



Digital Dissemination Platform of Transportation Engineering Education Materials Founded in Adoption Research

UAF Contribution to Final Report

Task 5A: Offer several courses using non-traditional academic models and methods, and monitor results.

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<p>National interest abounds in improving engineering education in the US. This interest stems from low performance on concept inventories (P.S. Steif, Dollar, & Dantzler, 2005; Paul S Steif & Hansen, 2006) concerns over the role of the US as a national economic leader (The National Academies, 2006), evidence of best practices in curriculum development and pedagogy, and a sense that we can just do things better. These concerns have led to the development of an abundance of materials and methods that are based on effective methods of development and/or been shown to be effective on student learning and other important educational outcomes.</p> <p>While progress has been made in improving courses and curriculum, it is greatly hindered by inefficiencies associated with duplicating development efforts. For example, there are approximately 200 introductions to transportation engineering courses taught annually in the US and little evidence of sharing of materials (other than textbooks) in these courses. More knowledge is needed on how and why faculty and teachers adopt curriculum. Where do they go for resources when developing a new course or revising an old course? How do they make adoption decisions when they find curriculum? In what forms can dissemination venues (such as websites) take to optimize adoption? How can higher education and workforce development curriculum be shared efficiently? This project will begin to answer these important questions through an investigation of how faculty adopt curriculum when developing a new course or revising an existing course and using this knowledge to develop an architecture and sustainable plan for a web-based dissemination venue. In parallel with this work, faculty from University of Alaska, Fairbanks will develop and test courses focused on working professionals. We will monitor this course development process to add to our knowledge base for repository development.</p>			
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I. Introduction

This report is University of Alaska Fairbanks' portion of the PacTrans project: Digital Dissemination Platform of Transportation Engineering Educational Materials Founded in Adoption Research. It reports on Task 5A: Offer several courses using non-traditional academic models and methods, and monitor results. The UAF portion was given the contract G00008085-337104 and initiated in March 2012. The sponsor's contract number is University of Washington NO. 739439, which is a pass thru from USDOT contract DTRT12-G-UTC10. Task 5A Included:

- Reviewed published works in the engineering academic literature regarding non-traditional means,
- Examined modes that might work for courses offered to DOTs,
- Coordinated with media and IT specialists and integrated selected delivery mode(s) into teaching plans for several courses,
- Developed methods for evaluating results,
- Coordinated with DOT engineering education contacts in other states, and
- Offered courses and evaluate results, with attention to administrative and IT issues.

Obtaining continuing education is an ethical obligation for engineers and a necessary part of growing in their jobs, both to enable them to handle more complex technical tasks, and to maintain competency with changing technology. As the engineers advance in their careers, they must master administrative and management skills in order to advance their projects. Thus this continuing education is workforce development for the engineers themselves, and also for the workers who will be employed on their projects. Because most engineers of these target demographics already have jobs, this education must be made convenient for the working engineer and fit the situational needs of working engineers and their employers. This is especially true with engineers entering the transportation workforce. New civil engineers starting in transportation may have only one or two college transportation-related courses. Here we examine alternative modes of education delivery that take advantage of the great progress in electronic communications. Specifically, we critically examine non-traditional modes of offering academic education in transportation engineering subjects and identify situations where these modes may transmit knowledge effectively and factors in successful transmission. We utilized experienced instructors and drew on their knowledge of the administrative and pedagogical systems to offer and then critique various methods. This preliminary review could aid instructors preparing for first time entry into non-traditional education, but would also serve as preliminary selection guidance for non-traditional educational modes.

The following sections include a literature search and background information section, and detailed reviews of five non-traditional methods:

- Flip Classroom on 5S Principles in Lean Construction
- Google Hangout with DOT's re: Leadership Learning
- Advanced Scheduling Techniques for Construction Management Certificate Program
- Overview three years of Video-Conferenced graduate courses.
- An undergraduate structures course for students in Alaska taught from North Carolina via video conference

Following the five reviews, we offer some overall recommendations. The last section has the references for the literature cited.