STRIDE | Southeastern Transportation Research, Innovation, Development and Education Center

Technology Transfer Final Report

STRIDE Project L2

Understanding Relationships Between the Built Environment, Physical Activity, Public Health, Urban Mobility, and Traffic Congestion: Graduate Curriculum

Dimitra Michalaka, Ph.D., P.E.

The Citadel

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THE STRIDE CENTER

The STRIDE Center is the 2016 USDOT Region 4 (Southeast) University Transportation Center (UTC) housed at the University of Florida Transportation Institute (UFTI). Our mission is to develop novel strategies for Reducing Congestion. The Center has nine partners, representing seven states in the Southeastern U.S. The UFTI and its partners in the STRIDE Center are recognized leaders at state, regional, national, and international levels. The STRIDE Center is focused on assembling and integrating research projects throughout the region in a way that maximizes contributions to solving current and future transportation problems as well as strengthening expertise and developing new technologies. For more information see https://stride.ce.ufl.edu/.

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1. Project Overview

Evidence-based research from the public health profession has determined adverse factors associated with the built environment, transportation network, urban land use patterns, and travel mode choices are contributing to declining public health and rising healthcare costs in U.S. metropolitan areas. The objective of this project was to develop a multidisciplinary graduate-level course addressing the intersection between public health, transportation, and the built environment. The methodology of this course focused on establishing the basis of need for and potential benefits from the implementation of optimal solutions to the challenging dilemma of how the built environment impacts urban mobility, transportation infrastructure, network connectivity, sustainability, livability, and public health. Interconnections between the fields of physical activity, public health, public policy, and engineering planning and design were identified. The goal was for students with diverse backgrounds, in a variety of academic fields, to be able to evaluate urban, suburban communities, and neighborhoods to identify positive and adverse effects of the built environment on levels of physical activity and measures of public health, with an emphasis on adoption of policies and approaches for improving desirable outcomes supporting healthier communities. There is a widely recognized need in professional circles for physical activity, public health, and transportation professionals to work collaboratively. However, these three disparate fields have distinct methods and languages that often inhibit meaningful collaboration. This course was developed in an effort to bring together content from physical activity, public health, civil engineering, transportation planning, and community design.

2. Research Goals

The objective of this project was to develop a multidisciplinary graduate course focusing on the intersection between public health, physical activity, transportation infrastructure, and the built environment especially considering the impacts of mobility benefits of short-distance trips by means of active transportation modes. The course focused on establishing the basis of need and potential benefits from the implementation of possible solutions to the challenging dilemma of the built environment, urban mobility, transportation infrastructure networks, sustainability, livability, and community wellness. Interrelated linkages between the fields of public health, public policy, and engineering planning and design were highlighted, emphasized, and explored.

3. Findings

The need for a multidisciplinary graduate-level curriculum that addresses the intersection between public health, transportation, and the built environment was addressed through the creation and offering of CIVL 642, Public Health, Physical Activity, and Design of the Built Environment during the 2019 Summer I term at The Citadel in Charleston, SC. Work on this project and course offering helped establish a need for graduate programs to provide students with diverse backgrounds, in a variety of academic fields, a curriculum that provides instructional materials to identify and evaluate positive and adverse effects of the built environment on levels of physical activity and measures of public health. Students pursuing graduate degrees in interconnected fields of physical activity, public health, public policy, city planning, transportation engineering, and civil engineering design need to gain a common understanding of how to contribute to the adoption of built environment policies and approaches for improving desirable outcomes supporting healthier communities. Students need to develop a depth of knowledge and practical skills to establish the basis of need and potential benefits from the

implementation of optimal solutions to the challenging dilemma of how to balance often competing demands of the built environment, urban mobility, transportation infrastructure, network connectivity, sustainability, livability, and public health.

4. Performance Metrics

Metric	# Completed
OUTPUTS	
Product(s): Number of new or improved tools, technologies, products, methods, practices, and processes created or improved	1 – Graduate Course
Technical Report: Number of client-based technical reports published	1 – STRIDE Final Report
OUTCOMES	
Body of Knowledge: Number of trainings for transportation professionals	1 – STRIDE Webinar
Professionals Trained: Number of professionals participating in trainings	30
IMPACTS	
Stakeholders: Number of stakeholders you met with to encourage adoption or implementation of product(s)	5 - Dr. John Vena, MUSC, Dr. Kendra Stewart, Col. of Charleston, Dr. BD Wortham, Clemson Univ., Dr. Nancy Muller, Lowcountry Graduate Center, Mr. Paul Wieters, City of Charleston
Adoption/Implementation: Number of incidences outputs of research have been implemented or adopted	1 – Graduate Course Implementation

5. Product(s)

Graduate Course: CIVL 642, Public Health, Physical Activity, and Design of the Built Environment

In 2021, 52% of all trips, including all modes of transportation, were less than three miles, with 28% of trips less than one mile (USDOT, 2021). Providing feasible alternative travel modes for shorter trip distances will serve to reduce demand on the roadway network and serve to mitigate congestion. Active travel modes requiring increased levels of physical activity are positively correlated with improved public health outcomes, as well as improved economic and social outcomes.

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Students pursuing graduate degrees in interconnected fields of physical activity, public health, public policy, city planning, transportation engineering, and civil engineering design need to gain a common understanding of how to contribute to the adoption of built environment policies and approaches for improving desirable outcomes supporting healthier communities. Students need to develop a depth of

knowledge and practical skills to establish the basis of need and potential benefits from the implementation of optimal solutions to the challenging dilemma of how to balance often competing demands of the built environment, urban mobility, transportation infrastructure, network connectivity, sustainability, livability, and public health. Such graduate curriculum benefits students and practicing professionals from a variety of fields and programs such as Traffic and Transportation, Urban, Regional, and City Planning, Architecture, Public Administration, Public Health, Recreation and Physical Activity, Non-Profit, and Social Sciences.

6. Who benefits/will benefit from your product(s)?

Target audiences anticipated for this type of graduate curriculum include students and practicing professionals from the following fields and programs:

- Traffic and Transportation Engineers
- Transportation Planners
- Urban, Regional, and City Planners
- Architects and Landscape Architects
- Public Administrators
- Environmental Sciences
- Public Health Professionals
- Recreation and Physical Activity Professions
- Non-Profit Organizations and Advocacy Groups
- Social Science and Social Services Professions

7. Image of Product

Course materials are available at the following link: https://stride.ce.ufl.edu/public-health-physical-activity-design-of-the-built-environment-course-materials/

8. Body of Knowledge & Professionals Trained

A webinar with the title "Creation of graduate curriculum explaining relationships between Public Health, Physical Activity, Urban Mobility and The Built Environment" was offered on July 8, 2020 by William J. Davis and Daniel B. Bornstein from The Citadel. The webinar is now available on YouTube at: https://www.youtube.com/watch?v=Z3GV0IIc3bQ&t=3s (30 attendees, 64 views).

9. Stakeholder Engagement

MEETING DETAILS		NARRATIVE DESCRIPTION
STRIDE rep.	William Davis	Committee members were engaged to: 1.) serve as expert panel for evaluation of final student presentations, 2.) provide relevant technical and
Date of Activity	Aug. 8, 2019	
Type of Activity	in-person meeting	

Stakeholder	City of Charleston Mayor's Health & Wellness Advisory Committee	community feedback and 3.) recognize the best presenting student team.

10. Adoption/Implementation

The graduate course (CVIL 642) was approved by Civil and Environmental Engineering Department, School of Engineering and Citadel college-wide Curriculum Committees. In addition, the South Carolina Commission on Higher Education officially approved the course and related courses to be provided within an affiliated graduate certificate program, which focuses on transportation, built environment, physical activity and public health. The course is one of four courses that graduate students from several Charleston-based graduate programs are able to complete to earn a Graduate Certificate in Built Environment and Public Health from The Citadel.

Considerable institutional coordination was focused on identifying and strategically attracting student enrollment streams for the proposed course and affiliated graduate certificate program. Prospective students would be generated from six graduate programs at four Charleston area institutions of higher education as follows:

1. Medical University of South Carolina, Master of Public Health Sciences
2. Clemson University, Master of Resilient Urban Design
3. College of Charleston, Master of Public Administration, Master of Science in Environmental Studies
4. The Citadel, Master of Science in Civil Engineering, Master of Science in Health Exercise and Sport Science

The course was offered Summer 2019 at The Citadel.

11. Broader Impacts

Broader impacts of teaching this course included engagement of academic institutions of higher learning and academic programs in the Charleston area with whom the course offering was coordinated including:

- Clemson University, Graduate Studies in Architecture + Health
- Clemson University, Planning, Development and Preservation
- Clemson University, College of Health, Education, and Human Development
- Clemson University, City and Regional Planning
- Clemson university, College of Engineering, Computing and Applied Sciences
- Clemson University, Parks, Recreation, and Tourism Management
- Clemson University, Master of Resilient Urban Design
- Medical University of South Carolina, Public Health Sciences
- College of Charleston, Master of Public Administration
- College of Charleston, Master of Science in Environmental Studies
- The Citadel, Master of Science in Civil Engineering
- The Citadel, Master of Science in Health Exercise and Sport Science

Furthermore, lasting broader impacts were reflected in graduate students who completed the course and continued their careers in the engineering profession with the following outcomes:

- 3 students who completed the course work as practicing civil engineers and stated they would use educational material from this course to better design projects they are currently working on and future projects to better accomplish site development, physical activity, and public health objectives through the design of the built environment.
- 1 student who completed the course works as a practicing transportation engineer and stated he is currently using educational material from this course to better design roadway improvement projects in the Charleston area and to engage other engineers in his office and broader profession to better adhere to best practices and guiding principles.
- 2 students work in positions of authority with local government transportation engineering agencies (City of Charleston Dept. of Traffic & Transportation, and Charleston County, Transportation Development Dept.). These students immediately used principles from the course to improve existing projects and programs that they were jointly working on and created an alliance to use principles on a broader basis to make transportation network improvements that would lead to better public health and mobility outcomes for the community.