A Report from the University of Vermont Transportation Research Center

Transportation Education Demonstration Pilot Program

UVM Transportation Research Center

TRC Report #12-013| McRae | June 2012

Transportation Education Demonstration Pilot Program
UVM Transportation Research Center

June 30, 2012

FINAL REPORT

Prepared by: Glenn McRae, Ph.D.

Transportation Research Center
Farrell Hall
210 Colchester Avenue
Burlington, VT 05405

Phone: (802) 656-1317
Website: www.uvm.edu/trc

Acknowledgements

The author would like to acknowledge the USDOT for funding this work through the University Transportation Center (UTC) at the University of Vermont and the support received from the Federal Highway Administration under Grant number DFH61-08-G-00007 as part of the Transportation Education Development Pilot Program (TEDPP). This work would not have been possible without the full support and cooperation of the state departments of transportation in Vermont, New Hampshire and Maine, as well as many of other key partners and participants, many of whom are referenced in the report.

Disclaimer

Table of Contents

1. Introduction 4

2. Project Components & Results 5
- 2.1 Transportation Systems Academy (TSA) 5
- 2.2 Transportation Systems Institute (TSI) 6
- 2.3 Second Careers in Transportation (SCT) 8
- 2.4 Community Colleges 9
- 2.5 Dissemination of Results 11

3. Next Steps 12

4. Conclusions 15

1. Introduction

The **Transportation Education Development Pilot Program (TEDPP)** develops innovative workforce development programs to attract and retain skilled workers in the transportation sector of Vermont, New Hampshire and Maine and encourages statewide economic development by cultivating a well-trained workforce. The U.S. Department of Transportation awarded $979,829 to the University of Vermont's Transportation Research Center (TRC) as part of a $1.01 million workforce development project to help develop four innovative programs to attract and retain skilled workers in the transportation sector of Vermont, New Hampshire and Maine.

Twenty million Americans are currently employed in transportation-related jobs, in careers as diverse as civil engineering, architecture, piloting of planes and ships, management of transit systems, planning transportation services, and design of intelligent transportation systems. However, because of demographic changes, the ranks of workers are thinning and more than half of workforce within state transportation agencies will be eligible to retire in the next decade. In addition fewer people are choosing careers in key transportation fields.

Although thousands of new transportation jobs were created through ARRA-funded public transit and highway projects, highly skilled transportation workers are still in great demand. The new transportation workforce will need the technical competencies to lead and manage change in the transportation field and to capitalize on opportunities for energy efficiency and pollution reduction. In addition, this workforce will have to find ways to provide mobility for the aging population as the number of Americans over age 65 will double over the next 50 years.

The project in Vermont chose four key interventions designed to test new approaches in transportation workforce development and leverage new resources and activities is addressing the need to build capacity to meet new and emerging needs in the workforce. Three programs are aimed at attracting and retaining skilled workers. Non-traditional labor sectors (e.g. young adults, retirees, veterans) are provided with transportation career awareness and skill building.

- Transportation Systems Institute (TSI)
- Transportation Systems Academy (TSA)
- Second Careers in Transportation (SCT)

One program has assessed the capacity of community colleges nationwide to participate in transportation workforce development.

- Community College (CC)

2. Project Components & Results

2.1 Transportation Systems Academy (TSA)

The Transportation Systems Academy (TSA) is a multi-tiered workforce development pilot program that is geared at working with non-traditional labor pools to provide career awareness and skills training for the transportation industry. The TSA is a comprehensive program that specifically trains individuals in the basics of transportation careers with an emphasis on operations and maintenance career pathways starting with a solid foundation in transportation system fundamentals and work zone safety.

The TSA program was designed to help address the following areas:

- 40-50 % of Vermont's transportation workforce is eligible to retire in the next 10 years.
- Fewer people are going into the key transportation fields & there is competition for those potential workers.
- The challenge of reaching non-traditional populations to create a workforce representative of our nation's diversity.
- The need for different and more complex skill sets for the next generation of transportation professionals.
- The critical shortage of maintenance and operations workers, which can be overlooked when universities focus workforce development programs on other professional positions.

The program has created a toolkit of training modules, career pathways and career development information as well as job seeking and workplace skills that can be integrated into existing curriculum or programs, or be combined as a stand-alone program that will assist interested students gain a foundation that will prepare them to be competitive in the job marketplace for positions in transportation operations and maintenance as the first step on a career path. Pathway tools demonstrate connections to jobs in multiple transportation modes. Modules include:

- Transportation 101
- Basics of a Good Road
- Winter Roads
- Worker Safety
- ✓ First Aid/CPR (Certification)
- ✓ OSHA-10 (Certification)
- ✓ Work Zone/Flagging (Certification)
- Respectful Work Environments
- Citizenship and Community Participation
- Project Planning & Selling
- Construction Math
- CDL Basics
- Work Experience in a DOT garage

The TSA has run pilot programs at the Community High School of Vermont and the Career Center at Canaan Vermont. The pilot program goal is to help educate, prepare and engage individuals not just for their next job but to start in a lifetime career path in the field of transportation. The immediate objective of the program is to support the training and career-readiness for potential *up-and-coming* employees. The longer-term objective is to attract new talent to the transportation industry from multiple pools (youth

and mature workers). The program was designed in close cooperation with the Vermont Agency of Transportation (VTrans). The skill building and certification modules are closely aligned with the VTrans training requirements for all first year employees and VTrans has provided training assistance and opened up facilities for job shadowing and internships, as well as summer employment opportunities that provide excellent entry level workplace experience. The TSA is easily combined with existing education programs in construction, heavy equipment operation, or automotive maintenance.

In 2012 working with the Riverbend Career Center (Bradford) and the Hannaford Career Center (Middlebury) the TSA is being tested for its adaptability to different curriculum designs and the structure of different centers to recreate the program to best take advantage of the local resources and needs of potential participants. At Riverbend, the current Heavy Equipment Operator program is being re-invented as a Transportation System Academy to provide students with a wide range of skills and opportunities for future work and education. At the Hannaford Career Center the program is being developed for the Adult education program with special emphasis on attracting Veterans and mature workers. TSA outreach will also continue to other Career Centers.

A Guidebook and a Career Pathway Tool are being produced as part of the Developmental Evaluation process being undertaken to test the potential for transfer of the program to other states.

2.2 Transportation Systems Institute (TSI)

The TRC partnered with Vermont Technical College Technology Extension Division (VTC TED) to successfully implement the Transportation Systems Institute. This program was created to address the needs of incumbent state transportation workers within Vermont, New Hampshire and Maine.

A *needs assessment* was conducted of VT, NH & ME Departments of Transportation consisting of 41 structured interviews with DOT officials conducted by an evaluation specialist contracted for by the VTC TED. In response to the key research question, "What do you think is the biggest challenge facing this DOT in the next 5 years?" the almost universal response was "*Obtaining necessary funding and replacing the knowledge and experience lost through retirement.*" In response to a question on what are the critical skills needed by the workforce to meet the needs of the DOTs in the next 5 years, the responses were varied but "management, leadership and communications" skills were most frequently cited. When asked for clarification, responses were "getting people to work effectively together, building collaboration, communicating effectively

In 2010, the first cohort of participants were selected from DOT employees in Vermont, New Hampshire and Maine (5 from each state). Fourteen participants finished the program.

Based on the needs assessment and introductory work with the participants, TSI training modules were led by Vermont Technical College professionals and outside experts and included the following curriculum elements:

• Leadership Styles & Workplace Principles • Systems & Organizational Change • Coaching & Feedback • Conflict Management • Trends & Topics in Transportation • Public & Government Relations • Government Project Finance • Adult Learners, Meetings, & Mentoring	• Train the Trainer • Attitude, Motivation & Customer Services Skills • Technical Project Management • Having Difficult Conversations • Ageism • Managing & Optimizing Group Processing • Critical Thinking • You Can't Do it Alone

In evaluating their experience in the TSI program:

- 60% of the participants agreed that the Institute had increased their knowledge base on critical issues.
- 50% of the participants agreed that the Institute changed their thinking.
- The majority (70%) of participants agreed that the Institute helped them to better understand their role in the workplace.
- 60% of participants agreed that the Institute changed their individual behavior.
- 70% participants agreed that the Institute provided an increase in their skill level.
- 50% of participants agreed that the Institute changed their understanding of diversity.
- More than half (56%) of the participants confirmed that the Institute made them realize there is a need for additional training in the workplace.
- 100% of participants agreed they would recommend this program to other colleagues.

Based on participant feedback, some curriculum modifications were made and a new cohort was chosen (12) to participate in the program in 2011.

Participants came from diverse backgrounds and positions:

MAINE	**NEW HAMPSHIRE**	**VERMONT**
Contracts Engineer	Municipal Highways Engineer, Bureau of Planning & Community Assistance	Quality Assurance & Technical Development Engineer
Superintendent of Highway Operations	Right of Way Engineer	District Transportation Administrator
Transportation Planning Analyst	District Engineer	IT Manager
Policy Development Specialist	Assistant Traffic Engineer - Bureau of Traffic	Structures Design Engineer
Assistant Bridge Maintenance Engineer	Program Specialist	Right of Way
Public Service Manager – Civil Engineer IV	District Construction Engineer	Local Transportation Facilities Program
Human Resources	Chief of Final Design	Administrative Services
Civil Rights Office	Financial Analyst	Maintenance Transportation Administrator
	Civil Engineer IV	Highway Safety & Design

At the conclusion of the second cohort training the two cohorts were brought together for three day long programs (June 2011, November 2011 and May 2012). The purpose of these sessions and the coaching that transpired between the sessions was to work with the participants on projects and efforts to convert the learning from the TSI into actionable work and effort within their home agencies while maintaining a tri-state learning community.

In the spring of 2012, VTC TED piloted a modified curriculum for eleven municipal leaders and planners in transportation, with design assistance from TSI participants. In a three day session in March and a follow up session in May the participants look at strategies for state and local agencies to work more collaboratively together to:

1. Address permitting processes
2. Streamlining funded projects, fed – state – local
3. Share common messages and vision
4. Involve federal people and DOTs in a system discussion
5. Getting town, state and FHWA together to change and streamline processes with federal programs
6. Improve and speed up the hiring and review of engineering services

Tropical Storm Irene was used as a case study to provide context for the discussion. For the state DOT TSI cohort members this was an opportunity to explore how to work more productively with their municipal level counterparts.

A review of the value of the TSI for participants was captured in a video presentation by VTC TED that was presented as a showcase at the National Transportation Workforce Summit in April 2012. From July 2012 to May 2013 UVM will be conducting a developmental evaluation of all TEDPP components to determine how best to support efforts going forward with DOT personnel and how the lessons from this project can be best used in other states.

2.3 Second Careers in Transportation (SCT)

Through the Second Careers in Transportation (SCT) initiative we moved to conduct a tri-state assessment of jobs available and working conditions that underlay employment in the transportation field (public and private) that would support or create barriers for older workers seeking continued or new employment. While the initial emphasis of the initiative was on laying done bridges to career pathways in transportation from other fields where there may be early retirees or displaced workers, our inaugural partners and the state DOTs who we were working with on the TSI initiative indicated a strong interest in efforts that would help retain and retrain incumbent workers who required either different jobs types or more flexible work conditions to continue working as they aged.

Retaining a worker is a much more cost effective strategy. The program has taken on a dual line of inquiry as a result as we examine barriers to changing jobs or increasing

workplace flexibility to retain current DOT employees, as well as seek bridging opportunities to bring new, older workers into the field. The project refocused to emphasize positions in the public sector (strategic partner focus) and to employ the training/education rubric of the TSA (same program different audiences) to help bridge both unskilled older workers into the field and to place a specific emphasis on reaching out the Veterans as a community of second career seekers even though many of them are in a younger age bracket. Lessons from these efforts should still inform a broader strategy for mature worker development in the field. This is the least developed project area of the TEDPP initiative and will be a key focus in the final year (2012-13).

What has been accomplished to date is the design and facilitation of a survey that sought to gauge the level of awareness of the transportation industry of practices and conditions that would be most likely to attract and retain mature workers. At the same time this effort sought to identify and quantify the current demographics of the transportation workforce across northern New England. The survey process was designed and implemented in partnership with the University of Vermont's Center for Rural Studies (UVM CRS). A pilot survey was conducted in Vermont in 2010 and then followed up with surveys in New Hampshire and Maine in 2011, with new data collected from the Vermont Agency of Transportation.

The pilot survey sought to look at jobs (broken down into Professional, Skilled and Administrative categories) across both public (state and municipal) and private sectors. While statistically significant the survey results were not sufficient to provide a true quantification of jobs by type and location in the sector. However, three key sets of findings emerged. First, the industry did anticipate a significant set of openings in all fields in the coming years. Second, public sector jobs in transportation (municipal and state), especially in maintenance and operations, are evenly disperse across each state. Unlike other industries, public transportation jobs have to be where people and infrastructure are, essentially across all population centers large and small. Third, workplace policies and practices in transportation agencies and organizations do not generally align themselves with findings on what make for an age-diverse friendly workplace.

2.4 Community Colleges

Community college participation and endorsement will be integral to the success of a National Transportation Workforce Development Strategy. The University of Vermont Transportation Research Center (TRC) analyzed the results of a survey conducted with the American Association of Community Colleges (AACC) that sought to quantify existing community colleges' programs, infrastructure and partnerships preparing students for careers in transportation. Building upon data from this survey, the TRC has analyzed what transportation training exists at community colleges today and how that curriculum is supported by both investments in specialized equipment and through strategic partnerships.

As detailed in the report: (http://www.uvm.edu/~transctr/trc_reports/UVM-TRC-10-002.pdf)

- The majority of schools reported having programs that develop skills relevant to the transportation sector, especially general skills (finance, technologies, operations and maintenance) that are transferrable to non-transportation industries.
- Where schools are planning to expand or initiate transportation curriculum, it is primarily in technical areas, such as engineering, where the skills may extend to sectors other than transportation.
- Similarly, where schools indicated having specialized equipment, most of the investment was for tools that could be leveraged beyond transportation studies. Few schools reported owning or having access to transportation-specific equipment, such as training ships, rail cars, or airplane fuselages.
- The majority of schools reported having strategic partnerships with other schools; federal, state, and municipal government entities; and private companies – supporting their transportation-related efforts.

Collectively, this data suggests that there is a solid foundation within community colleges to deliver transportation-related training, but that additional investment and coordination likely will be necessary to support future workforce needs. To that end, this report lays out both best practices for community colleges looking to increase their transportation programs and recommendations for how the U.S. DOT can best stimulate and support the evolution of community colleges as a key pillar in the transportation workforce development infrastructure.

The project followed up on this survey and analysis in three steps:
(1) The TRC engaged community colleges workforce leaders at the annual AACC Workforce Development Institute and presented these valuable findings at the AACC national conference in April 2010;
(2) The TRC is working with the Community College of Vermont to develop and launch a new associated degree program in Applied Business Operations, with a track in Transportation Systems, as part of increasing the career pathway infrastructure needed in Vermont and testing a model for other systems;
(3) The TRC engaged other New England Community College systems in discussions about access programs region-wide and building a regional transportation workforce education system.

2.5 Dissemination of Results

- Since the program was initiated an overview of project activities and accomplishments has been circulated to key stakeholders in northern New England in the form of an annual operations report. http://www.uvm.edu/~transctr/pdf/TEDPP_Executive_Report_2011.pdf

- In 2010 the results of the community college component of the program were published and distributed: ***Transportation Workforce Development at Community Colleges*** (TRC Report # 10-002) http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-10-002.pdf in cooperation with the American Association of Community Colleges.

- In 2010 the TSA was presented at the Annual Meeting of the National Association for Workforce Improvement (NAWI) http://www.nawionline.org/

- In addition we are in regular contact with the 3 DOTs in the pilot area and provide them with more regular updates and explore opportunities for collaborative action.

- Aspects of the TSI and TSA programs were showcased at the National Transportation Workforce Summit in April 2012. http://www.cutcworkforce.com/

- UVM TRC maintains regular updates of the program on its website. http://www.uvm.edu/~transctr/?Page=workforcedev/wd_default.php

- In 2012-2013 we will seek to present out results of the project at the annual meetings of TRB, the National Association of Workforce Development Professionals, the National Association for Workforce Improvement, the National Transportation Training Directors and other association meetings that specifically attract a wide range of practitioners.

4. Next Steps

The challenges of designing and maintaining a transportation system to meet the needs of the coming decades requires a skilled, motivated and sustainable workforce. TEDPP at the UVM TRC is addressing that challenge in Northern New England and creating lessons and resources to be used nationally. The TEDPP initiative focused on four key strategic initiatives to address what were perceived to be points of maximum leverage for preparing new entrants to the field and increasing the efficacy of current workers. Three of the initiatives were targeted at attracting and retaining skilled workers.

- The focus of efforts for new workers was on non-traditional labor sectors (e.g., young adults, retirees, veterans, and students under the supervision of corrections) through the creation of a Transportation Systems Academy (TSA) model that would provide an overlay to existing curriculum at career and technical centers.

- A special effort was designed to develop approaches to create bridges into the field for mature workers and second career seekers, as well as address the news and opportunities for older workers currently in the field to be able to bridge to new positions to continue to contribute and lend their experience and expertise to the field. This Second Careers in Transportation initiative focuses on building partnerships with special populations (e.g., Vets) and mature worker training programs (e.g., VT Associates in Training and Development).

- Effort directed at the current workforce has focused on early and mid-career workers from multiple fields at state DOTS (ME, NH, VT) and administered through a sub-grant with Vermont Technical College to develop a Transportation Systems Institute (TSI) to build leadership and change management skills, and cross disciplinary quality projects at their respective agencies.

The fourth initiative assessed the capacity of community colleges nationwide to participate in transportation workforce development. Work for this was conducted in close partnership with the American Association of Community Colleges.

Implementation of each of these initiatives and constant dialogue with a wide variety of stakeholders and program partners has led to some adjustments in the pilot initiative overall. The first and perhaps most widely applicable set of lessons came directly out of the research on community college capacity.

A. Capacity for new distinct programs is very limited.

B. To be sustainable programs need to have a foundation that extends across multiple industries/fields and not just focus on transportation.

C. Programs will be successful if they are developed as part of strategic partnerships.

UVM TRC TEDPP Next Steps and Sustainability of Effort

The UVM TRC pilot in developing approaches to transportation workforce development has initiated a set of individual program initiatives as well as a growing sense of collaboration among previously unconnected entities to address the need and opportunity within the transportation workforce field.

The TSI was designed to grow new cells of learning culture within the three state DOTs (ME, NH, VT) that would stimulate conversations and new patterns of action to support career growth in the agencies over time. The working groups in each state have reported back high levels of satisfaction with the professional growth opportunity and ability to apply learning back in their agency. Agency supervisors have likewise reported a high level of satisfaction with the value obtained by participating employees. In building a sustainable base for this work a new pilot initiative was launched to link the state participants with their counterparts at the municipal level to forge new learning teams.

The Community College initiative achieved high early value in the national survey work, engagement of AACC, and laying out a framework for action at the college and at the federal level for future investments. It also positioned the UVM TRC to engage more readily with potential community college partners in New England, which is did in crafting a 2011 UTC proposal. While the UTC proposal was not successful the resulting Community College relationships have been sustained and built into a future work plan for continued action that will strengthen community college programs to support transportation work force development directly, and test regional collaborations for more widespread dissemination and support, with clear linkages to the needs of employers and the opportunity to be an active set of supports on the career lattices being built in the transportation field.

The efforts to develop a cohesive approach to action steps supporting Second Careers in Transportation (SCT) is continuing. The process of surveying the industry to gain a better understanding of job types, numbers, anticipated opening and working conditions was an important step in outlining opportunities that would connect to programs to support mature workers to transition into the field. A base of data was gathered to make the case for this sector as a viable focus point for programs serving mature workers (as evidenced by our partnership with Vermont Associates for Training and Development) and pointed out clear initiatives that were needed to support employee retention among older transportation workers particularly in the public sector.

The highest value of the pilot work to date has been the building of collaborative partnerships (e.g., VT Associates and the Community High School of Vermont for intergenerational learning efforts), identification of pathways to work with new partners from specific sectors (e.g., Veterans), and interest at the state DOT level on addressing working conditions to support the working longevity of current employers as a way of retaining knowledge and experience and supporting future mentoring efforts. A one

year NC extension was granted to optimize the effectiveness of this pilot effort and the TEDPP grant will terminate in May 2013.

The TSA program, while directed at high school programs has garnered the greatest level of attention, support and identification of value by external partners. It has influenced the curriculum approach at the VT DOT training center, which now aligns its first year employee training schedule with the TSA framework. This means that TSA graduates will be highly valued as new hires at the agency. In addition the program has been adopted as a curricular focus at the Community High School of Vermont (Vermont's largest High School unit serving all persons under the supervision of the Department of Corrections) opening up this non-traditional population to the possibility of working toward a career in transportation. In switching from an approach of developing and presenting a set curriculum to an adaptable program overlay, the TSA has attracted strong support from the Vermont Career and Technical Center network, with two Centers starting pilots this spring and developing plans for full-fledged programs in the fall. This should leverage into opportunities to continue to expand the program into other centers throughout the state and package a toolkit and process to initiate the TSA more easily in other regions and states. Our initiative over the next year (as part of the requested NC extension) will be to implement, document and package this effort for broader dissemination. The sustainability of the program will be based both on attracting participants (we will tie this to our work in SCT) and have a wide pool of experienced and skilled trainers (a clear barrier that has plagued this program). We are working on a strategy with the VT DOT to build a new pool of trainers using their district staff and look to Career Centers as possible reciprocal training sites to support agency staff. Also based on feedback from stakeholders we are developing a template for showcasing career pathways in transportation across all modes, and making them specific to Vermont. The templates should be readily adaptable in other states.

Our approach to ensure sustainability and success is to follow the process guidelines we noted earlier from the Community College study:

A. Remember that capacity for new distinct programs is very limited;

B. Create a base that includes transportation but also extends across multiple industries/fields;

C. Focus on programs that are developed as part of strategic partnerships.

These are the guiding principles that we will focus on in completing our work in this pilot stage and which will inform our next generation of work to take the program initiatives to a larger region.

5. Conclusions

Proposed Action for New England TEDPP Collaborative

In March 2012, FHWA requested a proposal to fund work that would carry the TEDPP lessons and best practices forward. Toward that end the UVM TRC proposed a two-year initiative to form up a strategic set of partnerships New England wide to carry out an action plan for an interconnected transportation workforce initiative informed by the experience and results of managing the pilot program. While the pilot efforts were four distinct programs this initiative would advance a cohesive approach that would from the onset support the development of a continuum of efforts linking career awareness (K-12) to skill building (TSA) in high school and adult education programs to a continuum of career advancement efforts (Community College and SCT) that demonstrated a clearly articulated pathway in the transportation field with direct alignment to state DOT needs. By focusing on State DOT employment opportunities we do not exclude other employers, but with limited resources it is important to have a focus on an area where we know how to measure the need, where there are clear incentives to participate, and where the standards for employment will satisfy standards across most of the industry. Pathway links will also be developed that will demonstrate the versatility of career preparation in this field to being applicable across a number of other industries as well. This specific regional approach and UVM TRC's role as a convener are supported both by the active participation of stakeholders in TEDPP across the northern three states and the new work at UVM TRC to host the New England Transportation Consortium, involving all six state DOTs.

Activities

1. Host a regional working session on transportation workforce development (follow-up to the national summit) to set a regional framework for action.

2. The regional working session would be preceded by a regional scoping of programs and initiatives state by state; expansion of the SCT jobs in transportation survey to MA, RI and CT; creation of a six state advisory group; building of a web-based portal to the various toolkits developed in the UVM TRC initiative as well as other resources national (e.g., http://www.transportationcareers.org/)

3. Creating a common message for career awareness across the six states as well as a framework for career readiness training (TSA) given the very closely connected geography (some 700 miles of shared borders between the six states of the region; 54 towns adjoin one another across the VT-NH state lines alone). Employment and education works across state lines.

4. ID opportunities to introduce Transportation focus into STEM initiatives.

5. Assess and stimulate the capacity of community college programs to develop transportation related education and certificate programs to support career

advancement of workers in the field as well as to act as bridges to enter the field from other related fields or as a second career.

6. Identify opportunities to create interstate sharing of community college programs; New England is too small for every state to have a fully developed Community College set of programs to support the diverse needs of the industry as a whole.

7. Identify cross sector opportunities for career connections. While the training and education and emphasis will be on transportation, the career readiness will be across a number of fields broadly designated as Public Infrastructure (e.g., transportation, utilities, public works, and telecommunications).