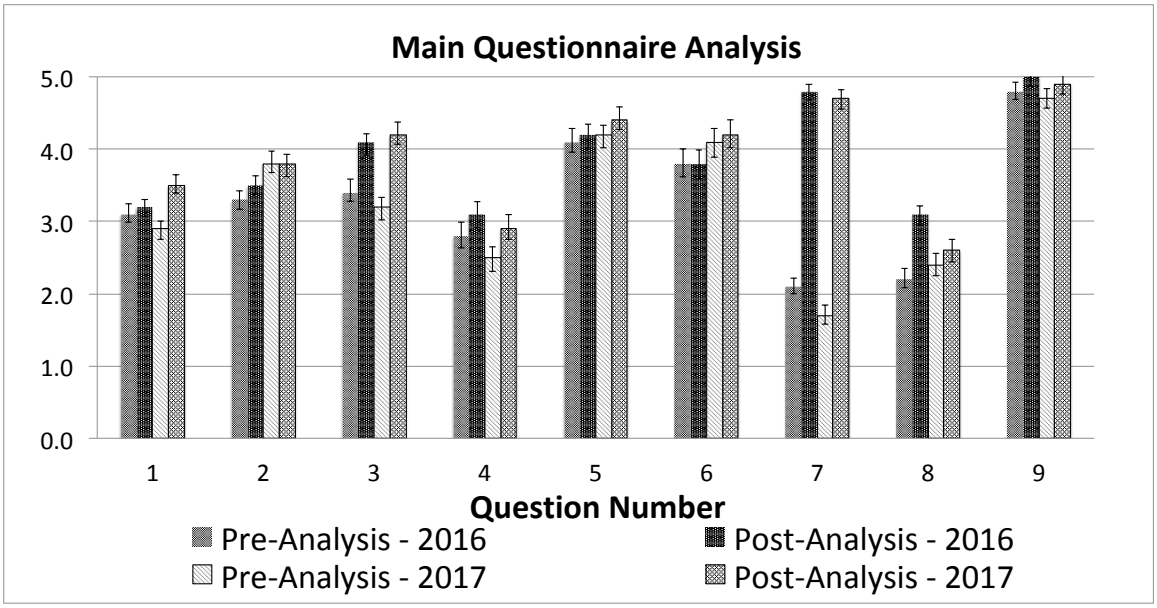

Figure 1: Teaching group pre and post questionnaire results of this study.

It can be seen that Question 1-3, that pertain to students' learning preference (self-taught, professor, or peers), the pre and post analysis are very similar, with minor improvement. The only question in this category that has gainful improvements is question 3, which asks about student preference to learn from their peers. The scores of the pre and post questionnaire from both iterations shows a drastic positive increase related to this

question. This shows that there was no change in student perceptions in self-taught and professor taught preference, but there was in the peer-teaching category after having learned Microsoft Project with their peer QM. Questions 4-6 pertain to student teamwork and their perception to working by oneself or with the team, or being a leader within a team. These three questions have varying degrees of preference, but what is noticed is that the pre and post answers are very similar. Question 4, which pertained to being a leader within a group scored the lowest values amongst the three questions (2.8/3.1) and also had the widest disparity between the three question's pre and post averages. Question 6 received the highest result amongst these three questions with an average of 4.1 for the pre questionnaire and 4.2 for the post. This question pertained specifically to working within a team, therefore, all four students ultimately preferred to work as a team as opposed to being a leader or working by themselves. Looking into Question 7, which compares students' perception of understanding Microsoft Project. This question has one of the strongest perception differences, such that the pre question had an average score of 1.7 and the post had an average of 4.7. This result ultimately shows that student comprehension within the teaching group was very high for Microsoft Project. Question 8 asked the students proficiency with Microsoft Project and if they can produce a schedule using the software. Recall that the methodology only required 1 of the 4 students to know Microsoft Project therefore it is expected that the pre results would be low. The results show the average pre questionnaire of 2.3 and the post of 2.85. The last question, Question 9, asked if the students if they believed that the topic was valuable to their career. The results for this answer was scored high on both pre and post questionnaire which provides affirmative student feedback on the priority to teach these programs.

In addition to the questionnaire provided to the student teaching group a questionnaire was distributed and analyzed from the remaining students enrolled in the class. This was done to determine the impact of the student led lecture on the remaining students in the class. The results of the post questionnaire provided to the remaining students in class, is shown in Table 4 and Figure 2, which were recorded on a 5 point Likert scale in which 5 was the highest.

Table 4: Presentation questionnaire provided to remaining students in class.

	2016	2017
1. Instructor explanations were clear and carefully explained.	4.5	4.8
2. The instructors was knowledgeable in the subject matter.	4.3	4.9
3. The use of a "roaming" lecturer helped me learn the software.	4.6	4.7
4. This topic is very important to my career	4.2	4.7
5. I preferred the use of peer teachers to learn Microsoft Project	4.5	4.4

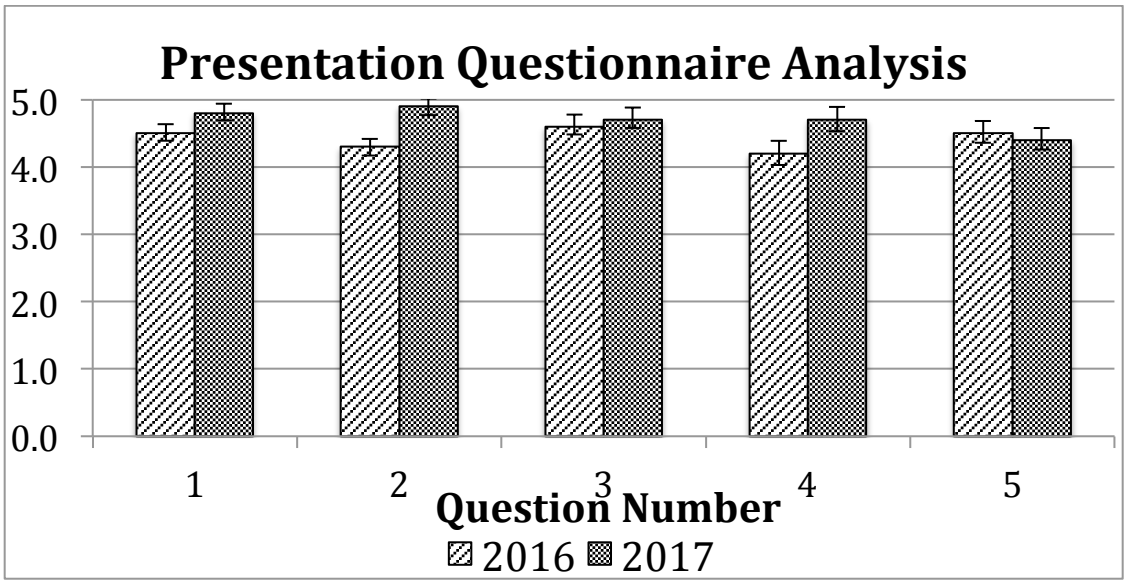

Figure 2: Presentation questionnaire provided to remaining students in class.

As seen in Figure 2 the results are very much in favor of the peer teaching led lecture. All questions at minimum scored above 4.0 out of 5.0, in which 5 was "Strongly Agree". Therefore, all students at minimum "Agree" with all questions asked following the student led Microsoft Project lecture. Analysis of each question reveals more insight to this study. Question 1-2 focused on the quality of the student presentations regarding clear explanations and knowledge of the subject, in which each scored above 4.3; therefore the remaining class agreed that the students had clear and knowledgeable explanations and did a good job conveying the appropriate knowledge. Question 3 pertains to the use of the "roaming" student lecturer. As described in the methodology section, two of the four students in the teaching group were instructed to "roam" the classroom throughout the lecture to answer any questions that students have while the other two led the remaining lecture, such that the lecture was more fluid with less interruptions. The students' perception of this technique was quite high with an average rating of 4.6/5.0 and 4.7/5.0. Question 4 asked the students if they felt this lecture was valuable to their career. The results of this question were 4.2 and 4.7, such that every student agreed that this lecture was valuable to their career. Question 5 asked if the students' preferred the student led lecture, which shows support and preference for a peer led lecture.

The last assessment tool used in this study was to compare the average homework grade from an assignment associated with Microsoft Project and one associated with Primavera. This analysis will allow for a direct (objective) measurement and conclusion to be made regarding the impact of the peer teaching pedagogical technique used in this study. The homework assignments were identical aside from the software package required to complete the assignment. To remove any bias from the study, an outside grader, with a

provided rubric, graded the homework assignments. The results of this comparison can be seen in Table 5.

Table 5: Homework grades based upon lecture type and student data

Grades	2016	2017
Microsoft Project	94	95
Primavera	88	81
Student Data	2016	2017
Amount of Students Being Taught	21	16
Student Teachers	4	4
Age Range of All Students	25-32	26-37

In Table 5 and Figure 3, results of the homework comparison show higher scores for the Microsoft Project homework in comparison with the Primavera homework. In addition, the Microsoft Project median score is higher than the Primavera scores. Provided with the student data information, it can be concluded that peer teaching techniques are a valuable teaching method.

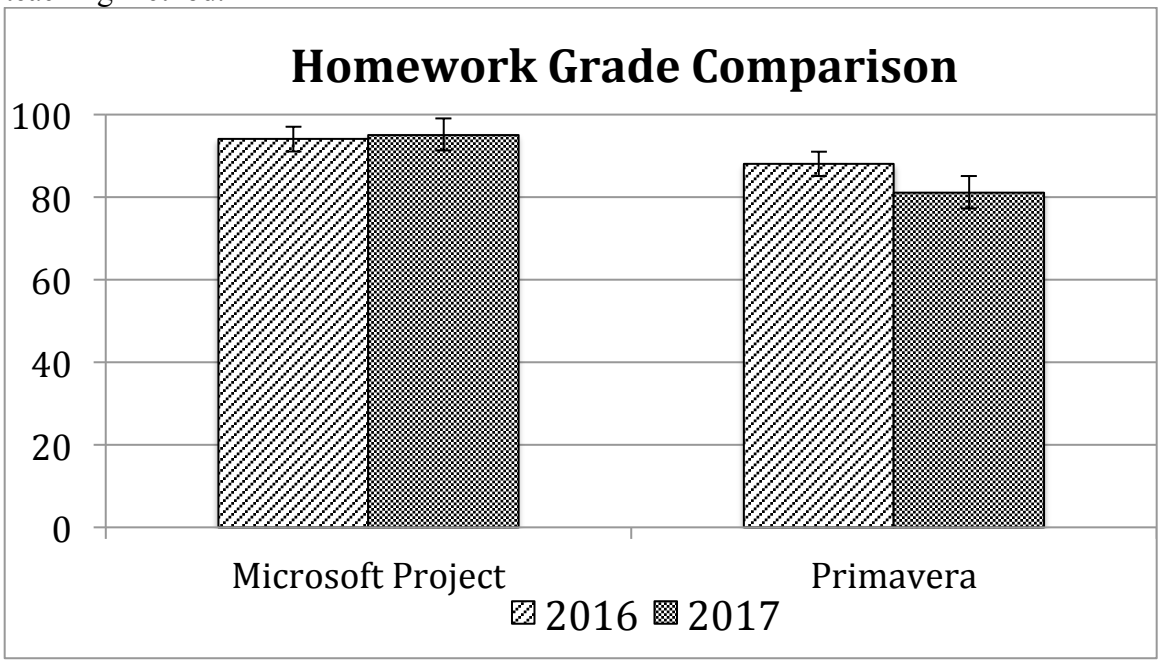

Figure 3: Homework grades based upon lecture type and student data.

It can be seen in Figure 3 that the homework grades from Microsoft Project yielded a higher average than Primavera. The average from the student led lecture was 94% and 95% and the average from the professor led lecture was 88% and 81%. This result ultimately demonstrates that the peer teaching technique had an impact on student learning and perception when it comes to learning to comparative scheduling software packages. To determine if these values are statistically significant a Mann-Whitney U-test was performed. A Mann-Whitney U-test was used as it allows a comparison between two

groups that are not normally distributed. The confidence level was set at 95%, $\alpha = 0.05$. The results of the Mann-Whitney U-test produced a p-value of 0.038 for 2016 and 0.031 for 2017, when the Microsoft Project versus Primavera grades were analyzed.

The data shows that students achieved high homework grades and perceived a better learning comprehension with Microsoft Project. The study shows that by using a QM in a teaching group, the participating students had an increase comprehension of the subject and an increased confidence when using the skills with their homework. In this study the results also show that the students preferred the student led lecture.

5. Conclusions and Limitations

This study measures the impact of a peer-teaching methodology used in a construction project management course that utilized Quality Managers (QMs) to assist the learning of the peer-teaching group. The peer teachers were required to teach one lecture of Microsoft Project, which was compared to one lecture that was professor led using a comparable software package, i.e. Primavera. A total of three assessment techniques were used to determine the impact of peer teaching and the use of Quality Managers. Two of the techniques were questionnaires, one administered to the teaching group and one administered to the remaining students. The last technique was an objective comparison of students' homework grades on the respective software packages.

The following conclusions can be drawn from this study:

The use of Quality Managers helped student learning within the teaching group.
The teaching group preferred the use of a Quality Manger to learn Microsoft Project.
The remaining class preferred a peer-to-peer teaching method to professor led.
The remaining class was not negatively impacted by the peer led lecture.

This study supports the idea that peer teaching can be done without negatively impacting the curricula or students. Further, it shows that Peer-to-Peer teaching utilizing QMs as an instructional assistance technique helps to bridge a learning gap between complex, technology based curricula and engineering technology students.

Some limitations exist in this study that are discussed here. The first being the amount of iterations performed. To fully solidify the effectiveness of this method, additional iterations need to be completed and, further, the methodology could be incorporated in similar courses at other universities. Another limitation could be the software itself. Although they produce similar results and have similar user operations, students may have inherent bias towards one over the other (i.e. feel more comfortable with one over the other). This fact could impact the results as there could be lurking factors impacting student's preference. Therefore future iterations of this study will switch the student-led software and the professor-led software. The assessment techniques could also be a limitation as questionnaires only measure the students' perceptions and are not direct measures of the validity of the technique. In regards to the assessment, this study only assess four data values (two questionnaires and two grades) may not be enough data to

make accurate conclusions. Additionally, the manner of selecting the QM could be a limitation. A more robust selection process could be adapted to objectively measure the quality of the QM. Related to the QM, what if no student enrolled in the class had Microsoft Project experience? The methodology would then have to be altered to identify a QM. Lastly, the course this method was used in was all graduate students with a different outlook and background on education than undergraduate students, therefore, the effectiveness of this study could vary when used with undergraduate students. Future iterations of this study aim to reduce these limitations.

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