Utilizing Job Camera Technology in Construction Education

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One of the toughest hurdles to overcome in construction education is the varying levels of construction field experience among undergraduate students. Although an internship is a common construction management requirement, it is often completed after students complete classes in planning and scheduling. This poses a challenge for the modern construction educator concerning course design. If the instructor begins discussing activities that the inexperienced student has never been a part of, these students could fall behind their classmates. This article presents a technique for overcoming this challenge. Two-term project assignments required undergraduate planning and scheduling students to view several progress photos using current "Job Camera" technology to identify and sequence activities. A survey was administered to three semesters of students exposed to the teaching technique in order to assess the students' ability to identify and sequence activities before and after being exposed to the teaching technique. Survey results indicated that 88 percent of the respondents reported an improvement in the ability to both identify and sequence activities. Further analysis included a comparison of program exit assessment scores for students exposed to the technique versus those not exposed. A one-way analysis of variance (ANOVA) indicated that those exposed to the technique had significantly higher planning and scheduling scores than those who were not exposed to the Job Camera technology.

Introduction

Proper planning and scheduling is the key to a successful construction project (Glavinich, 2004). Realizing the need to provide effective planners and schedulers to industry, many construction education programs require a course in construction planning and scheduling. The American Council for Construction Education (ACCE), recognized by the Council for Higher Education as the accrediting agency for four year baccalaureate degree programs in construction management, requires 3 credit hours of planning and scheduling (ACCE, 2009).

Many construction planning and scheduling authors (Glavinich, 2004; Hinze, 2008; Mubarak 2005) focus on the creation and use of the Critical Path Method (CPM). In order to prepare a network following CPM it is necessary to identify and sequence activities (Hinze, 2008). In fact, according to many CPM authors (Patrick, 2004; Hinze, 2008), these are the first two steps in creating the network model.

Statement of the Problem

Construction educators (McManus, Songpiriyakij, & Ryan, 2006; Mattila, Pocock, & Suermann, 2006), have previously noted that the topic of planning and scheduling is difficult to understand for students without practical construction experience. More specifically, it is difficult for inexperienced students to identify and sequence activities without a frame of reference. This poses a challenge for the modern construction scheduling educator concerning course design. If the instructor begins discussing activities that the inexperienced student has never seen, the student may fall behind classmates.

To offset this problem, Job Camera technology was incorporated into the lead author's planning and scheduling course to bring the students to a common ground of understanding concerning construction field operations. The next few paragraphs detail modern Job Camera technology and how it was incorporated into the instructor's construction scheduling course through two term project assignments.

Modern Job Camera Technology

Modern Job Camera technology enables students to study the construction of entire projects one photograph at a time. A remote camera placed at the jobsite transmits high-resolution photographs through a cell tower to a central data center, where they are archived and placed on a server. Students are then able to access the photographs from any computer that has an internet connection. The user is able to jump around to different photographs in the archive by clicking on different calendar days and selecting different times of the day. Another feature allows the user to zoom in to a portion of the photograph and hold that zoom while advancing the photographs. This allows the viewer to concentrate on the same area for

multiple photographs. These advanced interface functions separate the use of Job Cameras from mere banks of photographs or time-lapse videos.

Incorporating Modern Job Camera Technology into a Planning and Scheduling Course

The term project in the lead author's planning and scheduling course was a semester-long project that incorporated and applied class material as it was assimilated by the students. The primary text used for the course was *Construction Project Planning and Scheduling* by Charles Patrick (2004). The term project followed Patrick's basic steps in creating a network model, including defining activities, putting activities in order, diagramming the activities in network format, determining activity durations, and calculating the schedule. The term project followed the remainder of the course that included creating a cost distribution graph, allocating resources, and scheduling the project using scheduling software. Appendix A details the term project assignments and describes their point values.

The first term project assignment required the students to visit the provided project website, view the available pictures, and identify fifty construction activities. Students were encouraged to search the Internet for other project pictures and information. These sites explained the affect on the community and provided secondary project information, such as the actual milestone schedule and budget information. The Four Bears Bridge website provided by the North Dakota Department of Transportation (NDOT) and the Oxblue Corporation, for instance, included historical photographs of the previous two bridges. These photographs provided the Fall 2005 students with a feel for construction methods and improvement that had been made in construction technology during the many ensuing years. Figure 2 below shows the sheet piling that had to be installed before concrete could be poured in pier 2 of the previous bridge in 1955. Figure 3 shows the constructor's modern day approach where a concrete cofferdam was formed and poured on a barge at the shore before it was transported to its final location.

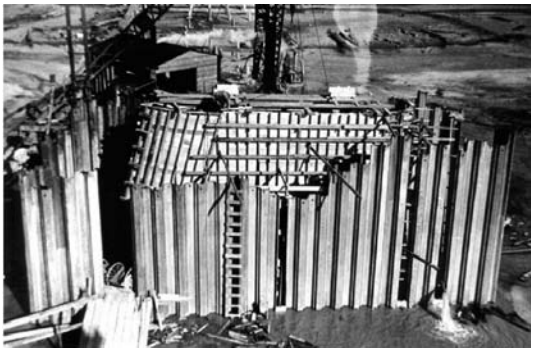

Figure 2: Pier 2 of the second Four Bears Bridge in 1955 (NDDOT, 2005)

Figure 3: Pier 3 of the third Four Bears Bridge in 2004 (NDDOT, 2005)

This first term project assignment forced students to narrow vast quantities of information gathered from the pictures into activities of two or three words, following the verb plus subject format instead of entire sentences. Students also had to decide the level of detail and how they would be consistent throughout the 50 activities. Upon collecting and discussing the first list of 50 activities with the students, the instructor provided a common list of activities for each student. This list contained as many of the students' original activities as possible so they would take ownership of the list. The left column of Appendix B includes 24 of the 50 activities the students created after viewing photographs of the Four Bears Bridge project.

The second term project assignment required the students to provide 1-3 activities from the original 50 activities that immediately preceded each of the activities. The right column of Appendix B shows the activities that immediately preceded the original activities. Like many scheduling and project management authors (e.g., Mubarak, 2005; Stevens, 1990) the instructor used activity and immediate predecessor activity (ACT/IPA) charts to teach logic. Given the list of activities already agreed upon, the student filled in the predecessors to each activity. This assignment required the students to return to the Job Camera photographs to determine the contractor's sequence of events.

Figures 4-6 show three screen shots of the Four Bears Bridge using the Oxblue Corporation's Job Camera interface (2005).

Figure 4 below shows a pier location that is about to receive its cofferdam base. Figure 5 shows the same location a day later at the same time.

If the student just clicked through the photographs by day, he or she would see the cofferdam suddenly appear somewhere between these two days. However, because these photographs were taken every ten minutes on this project, the student was able to pull up 9:10 am on September 30 to see a boat pushing a barge and cofferdam base into the proper location (see Figure 6).

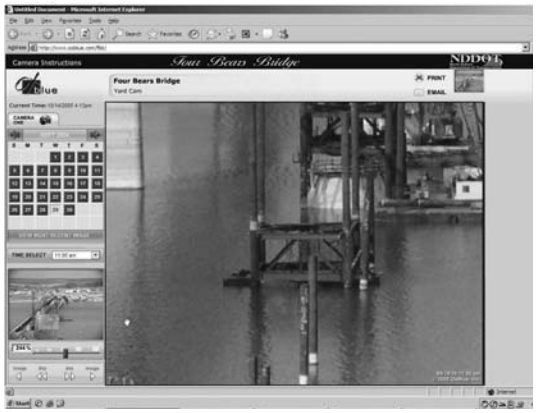

Figure 4: Four Bears Bridge photograph taken 9/29/04 at 11:06 am (Oxblue Corporation, 2005).

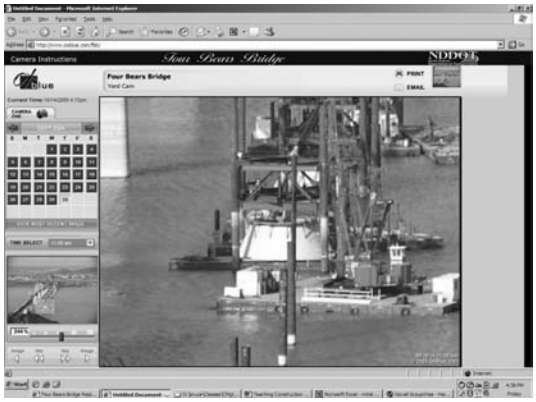

Figure 5: Four Bears Bridge photograph taken 9/30/04 at 11:05 am (Oxblue Corporation, 2005).

Figure 6: Four Bears Bridge photograph taken 30 September 2004 at 9:10 am (Oxblue Corporation, 2005).

At the end of term project assignments 1 and 2, the students turned in a table similar to the one in Appendix B. Even though students may have referred back to the pictures to identify activity durations, the remaining term project assignments did not specifically require the students to use the Job Camera technology.

As one can see in the preceding paragraphs, the first two term project assignments required students to utilize modern Job Camera technology to study sequentially archived construction photographs to identify and sequence activities. The goal of the term project assignments was to provide a frame of reference for discussion of activities and their sequencing by students with no construction experience and those with years of construction experience.

Literature Review

No studies were found on the efficacy of incorporating Job Camera technology into construction education curriculum. This literature review, therefore, focuses on incorporating technology in the classroom in order to engage students. It was written by David McCandless who holds a doctorate in education.

The ability to adjust and change is a key element to the success of the learning organization. This is asserted by Schein (1996) who stated that the ability to adapt is central to the learning organization's health, and it was substantiated by Senge (1990) who pointed out that the successful learning organization must emphasize an increased ability to adapt. As new organizational learning takes place, Mezirow pointed out that adaptations and changes in knowledge become apparent to the organization and to remain successful the faculty must use critical reflection to see how to turn this new transformative knowledge into a more inclusive, discriminating, permeable, and integrative perspective (as cited in Merriam, 2001; as cited in Scribner, & Donaldson, 2001).

Russell (2000) stated visual electronic media have not affected our classrooms to the same extent that they have affected students in society. Therefore, he argues visual information

from the superhighway and other multimodal media being used in the classroom is long overdue. Through the use of Job Camera experience, students can begin to visualize the construction and scheduling experience in a real-world setting and as stated by Pinsky and Wipf (2001) significantly increase recall and retention while enhancing the value of the learning experience.

This new knowledge base must be transformed so it can be shared with students through a constructive, re-acculturated language and cooperative and collaborative learning (Bruffee, 1999). As Bruffee pointed out, most students want to learn, and one of the best ways to accomplish this is by putting the students into a healthy environment or transition community where the students can talk with each other and work together.

As the educational leader begins to understand and use new concepts, the students become motivated and realize they play a part in the learning process. As Weimer (2002) pointed out, "If students are engaged, involved, and connected with a course, they are motivated to work harder in that course, and we know from so many studies that time spent on task results in more learning" (p. 31).

Purpose of the Study

Although the lead author who carried out this research perceived the Job Camera technology to be useful and effective in engaging students and leveling the field in regard to construction experience, he did not have any empirical evidence that it positively affected the students. The purpose of this study was to determine whether the use of Job Cameras increased the construction management students' ability to identify and sequence activities. The research question was as follows: Does the Job Camera technology increase the construction scheduling student's ability to identify and sequence activities?

Research Questions

In order to answer the above substantive research question, the following two research questions and hypotheses were created:

1. Is there a difference between the percentage of activities the students could identify and sequence before studying the Job Camera photographs versus after studying the Job Camera photographs?
2. Is there a statistically significant difference in the mean AC planning and scheduling scores for students exposed to the technique versus those not exposed?

Hypotheses

1. The null hypothesis is that there will be no difference between the percentage of activities the students could identify and sequence before studying the Job Camera photographs versus after studying the photographs.

2. The null hypothesis is that there will be no statistically significant difference between the mean AC planning and scheduling scores for students exposed to the technique versus those not exposed.

Methodology

Research Design and Population

In order to address whether the Job Camera technology and teaching technique had an effect on the students' ability to identify and sequence activities, the instructor employed two research designs in the study. The first research design (phase 1) utilized survey research to compare student perceptions on their ability to identify and sequence activities before and after viewing the Job Camera photographs. The second research design (phase 2) compared exit assessment scores of exposed students (experimental group) to non-exposed students (control group).

In the first phase, the instructor surveyed all of the students that had been exposed to the Job Camera teaching technique. Because he had been utilizing the technique for the past three semesters (Fall 2004, Spring 2005, and Fall 2005) the nonrandom sample was limited to 43 students who completed the course in those three semesters. Table 1 provides the number of the students per semester enrolled in the scheduling course.

Table 1 Sample Size by Semester for Study 1

Semester/Project	n
Fall 2004/Wisconsin Clinic	9
Spring 2005/Texas Clinic	17
Fall 2005/North Dakota Bridge	17
Total	43

In the second phase, the researcher compared a group of students that was not exposed to the technique (control group) to a group of students that was exposed (experimental group). The source for comparison was the students' planning and scheduling score on the program's exit assessment--the American Institute of Constructor's Associate Constructor (AC) exam.

The sample was all students that took the AC exam during those three semesters: Fall 2004, Spring 2005, and Fall 2005. Again, students were not randomly assigned to the groups; either they were exposed to the technique or they were not. The first phase of the study included all students in the planning and scheduling course for the three semesters. Four of those students had not taken the AC exam, four were not required to take it due to their major, one transferred before taking the exam, and one was younger than 18 years old; the number of subjects dropped from 43 to 33. Table 2 shows the sample size for the two groups: those exposed to the technique and those that were not exposed.

Table 2 Sample Size of Exposed and Not Exposed to Technique

Exposed to Technique	Not Exposed to Technique
33	45

Instrumentation

In order to determine whether the use of Job Cameras increased the construction management students' ability to identify and sequence activities, the instructor made use of two instruments. The researcher created and administered a six-question survey. Second, he researched student results on his program's senior exit exam.

For the first phase of the study, the researcher created the six-question survey titled the *Job Camera Effectiveness Survey* (see Appendix C). Because the instructor originally created the instrument to test the efficacy of the teaching technique, without consideration of future publications, the instrument was not pilot tested. Validity and reliability are addressed in the *Results* section of this paper.

The first research question addressed which semester and project the students were exposed to. The second question asked the students to choose which level of experience most closely fit their backgrounds. They were given the choice of no experience; 1 week to 3 months; 3 months to 1 year; and more than 1 year. These choices were created by the instructor based on the student's rank when enrolling in the course. The course is a sophomore/junior level course. Therefore, traditional students would have only had 2-3 summers available to work in construction prior to taking the course. The remaining questions sought to identify their ability to understand and sequence activities before versus after viewing the Job Camera photographs. The percentage thresholds that were created by the instructor follow: none; 1-50 percent; 50-75 percent; and 75-100 percent. Because most of the students were still in the program, the survey was administered in person. For students who had graduated, the survey was mailed to their last known address. The researcher limited discussion to the instructions at the top of the survey to limit the possibility of biasing the students to respond in any way and to reduce the Hawthorne effect.

For the second phase, the instrument was the AC exam. The Midwestern University has required all construction management students to take the exam since 1994. The exam tested students in ten areas, including communication, engineering concepts, management, materials, bidding, budgeting, planning & scheduling, safety, surveying, and project administration. The American Institute of Constructors provides scores in each of the areas. While many of the nation's construction management programs require students to take the exam, the lead author was not able to locate any studies on either the reliability or validity of the exam.

Statistical Analysis

For the first phase of the study, the researcher utilized the cross-tabulations (descriptive statistics) feature within SPSS version 15. This enabled the researcher to identify how many activities the students could identify before and after viewing the Job Camera photographs based on experience level.

For the second phase of the study, the researcher utilized the ANOVA to compare the means of the control group and the experimental group. An alpha of .05 was selected. The ANOVA was chosen because of the small group sizes and the fact that it is robust when small differences exist (Minium, Clarke, & Coladarci, 1999).

Data Collection Procedure

For the first phase, the instructor administered the survey to his current scheduling class first, then to students from previous semesters as he encountered them. Because most of the students were still in the program, the survey was administered in person. For those students that had already graduated, the survey was mailed to their last known address. As mentioned previously, the instructor limited discussion to the instructions at the top of the survey to limit the possibility of biasing the students to respond in any way and to reduce the Hawthorne effect.

For the second phase, the lead author gathered results of the AC exam. After each semester, the American Institute of Constructors sends an e-mail report showing a breakdown of scores per area for all students that took the exam at the instructor's school. The instructor gathered the planning and scheduling scores of students exposed to the Job Camera teaching technique and then of all other students who took the exam prior to that current date. He then placed the scores into an Excel spreadsheet prior to running the ANOVA data analysis.

Results

As mentioned previously, the six-question survey instrument for the first phase of the study was not pilot tested. Upon collecting data, however, the lead author coded the response categories numerically for questions 2-6 and ran a reliability test within SPSS. Cronbach's Alpha was measured at .803. Nunnally (1978) sets the minimum threshold at .70 to indicate reliability.

On the 6-question survey, the instructor achieved a 79 percent return rate by collecting surveys from 34 out of 43 respondents. While this is a respectable return rate for a survey, it should be noted that no attempt was made to control for non-response. Thus, it is unknown whether the results are similar for the other 7 students. Table 3 indicates that 15 out of 34 respondents (44.1%) had less than 1 year of general construction experience before taking CMgt 3355 Construction Scheduling. Of these 15 students, 10 (67%) responded that they could identify only 1-50 percent of the activities before studying the Job Camera photographs.

Table 4 indicates that 20 of the 34 respondents (59%) responded that they could identify and sequence 75 percent or more of the necessary activities to construct their project after studying the Job Camera photographs. The null hypothesis was rejected indicating that there was a difference between the percentage of students that could identify and sequence activities before studying the Job Camera photographs versus after studying the photographs.

When the lead author analyzed experience by sequencing confidence level before and after studying the Job Camera photographs, they found that the tables were identical to the previous two. In other words, the respondents provided the same responses for questions 5 and 6 as they did for questions 3 and 4.

Several of the respondents, 20 out of 34 (59%), provided additional feedback in the comment section of the survey. Most of the comments were suggestions, such as providing

Table 3. Experience by Identification Confidence Level BEFORE Studying Job Camera Photographs

			Percent of Activities Students Could Identify & Sequence BEFORE Studying Photographs				
			none	1-50%	51-75%	>75%	Total
General	No Experience	Count	0	0	0	0	0
Construction		Column %	0.0%	0.0%	0.0%	0.0%	0.0%
Experience	1 week to 3 months	Count	0	5	1	0	6
(1 sum = 3 months)		Column %	0.0%	25.0%	8.3%	0.0%	17.6%
	3 months to 1 year	Count	0	5	4	0	9
		Column %	0.0%	25.0%	33.3%	0.0%	26.5%
	more than 1 year	Count	0	10	7	2	19
		Column %	0.0%	50.0%	58.3%	100.0%	55.9%
Total		Count	0	20	12	2	34
		Column %	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4. Experience by Identification Confidence Level AFTER Studying Job Camera Photographs

			Percent of Activities Students Could Identify & Sequence AFTER Studying Photographs				
			none	1-50%	51-75%	>75%	Total
General	No Experience	Count	0	0	0	0	0
Construction		Column %	0.0%	0.0%	0.0%	0.0%	0.0%
Experience	1 week to 3 months	Count	0	1	4	1	6
(1 sum = 3 months)		Column %	0.0%	100.0%	30.8%	5.0%	17.6%
	3 months to 1 year	Count	0	0	4	5	9
		Column %	0.0%	0.0%	30.8%	25.0%	26.5%
	more than 1 year	Count	0	10	7	2	19
		Column %	0.0%	0.0%	38.5%	70.0%	55.9%
Total		Count	0	1	13	20	34
		Column %	100.0%	100.0%	100.0%	100.0%	100.0%

pictures that encompass the entire project from at least two vantage points inside and outside of the structure from the ground up.

AC Exam Results

In regard to the AC exam results, the instructor acquired the Planning, Scheduling, and Control scores of the experimental and control groups. The instructor was able to record all student scores. After placing an A next to the control group students and a B next to the experimental group students, the instructor opened the Excel file in SPSS version 15.0. Prior to running the one-way Analysis of Variance (ANOVA), the instructor tested the assumptions necessary for the technique. All assumptions were met. The independent samples were normally distributed and equally variable. High significant values for the Kolmogorov-Smirnov (.175 for the control group and .200 for the experimental group) test for normality indicated that the categories had normal distributions. Levene's test for equality of variances indicated that the groups had equal variances (F = 2.133, p = .148).

Table 5 presents the ANOVA table for AC planning and scheduling scores for the control group versus experimental group. The F value of 7.75 was significant (p = .007). The null hypothesis was rejected indicating that there was a significant difference between the control group and experimental group in regard to mean score on the AC exam.

Table 5 One-way Analysis of Variance for AIC Planning and Scheduling Scores by Group

Source	df	SS	MS	F
Between Groups	1	218.78	218.78	7.75*
Within Groups	76	2146.09	28.24	
Total	77	2364.87		

*p < .05

Conclusions

Generalization of the study was limited to construction management students at a Midwestern University. Identifying and sequencing activities are important steps in creating a network model for a construction project. It is difficult for inexperienced construction management students to perform these tasks without a frame of reference. To offset this problem, Job Camera technology was incorporated into the lead author's planning and scheduling course. This study addressed the efficacy of the teaching technique. The substantive research question asked if exposure to the Job Camera technology increased the student's ability to identify and sequence activities.

The instructor surveyed all students exposed to the technique and compared AC exam results of students exposed to those not exposed. The survey results supported the hypothesis that the Job Camera technology had a positive impact on the student's ability to identify and sequence activities. Survey results indicated that 88 percent of the respondents reported an improvement in their ability to both identify and sequence activities after studying Job Camera photographs. Although the AC exam does not specifically measure the students' abilities to identify and sequence activities, the AC exam comparisons showed that students that were exposed to the technique performed better on

the planning and scheduling area of the exam than those that were not exposed to the technique.

Discussion

The findings of this research are beneficial not only to the instructor of the course, but also to all construction management instructors who teach construction scheduling. They will not only be exposed to the Job Camera technology and how it can be incorporated into a scheduling course, but will also see how results can be measured. Results of this study may be used by other construction planning and scheduling instructors to decide if Job Camera technology could be incorporated into their courses. Instructors may decide to incorporate the same methodology, or they may decide to use the same strategy for measuring results.

The authors see great potential in this area of study. In addition to providing a term project for a planning and scheduling course, the authors see potential applications in other construction-related courses, such as estimating, project administration, and project control. Estimators could perform a material takeoff, assign a crew, and estimate output per day. They could then use the Job Camera photographs to see how long the project actually took. In addition, because Job Camera photographs provide the date of the photograph, the information could be used to complete Construction Daily Reports and update schedules.

The authors also see potential for two additional studies. First, because all of the students answered question 3 the same as question 5, this implies that students interpreted their ability to identify activities the same as their ability to sequence activities. The lead author initially thought that identification and sequencing were separate and that a respondent might be able to sequence a list of activities provided, yet not be able to identify the necessary items from the plans and specifications. This is an area that was not specifically addressed in this study, but could warrant a follow-up study. Second, other researchers could consider incorporating the project's plans and specifications alongside the Job Camera technology to assist the student in being able to identify activities.

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Appendix A Term Project Assignments (included in syllabus)

Component	Specifics	Due Date	Points
#1 Define the Activities	Review the Job Camera photographs to arrive at 50 activities.	8/31	5
#2 Put the Activities in Order	Create an ACT/IPA chart listing the activities and their immediate predecessors based on given logic.	9/7	10
#3 Diagram the Activities	Draw an activity on arrow (AOA) diagram in pencil on 17" x 22" graph paper following proper conventions. The diagram shall have a title block and shall be folded into fourths so that it will be 8.5" x 11".	9/21	15
#4 Determine Activity Durations	Update the ACT/IPA chart with a column for durations.	9/28	15
#5 Calculate the Schedule Using the AOA Method	Create a new AOA diagram with corrections. Complete a forward and backward pass and note total float and free float. Again, use 17" x 22" paper folded into fourths.	10/5	15
#6 Repeat Assignments 3 and 5 Using the AON Method	Draw the schedule using the precedence diagramming method. Complete a forward and backward pass and note total float and free float. Use 17" x 22" graph paper folded into fourths.	11/2	15
#7 Computer Applications	Print out the schedule in MS Project, Sure Trak, and P3 (Gantt). Provide a one page cover sheet comparing the three software packages.	12/7	20
#8 Project Folder	Organize the preceding items in a folder and insert it in the course notebook. Include a table of contents for the project folder.	12/14	5
		Total	100

Appendix B First Two Term Project Assignments for Four Bears Bridge

	ACT	IPA
1	Receive notice to proceed	-
2	Order Cranes	Receive notice to proceed (1)
3	Order Steel	Receive notice to proceed (1)
4	Order Barges	Receive notice to proceed (1)
5	Clear Embankment	Receive notice to proceed (1)
6	Cut access roads	Clear Embankment (5)
7	Drive shore sheet piles	Clear Embankment (5)
8	Deliver Cranes	Order Cranes (2)
9	Deliver Steel	Order Steel (3)
10	Deliver Barges	Order Barges (4)
11	Survey casting building	Clear Embankment (5)
12	Layout casting building	Survey casting building (11)
13	F/R/P Footings/SOG	Layout casting building (12)
14	Erect casting building	F/R/P Footings/SOG (13)

15	Layout piles	Receive notice to proceed (1)
16	Drive 2 piles	Layout piles (15), Deliver Crane (8), Deliver Steel (9)
17	Set/Raise frame	Drive 2 piles (16)
18	F/R/P Cofferdam Base	Deliver Barges (10)
19	Transport Cofferdam Base	F/R/P Cofferdam Base (18)
20	Set Cofferdam Base	Set/Raise frame (17), Transport Cofferdam Base (19)
21	Drive 13 Diagonal Piles	Set Cofferdam Base (20)
22	R/P Pier Base	Drive 13 Diagonal Piles (21)
23	Disassemble frame	R/P Pier Base (22)
24	R/F/P Pier Column	Disassemble frame (23)

Appendix C Job Camera Effectiveness Survey

The following short survey is an attempt to find out if viewing Job Camera photographs had an impact on your ability to identify and sequence activities. Please circle the best answer and provide any comments at the bottom of the sheet.

1. Which of the following semesters were you enrolled in CMgt 3355 Construction Scheduling?
   A. Fall 2004 Term Project: Madison, WI Clinic (from steel on, pre-cast, EPDM roof, brick)
   B. Spring 2005 Term Project: East Texas Clinic (ground up, steel, EIFS)
   C. Fall 2005 Term Project: Four Bears Bridge (cofferdams, piers, bridge deck)
2. Which of the following best describes your level of general construction experience before taking CMgt 3355 Construction Scheduling? 1 summer = 3 months, so 4 summers = 1 year.
   A. No experience
   B. 1 week to 3 months
   C. 3 months to 1 year
   D. more than 1 year
3. Which of the following best describes your ability to identify activities required to complete this type of project before viewing the Job Camera photographs?
   A. I would not have been able to identify any of the required activities.
   B. I would have been able to identify 1-50% of the required activities.
   C. I would have been able to identify 51-75% of the required activities.
   D. I would have been able to identify 76% or more of the required activities.
4. Which of the following best describes your ability to identify activities required to complete this type of project after viewing the Job Camera photographs?
   A. I would not have been able to identify any of the required activities.
   B. I would have been able to identify 1-50% of the required activities.
   C. I would have been able to identify 51-75% of the required activities.
   D. I would have been able to identify 76% or more of the required activities.
5. Which of the following best describes your ability to put the activities in correct sequence for this type of project before viewing the Job Camera photographs?
   A. I would not have been able to sequence any of the required activities.
   B. I would have been able to sequence 1-50% of the required activities.
   C. I would have been able to sequence 51-75% of the required activities.
   D. I would have been able to sequence 76% or more of the required activities.
6. Which of the following best describes your ability to put the activities in correct sequence for this type of project after viewing the Job Camera photographs?
   A. I would not have been able to sequence any of the required activities.
   B. I would have been able to sequence 1-50% of the required activities.
   C. I would have been able to sequence 51-75% of the required activities.
   D. I would have been able to sequence 76% or more of the required activities.

Student Comments: _____