

PART I: BACKGROUND

Title: : Traffic Safety for Construction Management

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Discipline or Field: Construction Management, Risk Control, Worker Safety and Health, Construction Training

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Course Name: Construction Safety

Course Description: Construction Safety (RC-388/588) is a dual level course offered by the Risk Control Program at the University of Wisconsin-Stout. This class is required of all Construction Management Students for their BS degree and is an acceptable elective for Risk Control graduate students and Interior Design undergraduates; it is sometimes taken by other students with an interest in construction safety.

The class size is usually about 30 students and lessons take place for 2 hours per week for the entire semester. The class can take place in any classroom where there is a computer projector available, although the class could be modified to fit any learning environment. The lesson topic is extremely important, as traffic safety causes many accidents/fatalities and is applicable to a wide variety of construction projects. The lesson can take place at any point in the semester since it is basically a stand-alone topic.

Executive Summary: The Lesson Study team conducted a lesson on traffic safety 2 times, once during Fall 2006 and once for Spring 2007. By using pre/post tests and case studies, the researchers improved student learning and their methodology for delivering the topic.

Methodology used included:

- Delivery of a pre/post test on the topic of traffic safety;
- Having small groups complete a short homework assignment on the topic of traffic safety;
- Having groups analyze several case studies on the topic of traffic safety;
- Videotaping the lesson to make qualitative observations on student learning.

Pre- and post-test results indicate that student knowledge on the topic of traffic safety improved as a result of completing the homework assignment and analyzing several case studies in groups. Furthermore, student engagement increased dramatically compared to watching a video on the subject. Students were sharing personal work experiences, gaining collective insight from each other and working as a team to evaluate the situations, identify common themes and propose solutions.

The Lesson Study program was viewed as an effective tool for instructors as it stimulated self-reflection and dialogue on processes and methods for facilitating student learning. Throughout the process instructors shared new methods for increasing the depth of learning expanding by infusing a variety of approaches into content delivery.

The group's last discussion centered on the fact that the case study-based lesson was highly effective, but that a future lesson for the topic of Traffic Safety might entail students actually setting up a worksite as a hands on activity.

Other relevant observations are that the Lesson Study Process, while beneficial for improving a particular lesson topic and generating appropriate discussion about pedagogy, took a lot of time. Perhaps another Lesson Study method could be developed in order to minimize the time commitment while maximizing the amount of time observing lessons in progress.

PART II: THE LESSON

How to Teach the Lesson

Class Prior to Lesson Day:

- Pretest at end of class (10 minutes)
- Looking at first case study – baseline before instruction (10 minutes) - groups of 3 look at one case study each (A-J) – what are issues and how should they be rectified?
 - o Turn these in
- Assignment given on basic traffic safety information (5 minutes)

Day of Lesson:

- Turn in assignments (5 minutes)
- Envelopes (5 minutes to get ready)
- Envelope activity (30 minutes)-
 - o Have all envelopes ready. A-J. each envelope has a case study and 3 sheets of paper and the original assessment.
 - o What are issues and ways that you could improve the situation?
 - Fresh sheet of paper for each group. 2 other groups
 - 10 minutes for each group. (25 minutes)
 - o Goes to original group – redo your original assessment (10 minutes)
 - What is different that you did from your original assessment?
 - Assess your original group activity (enclosed). What did you learn since that time that helped you out?
 - What do all of the case studies that you looked at today have in common:
 - Common issues
 - Common solutions
 - Turn in all envelopes and all work.
 - o Ask class – what are common issues/solutions for each group (10 minutes)
 - o Re-take the pre-test (10 minutes)

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Student Learning Goals

The purpose of this project is to determine the effectiveness of using the Lesson Study Program for improving student learning for the topic of Traffic Safety. Learning goals for the lesson include:

Remembering: *can the student recall or remember the information?*

Students will be able to recall basic information relating to construction traffic safety procedures and regulations.

Understanding: *can the student explain ideas or concepts?*

Students will be able to explain concepts (practices) relating to construction traffic safety to fellow class members.

Applying: *can the student use the information in a new way?*

Students will be able to explain how these practices and concepts relate directly to worker safety and health.

Analyzing: *can the student distinguish between the different parts?*

Students will be able to apply the practices and concepts to analyze appropriate case scenarios.

Evaluating: *can the student justify a stand or decision?*

Students will be able to evaluate others' analyses and recommend modifications to improve their case scenario.

How the Lesson is Intended to Work

Enhancing safety training is especially important for the construction industry, since many topics, including traffic safety, concern life threatening situations. The general methodology of using case studies as a way to improve student learning was agreed upon by consensus of the lesson study group. Previous teaching had been delivered as a video and short quiz in which student engagement was minimal. Therefore the methodology used was intended to maximize student engagement and assess learning improvement.

PART III: THE STUDY

Approach

There were several foci of interest and observation during the lesson:

- A pre-test, given before the lesson, was comprised of 10 questions and provided a baseline of student knowledge.
- Before the lesson was given, student groups analyzed a case study to determine what issues and solutions they could identify before instruction occurred.
- Each student was responsible for completing a homework assignment on the topic of traffic safety prior to the lesson. This was done so that students could be exposed to the subject at least one time before the lesson actually occurred.
- During the lesson, each student analyzed several case studies in teams – the students were required to identify appropriate issues and solutions for each case study. The student groups had to write down a short description of issues and solutions identified.
- At the end of the lesson, each group was asked to re-analyze the original case study that they had looked at prior to class. They were asked if they could identify more/different topics after having done the homework and analyzing several case studies.
- Observers of the class were asked to gage classroom engagement during the session.
- The class was videotaped so that we could assess classroom engagement after the session.
- A post-test (exactly the same as the pre-test) was administered to determine if student knowledge of the subject had improved during the process.
- Additionally, each of these measurements was made during 2 semesters, where the lesson was changed slightly from semester 1 to 2.

Findings

Pre and Post Tests

	Semester 1	Semester 2
Average percent improvement between the pre- and post-tests	19.7%	24.7%
Number of participants	30	58
Maximum change in improvement	58%	90%
Minimum change in improvement	-9%	-16%

Change in ability to analyze case studies

When asked the question, “Assess your group’s original group activity. What did you learn since then that has helped you (during the final re-assessment)?” some of the following observations were made by student groups:

- “Very Involved. Learned more from various scenarios. Also gathered info from the Work Zone Safety Book.
- “Not a whole lot”
- “We were able to add a few key items”
- “Communication through employees and knowledge of entire work environment.”

- “Read a traffic manual so we more (sic) knowledgeable about the situations we are discussing. There is more danger to traffic/road safety than we thought.”
- “Facts about controls and hazards of road construction”
- “Appropriate regulations, standards and procedures”
- “We learned there is more than one way to prevent the hazards”
- “The more people that brainstorm, the more ideas that you get. Opens your mind to other hazards and controls.”
- Completing the homework assignment was beneficial.
- “Install a higher K-rail, use slower traffic patterns, more separation between work zones”

Lesson Study Participant Observations

Lesson Study participants who observed the lesson unanimously agreed that the lesson effectively engaged the students. Furthermore, all observers felt that the class would have positive effects on the student’s ability to remember the material in the long term since the class had several opportunities to practice what they had learned in case studies.

Discussion

Pre- and post-test results indicate that student knowledge on the topic of traffic safety improved as a result of completing the homework assignment and analyzing several case studies in groups. Furthermore, student engagement increased dramatically compared to watching a video on the subject. Students were sharing personal work experiences, gaining collective insight from each other and working as a team to evaluate the situations, identify common themes and propose solutions.

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APPENDIX

Files related to this project include:

- Additional group questions.doc
- FACE for highway safety.doc
- FACE for highway safety_2.doc
- FACE for highway safety_3.doc
- FACE for highway safety_4.doc
- FACE for highway safety_5.doc
- FACE for highway safety_6.doc
- FACE for highway safety_7.doc
- FACE for highway safety_8.doc

- Pre-class work zone case study questions.doc
- Homework assignment for Work Zone Safety.doc
- work zone case study questions.doc
- work zone assignment.doc
- pre test for traffic safety.doc