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# Framing Transportation Planning Pedagogy for Sustainability Generalists

Beth Sweeney  
*University of Oregon*

Ann Scheerer  
*University of Oregon*

Vicki Elmer  
*University of Oregon*

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OREGON  
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FINAL REPORT

# Framing Transportation Planning Pedagogy for Sustainability Generalists

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1 **FRAMING TRANSPORTATION PLANNING PEDAGOGY FOR**  
2 **SUSTAINABILITY GENERALISTS**

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9  
10 by: Beth Sweeney  
11 Student Affairs Officer, Oregon Leadership in Sustainability Program  
12 Planning, Public Policy and Management  
13 University of Oregon  
14 1209 University of Oregon  
15 Eugene, OR 97403-1209  
16 (541) 346-8227  
17 [esweene3@uoregon.edu](mailto:esweene3@uoregon.edu)  
18

19 Ann Scheerer  
20 Adjunct Instructor, Oregon Leadership in Sustainability Program  
21 Planning, Public Policy and Management  
22 University of Oregon  
23 1209 University of Oregon  
24 Eugene, OR 97403-1209  
25 (541) 346-8979  
26 [scheerer@uoregon.edu](mailto:scheerer@uoregon.edu)  
27

28 Vicki Elmer, PhD (*Corresponding Author*)  
29 Program Director, Oregon Leadership in Sustainability Program  
30 Planning, Public Policy and Management  
31 University of Oregon  
32 1209 University of Oregon  
33 Eugene, OR 97403-1209  
34 (541) 346-8227  
35 [velmer@uoregon.edu](mailto:velmer@uoregon.edu)  
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1 **FRAMING TRANSPORTATION PLANNING PEDAGOGY FOR**  
2 **SUSTAINABILITY GENERALISTS**

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4  
5 Beth Sweeney  
6 Ann Scheerer  
7 Vicki Elmer  
8 University of Oregon  
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10  
11 **ABSTRACT**

12  
13 This paper describes a pilot graduate sustainable transportation course developed at the  
14 University of Oregon to provide hands-on project experience for students studying  
15 sustainability. New approaches to sustainability and transportation pedagogies will  
16 provide a galvanizing force for tomorrow's graduates, who must respond to concerns  
17 about climate change and the environment, social equity, and an uncertain economy.  
18 They will require an aptitude for both technical skills and collaborative leadership and  
19 communication skills.

20 The course was guided by a framework founded in five themes from the literature  
21 on sustainability education and transportation planning and engineering education: (1)  
22 leading with sustainability's cornerstones of people, prosperity and planet, (2) sponsoring  
23 a systems thinking approach to analyze transportation issues and potential solutions, (3)  
24 incorporating knowledge from interdisciplinary resources, (4) promoting "softer" skills  
25 including communication and leadership, and (5) emphasizing applied learning. The  
26 themes aim to overcome institutional barriers and to better prepare students for the  
27 rapidly evolving challenges they will encounter in the sustainability and transportation  
28 fields.

29 Although the purpose of the project was to develop a framework and  
30 institutionalize a sustainable transportation class at the graduate level, the student projects  
31 had unforeseen impacts upon the community in furthering innovative technologies and  
32 policies. Ultimately, the class was featured in the local progressive weekly newspaper as  
33 starting a "sustainable transit revolution." This paper documents the process, the projects,  
34 and puts the experience in the context of literature on the framework themes and  
35 sustainability and transportation education.  
36

# 1 **FRAMING TRANSPORTATION PLANNING PEDAGOGY FOR** 2 **SUSTAINABILITY GENERALISTS**

## 3 4 5 **INTRODUCTION**

6  
7 Global climate change poses an unprecedented challenge to the field of transportation.  
8 Business as usual will not satisfy the need to significantly reduce greenhouse gas  
9 emissions in the United States, nor will it address the complex goal of making our cities  
10 and residents more able to adapt to the consequences of a warmer planet. This challenge  
11 requires not just resilient behaviors, policies and programs within existing transportation  
12 agencies, but a new paradigm that is interdisciplinary, interagency and holistic in its  
13 approach. This radical change must be reflected in the educational practices that are being  
14 used to people the organizations of the future.

15 As awareness of climate change, equity concerns and sustainable business and  
16 government practices mount, new approaches to sustainability and transportation  
17 pedagogy will provide a galvanizing force for tomorrow's graduates. The literature  
18 addresses these trends with a call for curriculum adaptations that promote a breed of  
19 transportation professionals, versed in sustainability, with technical skills and a broad  
20 systems perspective along with responsive and collaborative leadership and  
21 communication. Forward-thinking universities are beginning to educate their students in  
22 the new paradigm; however, the majority of these courses are aimed at planners and  
23 engineers, leaving a void in the field that could be filled by the emerging array of  
24 sustainability generalists who are well suited to bridge disciplinary gaps and build  
25 collaborative responses to pressing transportation problems.

26 With this in mind, the University of Oregon's Oregon Leadership in Sustainability  
27 (OLIS) Program set out to develop and test a framework that would steer process and  
28 curriculum for a graduate-level Sustainable Transportation class geared toward  
29 sustainability generalists. Students trained in a range of sustainability theories and  
30 practices along with collaborative approaches and systems thinking shape the program's  
31 definition of "sustainability generalists." Many of these graduates will soon become  
32 change agents guiding the policies and practices that influence future transportation  
33 planning in roles such as local government and transit sustainability management. The  
34 course curriculum is focused on enhancing transportation planning and engineering  
35 pedagogy in the context of sustainability. The methods are suitable for emerging  
36 sustainability generalists and also complement traditional transportation planning and  
37 engineering curricula.

38 This paper describes the five themes culled from national research, the resulting  
39 framework, and the methods and recommendations derived from implementing a 10-  
40 week course on Sustainable Transportation at University of Oregon.  
41  
42  
43  
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45

## 1 LITERATURE REVIEW

2  
3 Five themes emerge from the literature on sustainability and transportation education that  
4 are recommended to guide the pedagogy. Research suggests that implementing these  
5 themes will help overcome institutional barriers and better prepare students for the  
6 challenges they will encounter in the sustainability and transportation fields. OLIS  
7 synthesized these themes into a framework that shaped its pilot Sustainable  
8 Transportation course. The themes are outlined in Table 1.

9  
10 **TABLE 1 OLIS Sustainable Transportation Framework Themes**

11 Theme	12 Description
13 Sustainability Foundation	The sustainability paradigm's triple bottom line emphasizes environment, economy and social equity.
Systems Thinking Approach	Systems thinking provides a frame through which to view system connections and influences.
Interdisciplinary Basis	Interdisciplinary education unites a variety of academic disciplines with the goals of providing a well-rounded education and preventing information "silos."
Collaborative Leadership	Collaborative leadership builds consensus through a more equitable and open approach to decision making.
Applied Learning	Applied learning emphasizes practical experience.

14  
15 Source: OLIS, University of Oregon, 2013

16  
17 The following synopsis describes current thinking on institutional barriers to a  
18 new pedagogy and further detail on the research that shaped the OLIS framework for  
19 sustainable transportation education.

### 20 **Sustainability Education Research**

21  
22  
23 Academic interest continues to rise in developing new sustainability-oriented programs  
24 and encouraging innovative ways to teach them. Educators aim to cultivate a deep and  
25 empathetic curiosity in their students that allows them to envision issues from different  
26 perspectives, understand and relate to the people affected by those issues, question the  
27 values that contribute to global and local systems, and develop solutions that promote a  
28 healthy community and planet (*1*).

29 In July 2013 the Association for the Advancement of Sustainability in Higher  
30 Education (AASHE) Academic Programs database contained 1377 sustainability-focused  
31 academic programs at 456 campuses in 63 states and provinces in North America (*2*). But  
32 along with the burgeoning programs come conflicting theories and practices regarding  
33 their delivery. Several barriers have been identified that present a challenge to developing  
34 a new sustainability pedagogy: institutional disciplinary silos, locating well-trained  
35 educators and classroom settings, and legitimizing sustainability as complementary to

1 existing programs. It will be critical to overcome these barriers so that a guiding  
2 sustainability pedagogy and accompanying skill set can be developed and shared (3).

3 This call necessitates action as the field continues to grow, shaping both new  
4 disciplines and the ones from which it sprung. Sustainability serves as a potential guiding  
5 paradigm for developing curricula that fulfill environmental education program  
6 managers' perceptions of core competencies for their students (4). It is also a driving  
7 force behind a new generation of transportation professionals (5). Opportunities such as  
8 University of Oregon's Sustainable City Year Program capitalize on this movement with  
9 an approach that promotes multidisciplinary, applied learning-based frameworks and  
10 allows students to confront challenging local sustainability issues. Applied study of local  
11 and regional transportation systems and issues is a meaningful way to package relevant  
12 theories and practices (6). This and other innovative teaching methods nurture  
13 interdisciplinary, collaborative learning and critical thinking.

### 14 **Transportation Planning and Engineering Education Research**

15  
16  
17 Climate change considerations, the global relationship between equity and mobility,  
18 shifts in the economic base of the United States and the explosion in information  
19 technology require and invite a more sustainable paradigm for transportation systems.  
20 This new paradigm has evolved over the past twenty years, and is well articulated (7, 8,  
21 9, among others) by forward-thinking analysts in research institutions, academic and  
22 grassroots organizations.

23 However, many mainstream practitioners and decision makers in existing  
24 transportation institutions are either not versed in these new concepts, or they meet  
25 extraordinary resistance within their organizations and communities (10). Although  
26 cutting-edge researchers, advocates and agencies promote more sustainable alternatives  
27 (11, among others), transportation decision making in many communities is, for the most  
28 part, still silo-based and has a technical orientation eschewing community values, relying  
29 instead on level of service standards rooted in the automobile era (12).

30 Academic establishments are also beginning to educate planners and engineers in  
31 the new paradigm (6). The field's leading thinkers have called for a fresh approach to  
32 transportation planning and engineering pedagogy that employs more effective methods  
33 and encompasses a broad skill set to better prepare graduates for the transportation  
34 system challenges they will encounter.

35 In addition to the "hard" skills associated with transportation planning and  
36 engineering, "softer" skills, including an aptitude for communication and leadership,  
37 comprise what a significant number of professionals find they need once in the field. A  
38 survey of transportation professionals found that proficiency in public involvement and  
39 interpersonal communication were among the skills most readily identified as being  
40 important but lacking in the graduate programs attended by the survey participants (13).  
41 The researchers recommended that future transportation education include the following:  
42 communication skills training, enhancing educator-professional connections, resolving  
43 tension between teaching theory and practice, critical thinking training for students and  
44 educators, recognizing and working within different political contexts, and providing  
45 multi-disciplinary connections. Similar findings have highlighted the need to integrate  
46 sustainability, ethics and communication in transportation planning pedagogy (14).



1 Researchers emphasize the need to break down silos within the field using an  
2 interdisciplinary approach that specifically integrates planning and engineering program  
3 administrators' and educators' delivery of land use and transportation education (15). The  
4 authors cautioned against graduating planners with exclusive knowledge of one  
5 specialization, but who lack education in closely-related subfields. Later studies  
6 expanded the land use-transportation interdisciplinary connection to recommend that  
7 educators convey an even broader sweep of transportation systems' laws, policies and  
8 topics (6). Bicycle and pedestrian planning and design are being promoted more  
9 extensively in many regions; as such, transportation planning programs can better prepare  
10 their students by integrating these topics into their curricula (16).

11 Transportation engineers as well as planners will benefit from a collaborative  
12 approach toward transportation projects that values and integrates community and  
13 environmental considerations. Proficiency in context-sensitive solutions will be critical  
14 for new graduates, although the need is not being driven by the transportation engineering  
15 job market, which appears to deemphasize this skill set in its hiring (17).

## 17 **A NEW PEDAGOGICAL MODEL FOR SUSTAINABLE TRANSPORTATION**

### 19 **Oregon Leadership in Sustainability Program**

21 The Oregon Leadership in Sustainability (OLIS) program is an intensive one-year,  
22 cohort-based graduate certificate program at the University of Oregon designed for  
23 students from diverse backgrounds who want to prepare for emerging careers leading  
24 sustainability efforts in the public, private, and nonprofit sectors. The program was  
25 inspired in part by a speaker at the 2008 Oregon University System (OUS) Sustainability  
26 Summit who called for the restructuring of OUS programs in order to foster  
27 interdisciplinary thinkers who could be "archineers/engitects" (a combination of the  
28 fields of architecture and engineering), civil scientists, and "environomists"  
29 (environmentalists and economists) (18) who are versed in sustainability.

30 Housed within the University's Department of Planning, Public Policy and  
31 Management and its School of Architecture and Allied Arts, OLIS provides an  
32 interdisciplinary learning community with an emphasis on practical experience through  
33 applied research projects. In addition to coursework in key sustainability components  
34 such as sustainable transportation, energy and climate change, urban ecological design  
35 and social justice, students participate in a leadership track that provides them with tools  
36 and practice in leadership, communication and effecting change in their organizations and  
37 communities. The OLIS model differs from other sustainability graduate certificate  
38 programs in that it is a full-time cohort-based program grounded in public policy and  
39 planning.

40 Early in OLIS' inaugural year, the program recognized a need for a broad-based  
41 interdisciplinary educational effort in sustainable transportation concepts and skills that  
42 targeted generalists training for a career in sustainability. Many prominent transportation  
43 programs, including ones that are beginning to educate their students within more  
44 sustainable paradigms, gear their courses solely toward those studying transportation  
45 engineering and planning. In a 2004-2005 Nationwide Survey of Transportation Planning  
46 Courses, planning and engineering students comprised the majority in the classrooms.

1 Markedly, the study reported that a mere 5% of the 40 classes surveyed included students  
2 from other backgrounds (6). However, sustainability professionals from educational  
3 backgrounds other than transportation planning and engineering may well influence  
4 future sustainable transportation systems through policy, advocacy and research.

5 With financial support from the National Institute for Transportation and  
6 Communities, a program of the Oregon Transportation Research and Education  
7 Consortium, OLIS researched and developed a sustainable transportation curriculum. The  
8 pilot class was offered in Winter Quarter 2013.

## 9 10 **OLIS Framework**

11  
12 OLIS created a framework for its sustainable transportation pedagogy that addresses the  
13 aforementioned institutional barriers confronting sustainability education: sustainability's  
14 interdisciplinary nature, its need for content and methods that are different from  
15 established curricula, and the perception of sustainability as an imposition on already  
16 established programs and curricula. This framework can serve as a model for  
17 interdisciplinary sustainability integration in other University of Oregon departments and  
18 as a case study for courses under development in other institutions. The framework  
19 guiding the sustainable transportation curriculum is founded in five themes from the  
20 literature, based on a national scan of research on sustainability and transportation  
21 planning education.

22 These themes led the program administrators to create a course that (1) was built  
23 on sustainability's cornerstones of people, prosperity and planet, (2) sponsored a systems  
24 thinking approach to analyze complex transportation problems and potential solutions,  
25 (3) incorporated knowledge from interdisciplinary resources, (4) promoted "softer" skills  
26 including communication and leadership, and (5) was motivated by applied learning.  
27 OLIS strove to create an experience where students could apply theory to local practice  
28 and create useful products for the community. The themes' bearing on transportation  
29 planning education and institutional barriers are described below in greater detail along  
30 with the pedagogical strategies OLIS used to implement the framework in the classroom.

### 31 32 *Sustainability Foundation*

33  
34 Transportation choices are one of the main determinants of the sustainability of the urban  
35 environment. Legacy transportation system decisions from the industrial era have  
36 influenced the urban form of our cities (19, 20) and are now considered a major factor  
37 contributing to climate change (21). Any effort to reform transportation planning and  
38 engineering pedagogies must be centered on a paradigm of sustainability to face climate  
39 change and population growth and cultivate cities' livability and their inhabitants' quality  
40 of life. This theme addresses the barrier of integrating sustainability concepts with  
41 existing curriculum.

### 42 43 Pedagogical Strategies:

44 • Couched the discussion of transportation within the framework of  
45 sustainability's 3P's: people (meeting the basic needs of all citizens and improving their

1 quality of life), prosperity (promoting sound economic development), and planet (doing  
2 so in a way that minimizes environmental impact and promotes environmental benefits).

3 • Cultivated a forward-thinking, nimble and responsive approach to studying  
4 current situations, proposed alternatives and cutting-edge innovations.

5 • Analyzed current best practices in sustainable urban design and transportation,  
6 including Smart Growth, complete streets, multimodal transportation, scenario planning  
7 and demand management.

### 8 9 *Systems Thinking Approach*

10  
11 Transforming transportation from an automobile-centered system to one founded on  
12 myriad accessibility and mobility options ultimately requires a paradigm shift to a new  
13 system. Systems thinking will help students better work with transportation as it exists  
14 today, shape it to meet future needs and recognize the opportunities it presents (22). This  
15 theme addresses the barriers of disciplinary silos and alternative content.

### 16 17 Pedagogical Strategies:

18 • Analyzed how prior and current theory, policy, economy and practices created  
19 today's transportation systems and their guiding paradigms.

20 • Studied and suggested alternative paradigms that address health, the  
21 environment and economic opportunity through the lens of transportation.

22 • Reviewed the elements, interconnections and purposes of transportation systems.

23 • Considered sustainable transportation's role in urban resilience.

24 • Discussed system diversity via multimodal transportation options.

### 25 26 *Interdisciplinary Basis*

27  
28 Transportation is inherently an interdisciplinary field, but one which has historically been  
29 reduced to an approach that aims to pave its way out of urban problems (23). But the  
30 transportation challenges our cities, regions, nation and world face cannot be met with  
31 concrete alone. They require new solutions that will be revealed by learning from and  
32 with other disciplines. This theme contends with barriers from disciplinary silos and  
33 current program integration.

### 34 35 Pedagogical Strategies:

36 • Examined the confluence of land use and transportation.

37 • Engaged with economists, advocates and government representatives from  
38 public, private and nonprofit agencies to better understand their diverse roles related to  
39 transportation.

40 • Integrated planning, engineering, economics, behavioral science and policy  
41 disciplines into curriculum.

### 42 43 *Collaborative Leadership and Communication Emphasis*

44  
45 Collaboration renovates historical top-down approaches to generating solutions and  
46 instead builds consensus through planning and management processes involving

1 stakeholders and the public (24). Collaborative leadership and communication require  
2 skills germane to today's sustainability and transportation fields. This skill set can be  
3 summarized through the lens of "Gestaltungskompetenz," which means, among other  
4 things, the ability to see the world from different vantage points and involve multiple  
5 communities in decision-making processes, to be open-minded, to be able to participate,  
6 motivate, plan and implement, and to feel empathy and solidarity (25). This theme in the  
7 framework attempts to overcome barriers related to sustainability's interdisciplinary  
8 nature and its pedagogical content and methods.

#### 9 10 Pedagogical Strategies:

- 11 • Required prior coursework in leadership and a simultaneous class in effective  
12 communication for cohort members.
- 13 • Emphasized group projects within course design to facilitate students'  
14 experience in working with varied skill sets and encourage open communication, task  
15 delegation and shared problem solving.
- 16 • Introduced behavior change strategies, which were pursued in greater detail in a  
17 subsequent required class in leading sustainable change.
- 18 • Required individual student-led classroom facilitation to foster critical  
19 understanding of readings and to develop public engagement skills.

#### 20 21 *Applied Learning Priority*

22  
23 The process of learning is as important as the product (26). Applied projects get students  
24 out of the classroom and provide an opportunity for meaningful work that offers  
25 community benefit. In so doing, students gain respect for process and recognize that they  
26 can shape the way in which their work unfolds. This concept is well established in  
27 technical fields such as medicine. In transportation planning and engineering education,  
28 collaborative methodologies such as active, cooperative and project-based learning have  
29 been established as effective techniques that improve outcomes for students both in and  
30 outside the classroom (27, 28, 29). This theme grapples with barriers related to  
31 sustainability's demand for innovative curriculum and delivery.

#### 32 33 Pedagogical Strategies:

- 34 • Partnered with City of Eugene, Lane Transit District and University of Oregon  
35 staff to provide real-world projects that let students apply learned skills and knowledge to  
36 municipal and academic transportation scenarios.
- 37 • Provided benefits to partner organizations by taking on projects that could not  
38 otherwise be pursued due to fiscal or time constraints.

#### 39 40 **Curriculum Synopsis**

41  
42 The class was co-taught by two adjunct instructors with expertise in urban design and  
43 planning, public administration, leadership and transportation. The instructors also  
44 facilitated project management for the 20 students' applied learning projects. The  
45 students ranged in age from early 20s to mid 40s and came to the program with diverse

1 backgrounds in fields from engineering to art. Approximately 90 percent were enrolled  
2 full time.

3 The course design offered a combination of instructor lectures, guest lectures  
4 from the public, private and nonprofit sectors, and student-led facilitation. The required  
5 text was Jeffrey Tumlin's *Sustainable Transportation Planning: Tools for Creating*  
6 *Vibrant, Healthy and Resilient Communities*, which "aims to reunite transportation with  
7 its sister fields to fill the largest remaining gap in urban sustainability strategies" (23).  
8 Coursework included readings, classroom facilitation, take-home quizzes, a  
9 transportation-related policy brief and an applied learning project, which comprised 30%  
10 of the students' grades. The applied learning projects synthesized the other four  
11 framework themes by providing students with an opportunity to put their interdisciplinary  
12 understanding of sustainability and systems theory, and their skills in leadership and  
13 communication, to the test.

14 The course introduced a broad range of sustainable transportation and land use  
15 planning and design concepts to enable students to understand land use and  
16 transportation's sustainability impacts, review current best practices and innovations,  
17 recognize analytical tools and performance measures used in local transportation decision  
18 making, and examine sustainable transportation case studies, policies and programs. A  
19 synopsis of the curriculum is illustrated in Table 2 below.

20  
21 **TABLE 2 OLIS Sustainable Transportation Curriculum**

22

23 Week	Topic
24 1	A highly mobile planet and its challenges: automobile dependence, equity and inequity, congestion, urban sprawl, zoning, car culture and property rights
2	Why sustainable transportation is vital to cities: land use and transportation planning, smart growth and the compact city
3	Sustainable transportation strategies: transportation demand management and scenario planning
4	Multi-modal transportation system design: complete streets, context-sensitive solutions, walkable communities, biking safety and design
5	Multi-modal transportation system design (continued): motor vehicles and transit, transit-oriented development
6	Transportation and public health: reforming street design, active transportation, air and water quality concerns
7	Transportation and social sustainability: social and environmental justice, behavior change
8	Transportation funding and economics: strategies, jobs and growth
9	Innovations in sustainable transportation: collaborative consumption models, cutting-edge technologies
10	Case studies of exemplar sustainable transportation systems

25  
26 Source: OLIS, University of Oregon, 2013 (30)

27

## 1 **Applied Learning Projects**

2  
3 For the applied learning portion of the class, groups of 3-5 students undertook research  
4 projects with the City of Eugene, Lane Transit District, and the University of Oregon's  
5 Office of Sustainability, Bike Program and LiveMove Program (an advocacy group  
6 focused on issues surrounding livability and active transportation). Each project  
7 represented a local sustainable transportation opportunity or challenge that reflected  
8 issues being considered in communities around the world: commuting, bike sharing  
9 programs, fuel consumption trends, pay-as-you-drive automobile insurance, bicycling  
10 economies, and multi-family development parking infrastructure trends (31). The  
11 synopses below describe the projects and summaries of the findings.

### 12 13 *Biking Up, Driving Down: UO 2013 Commuter Survey*

14 The University of Oregon's commuter survey is conducted every three years and results  
15 are used to revise the University's Climate Action Plan and determine ways to improve  
16 transportation programs and infrastructure. A student team updated and distributed the  
17 2013 Commuter Survey to 40% of the University community, including students, faculty  
18 and staff. Results revealed that 28% of respondents drove alone to campus, while 22%  
19 biked. The team found that student bike commuting had increased since the last survey in  
20 2009, and 2% fewer staff and faculty members drove alone to campus. Recommendations  
21 to reduce the number of staff and faculty single occupancy vehicle commuters included  
22 incentives such as providing shower facilities for bike commuters, allocating free one-day  
23 parking passes to those who regularly commute using alternative transportation modes,  
24 and developing a smart phone mobile application for users to find real-time local bus  
25 routes and schedules (32).

### 26 27 *Expanding Bike Sharing to the City of Eugene*

28 The City of Eugene is pursuing funding for a 10-station, 100-bicycle sharing program to  
29 complement University of Oregon's emerging on-campus bike share. A team of graduate  
30 students researched bike-sharing models in Chicago, Washington, D.C. and Denver to  
31 determine the feasibility of a Eugene-based program. Analyzing installation costs, siting,  
32 business models, numbers of bikes and stations, and potential financing sources and  
33 program revenue, the group determined which combination would be most appropriate  
34 for Eugene. They recommended that the City adopt a city-owned and managed business  
35 model, in which the City partners with Lane Transit District to define the boundaries of  
36 the bike-sharing stations and integrate the program with public transit (33).

### 37 38 *Fuel Consumption in Eugene Declines; Vehicle Miles Traveled Stay Consistent*

39 Between 2003 and 2011, the City of Eugene's gasoline and diesel consumption dropped  
40 by 15%, while vehicle miles traveled (VMT) remained fairly steady. Over the same time  
41 frame, neighboring Springfield saw a 5% reduction and statewide gas and diesel receipts  
42 fell by 1%. Armed with Oregon Department of Motor Vehicles (DMV) data on vehicles  
43 registered in Eugene, Springfield and Tigard, students attempted to discover how and  
44 why the decline occurred. Initial theories ranged from high fuel-efficient and hybrid  
45 vehicle adoption rates to gas station closures, diesel emissions reduction efforts and car  
46 scrapping programs. To investigate the fuel efficiency theory, the team used fleet age as a

1 proxy for fuel economy, consolidating and calculating the fleets' age mix by registration  
2 year for the three cities. Contrary to what might be expected in a community with  
3 declining fuel consumption, the researchers found that the percentage of "middle-aged"  
4 cars (11-20 years old) was higher in each respective city in 2011 than in 2003. The trend  
5 is logical based on the changes in the economy during the study period, but it does not  
6 explain the fuel consumption reduction. The study is a starting point for more detailed  
7 fuel economy research, and another step toward piecing together Eugene's puzzle (34).

#### 8 9 *Pay-As-You-Drive Insurance Feasibility for University of Oregon*

10 MetroMile offers a cutting-edge business model that incentivizes reductions in driving by  
11 offering pay-as-you-drive (PAYD) insurance, a program developed for people who drive  
12 fewer than 10,000 miles per year. PAYD insurance rewards low-mileage drivers with a  
13 monthly rate based on calculating the amount a customer drives, as opposed to lump-sum  
14 insurance pricing. Students hypothesized that offering PAYD insurance for University of  
15 Oregon's staff and faculty may provide motivation to use alternative modes of  
16 transportation, including carpooling, and reduce single occupancy vehicle commutes to  
17 campus. The insurance team collaborated with the commuter survey group, incorporating  
18 survey questions to determine the interest in and feasibility of the University developing  
19 a PAYD pilot program. About half of the respondents who drove approximately 8,000  
20 miles or less per year were interested in learning more. Based on the results of their  
21 research, the students recommended that the University pursue a pilot program (35).

#### 22 23 *Bikes Mean Business to the Silicon Shire*

24 Students researched the role bicycling commuting and infrastructure play in the  
25 Silicon Shire, a Eugene-Springfield association of technology-related businesses. They  
26 analyzed whether central Eugene Silicon Shire members considered biking in their  
27 everyday operations or when making business decisions regarding location, employment,  
28 and storefronts. Students found that an overwhelming majority of businesses supported  
29 the local bicycle community. The team also found that 66% of companies surveyed  
30 believed a bike share located near their businesses would have a positive impact. Student  
31 recommendations for the City of Eugene's transportation planning department included  
32 continuing to improve bicycle infrastructure downtown, marketing the City's planned  
33 bike sharing to demonstrate the positive impact it has on businesses, and educating  
34 businesses on opportunities to integrate biking to work with employee health insurance  
35 plans (36).

#### 36 37 *Study of Parking Characteristics in Eugene*

38 Students researched the parking characteristics of multi-family developments throughout  
39 Eugene and met with developers to gain their perspectives. The team analyzed the  
40 relationship between developments' parking infrastructure and their distance to public  
41 transit and considered whether parking maximums could mitigate the impact of future  
42 development. Findings from case studies in cities throughout the United States were used  
43 to determine best practices for maximum parking limits, and were applied to Eugene's  
44 developments and community characteristics. The group recommended that Eugene  
45 establish parking maximums along transit corridors to increase public transit ridership  
46 and reduce vehicle miles traveled. Recommendations for the City of Eugene's

1 planning department also included incentivizing car sharing programs and transit near  
 2 new multi-family developments, better managing infrastructure, and prohibiting  
 3 surface/above-grade parking (37).

## 4 5 **PRELIMINARY IMPACTS OF NEW MODEL**

### 6 7 **Pedagogical Impact**

8  
9 OLIS gathered a series of qualitative responses to the course and its framework to gauge  
 10 its influence on those involved, including students, educators, the Department and  
 11 University, and the project clients. Students found that the projects were a strong  
 12 component of the course and appreciated the real-world application they provided.  
 13 Educators found the co-teaching arrangement beneficial to the applied learning project  
 14 and discovered that it created more flexibility for project facilitation and management.

15 The Department of Planning, Public Policy and Management responded to the  
 16 course's success by ensuring that Sustainable Transportation is integrated into its ongoing  
 17 curriculum for OLIS students and others pursuing their graduate studies. Every new  
 18 endeavor offers success stories and room for improvement in subsequent iterations. Table  
 19 3, below, provides a snapshot of these outcomes for the OLIS Sustainable Transportation  
 20 pilot course based on feedback from student evaluations, instructor interviews, and  
 21 program and client observations.

22  
23 **TABLE 3 Course Outcomes and Responses**

24 Outcomes	25 Feedback (sorted by framework theme)
26 Successes	<p><i>Sustainability Foundation</i></p> <ul style="list-style-type: none"> <li>• Curriculum offered a broad perspective and useful introduction to transportation planning through the lens of sustainability.</li> </ul> <p><i>Interdisciplinary Basis</i></p> <ul style="list-style-type: none"> <li>• Guest speakers provided insight and networking opportunities.</li> <li>• Class projects built bridges between the OLIS program and City departments working on climate change, planning and transportation.</li> <li>• Clear and well-researched curriculum facilitated the class's integration into UO's Department of Planning, Public Policy and Management.</li> </ul> <p><i>Applied Learning Priority</i></p> <ul style="list-style-type: none"> <li>• Applied learning projects were relevant and provided a useful snapshot of the many facets of sustainable transportation planning.</li> <li>• Co-teaching arrangement allowed educators to spend more time as needed on project facilitation.</li> </ul>



Opportunities for  
Improvement

*Systems Thinking Approach*

- Students would benefit from additional critical thinking about the roles that accessibility and mobility play in a community's resilience.

*Collaborative Leadership and Communication Emphasis*

- Student-led classroom facilitation was a worthwhile goal, but overall, students lacked classroom engagement techniques.
- Some students encountered unclear directions from their clients during the project work.

*Applied Learning Priority*

- Group projects provided a rich opportunity for learning, but presented some of the common issues that arise when working with teams, such as inequities in team member participation and communication barriers.
- Program and student ambition must occasionally be tempered by the realities of what can be accomplished during a project that comprises only one piece of students' demanding graduate schedules.
- Original project scopes may have been better suited to a semester schedule than the University's fast-paced 10-week quarters.
- Students were not equipped with resources to handle heavy statistical analysis, slowing some projects down and creating confusion about assigned tasks.

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Recommendations

*Collaborative Leadership and Communication Emphasis*

- Facilitate or encourage frank initial group discussions of expectations and work styles as soon as project teams are set up to reduce potential friction and improve teamwork by encouraging empathy, understanding and respect.
- Promote frequent program-client communication at an organization's various levels to help relieve burden placed on students receiving conflicting information from their clients.
- Include public engagement and facilitation strategies in OLIS leadership track to improve student-led collaborative learning experiences.

---

1  
2 Source: OLIS, University of Oregon, 2013

3  
4 **Community Impact**

5  
6 Selecting these particular projects for student investigation supported the efforts of local  
7 transportation managers who have been promoting them within their agencies and the  
8 community. Positive responses from community members, the media and professional  
9 collaborators validated the inclusion of sustainable transportation into the OLIS  
10 curriculum. Each student group presented its findings to individual client panels and took

1 part in a large group presentation that was marketed to the University, organizations and  
2 the community. Approximately 30 representatives from local agencies, nonprofit  
3 organizations and advocacy and advisory groups, including the City of Eugene, Lane  
4 Transit District, Safe Routes to School, Greater Eugene Area Riders (GEARs), University  
5 of Oregon's LiveMove Program, and Eugene's Bicycle and Pedestrian Advisory  
6 Committee attended the student presentations.

7 The local progressive newspaper, *Eugene Weekly*, featured the class projects as a  
8 lead story and credited the students with launching a "sustainable transit revolution"(38).  
9 While transportation agencies and advocates in Eugene have in fact been making great  
10 strides toward sustainability for some time, this press response does indicate a growing  
11 interest in sustainable transportation and highlights the opportunities that academic  
12 institutions and their students have to contribute to raising awareness and igniting  
13 behavior change in their local communities.

14 In the months that have passed since the student projects were completed, their  
15 impact continues to unfold on campus and with the City of Eugene and Lane Transit  
16 District. The University of Oregon Office of Sustainability is using the commuter survey  
17 as part of its update to the campus Climate Action Plan, and is exploring pay-as-you-  
18 drive insurance as a potential behavior change strategy to encourage UO faculty and staff  
19 to reduce their driving. The City of Eugene will incorporate the results of the  
20 municipality-oriented student projects into the next iteration of its transportation plan.  
21 Student findings will also help the City inform the grant-seeking process for its bike share  
22 program and supplement its previous research to tease apart the fuel consumption/VMT  
23 conundrum.

## 24 25 **DISCUSSION**

26  
27 This course and its guiding framework attempted to surmount the previously-identified  
28 barriers to developing and implementing a new pedagogy for sustainability. It encouraged  
29 both students and educators to reach beyond disciplinary silos and adopt a holistic  
30 worldview that allowed them to envision a range of reasons for and solutions to real-  
31 world problems. Working with formal educators in the classroom and informal educators  
32 outside of the classroom through the applied learning projects acknowledged the  
33 challenges both physically and pedagogically built into in a university setting. These  
34 relationships moved the students out of campus facilities that were less conducive to  
35 active learning and into a more expansive learning environment. In sharing the successful  
36 outcomes of the sustainable transportation course, OLIS can provide other departments  
37 and disciplines with an on-the-ground success story and a replicable model.

38 An additional barrier to consider is the need for a paradigm shift for students who  
39 are accustomed to a lecture-style learning environment and who find themselves troubled  
40 by collaborative learning models. Part of the expectations and expense of graduate school  
41 are tied to the opportunity to learn from educators with a wealth of research and  
42 resources, and students may be required to change their expectations when facing an  
43 experience where they are learning from their peers. Educators and their students would  
44 benefit from testing and reflecting on different methods by which to focus and implement  
45 active, student-led learning.

1 As a framework for an emerging pedagogy in sustainable transportation, in many  
2 ways the class validated the thinking in the current literature. Each of these students  
3 joined the program because of his or her personal belief in the goals of **sustainability** and  
4 its potential to build more resilient communities. This type of student will likely become  
5 only more prevalent as today's youth look to themselves as change agents for a swiftly  
6 evolving planet. It became obvious that teaching transportation as a whole and complex  
7 **system** made for a broader perspective on the paradigm that has led to its current state.  
8 Analyzing problems and solutions **across and outside the discipline**, students reported  
9 garnering a more expansive understanding of the connections between land use,  
10 transportation, health, the economy and the environment. Based on interactions with their  
11 professional collaborators, the students found that being able to communicate effectively  
12 with stakeholders from a full spectrum of disciplines was of paramount importance.  
13 Capably building and presenting convincing arguments, while being open to feedback  
14 and change, will help make these students strong and **collaborative leaders** in their  
15 agencies and communities. The eager reaction from University and City staff as willing  
16 project participants, the appearance of many community, University and local  
17 government representatives at the student presentations, and the media response suggest  
18 that the **applied learning** projects and their process were indeed current and relevant.

19 Viewed through the "Gestaltungskompetenz" lens, the framework may have  
20 benefited from an empathy theme that emphasized building deeper connections with the  
21 local community. To be relevant to this course, specific subsets of the community might  
22 include those most affected by accessibility and mobility concerns that can be addressed  
23 by the realm of sustainable transportation. Whether empathy can in fact be taught is a  
24 difficult question, but training students in matters of equity and bringing them out of  
25 academia and into the public realm via applied learning projects would be a valuable  
26 starting point.

## 27 28 **CONCLUSION**

29  
30 The OLIS framework for the Sustainable Transportation course provided the cohort of  
31 sustainability generalists with an understanding of technical tools and, along with other  
32 programming, helped them to become responsive and collaborative leaders and  
33 communicators. Both the sustainability and transportation academic fields would benefit  
34 from encouraging students from diverse backgrounds to take their courses, fostering  
35 greater interdisciplinary connections and filling out the field so that students pursuing  
36 other disciplines will later include transportation concerns in their decision making. OLIS  
37 found working within the framework to be beneficial to its program development and  
38 will apply the model to the program's other courses.

39 Further refining the sustainability and transportation pedagogies has broad  
40 implications for higher education. Teaching requires significant advance preparation,  
41 great capital investment and excellent tools. Primary, secondary and even undergraduate  
42 educators have access to tools that help guide the delivery of their curricula. Graduate  
43 programs are required to be state-of-the-art, and program emphasis is on content. But  
44 there are fewer explicit techniques that describe the methodology with which to impart  
45 the knowledge and skills graduate students will need to meet the increasingly complex  
46 demands of the workplace and the world.

1           As financial crises continue to affect university systems and students, universities  
2 must promote internal systemic resilience by adapting their methods and endorsing lower  
3 cost, higher return investments that offer a sustainable experience for their educators  
4 along with applied learning for their students and products their communities can use.  
5 Applied learning projects such as the ones these students undertook galvanize support  
6 within agencies, energizing projects and bringing them to the forefront of community  
7 attention. Program frameworks that promote sustainability, systems thinking,  
8 interdisciplinary connections, collaborative leadership, and applied learning merit further  
9 investigation. The field would also benefit from an in-depth look at specific graduate-  
10 level tools for active and collaborative learning, appropriate ways to develop facilitation  
11 skills through regular curricula, and approaches for shifting student and educator  
12 paradigms about new pedagogical experiences.

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#### 18 19 **REFERENCES**

- 20  
21 1. Wals, A.E.J. Educating for a More Sustainable World. *eg magazine*. Global To Local  
22 Foundation. Vol. 18, Issue 2. [http://www.globaltolocal.com/eg%2018\\_2.pdf](http://www.globaltolocal.com/eg%2018_2.pdf). Accessed  
23 July 29, 2013.  
24
- 25 2. AASHE Academic Programs Database. Association for the Advancement of  
26 Sustainability in Higher Education. <http://www.aashe.org/resources/academic-programs/>.  
27 Accessed July 24, 2013.  
28
- 29 3. Wheeler, S.M. Book Review: Sustainability Education: Perspectives and Practice  
30 Across Higher Education. *Journal of Planning Education and Research*, Vol. 32, No. 1,  
31 2012, pp. 125–127.  
32
- 33 4. Vincent, S., and W. Focht. US Higher Education Environmental Program Managers’  
34 Perspectives on Curriculum Design and Core Competencies: Implications for  
35 Sustainability as a Guiding Framework. *International Journal of Sustainability in Higher*  
36 *Education*, Vol. 10, No. 2, 2009, pp. 164–183.  
37
- 38 5. Schlossberg, M., and N. Larco. Expanding Transportation Education Across the  
39 Academy: The Sustainable City Year Program. Paper #13-0862. A Paper Submitted to  
40 the 2013 Transportation Research Board Annual Meeting and for consideration of  
41 publication within the *Transportation Research Record: Journal of the Transportation*  
42 *Research Board*. 2013. <http://docs.trb.org/prp/13-0862.pdf>. Accessed July 10, 2013.  
43
- 44 6. Zhou, J., and L. Schweitzer. 2009. Transportation Planning Education in the United  
45 States: Literature Review, Course Survey, and Findings. In *Transportation Research*  
46 *Record: Journal of the Transportation Research Board*, No. 2109, Transportation

- 1 Research Board of the National Academies, Washington, D.C., pp. 1–11.  
2
- 3 7. Calthorpe, P. *Urbanism in the Age of Climate Change*. Washington, D.C., Island  
4 Press, 2010.  
5
- 6 8. Cervero, R. *The Transit Metropolis*. Washington, D.C., Island Press, 1998.  
7
- 8 9. Wachs, M. Transportation Policy, Poverty, and Sustainability. *Transportation*  
9 *Research Record: Journal of the Transportation Research Board*, No. 2163,  
10 Transportation Research Board of the National Academies, Washington, D.C., 2010,  
11 pp. 5–12.  
12
- 13 10. Innes, J. and J. Gruber. Planning Styles in Conflict: The Metropolitan Transportation  
14 Commission. *Journal of the American Planning Association*, Vol. 71, Issue 2, 2005, pp.  
15 177-188.  
16
- 17 11. Final Report to The Florida Department of Transportation Systems Planning Office  
18 On Project Expanded Transportation Performance Measures to Supplement Levels of  
19 Service (LOS) for Growth Management and Transportation Impact Analysis. University  
20 of Florida Transportation Research Center. October 31, 2012.  
21 [http://www.dot.state.fl.us/research-](http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PL/FDOT_BDK77_977-14_rpt.pdf)  
22 [center/Completed\\_Proj/Summary\\_PL/FDOT\\_BDK77\\_977-14\\_rpt.pdf](http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PL/FDOT_BDK77_977-14_rpt.pdf). Accessed July 30,  
23 2013.  
24
- 25 12. Victoria Transport Policy Institute. Institutional Reform: Creating Organizations That  
26 Support Efficient Transport in the TDM Encyclopedia, Updated January 18, 2011.  
27 <http://www.vtpi.org/tdm/tdm32.htm>. Accessed May 8, 2012 .  
28
- 29 13. Handy, S.L., L. Weston, J. Song, K.M.D. Lane, and J. Terry. Education of  
30 Transportation Planning Professionals. *Transportation Research Record: Journal of the*  
31 *Transportation Research Board*, No. 1812, Transportation Research Board of the  
32 National Academies, Washington, D.C., 2007, pp. 151-160.  
33
- 34 14. Khisty, C. J. and S. Kikuchi. Urban Transportation Planning Education Revisited:  
35 Reading the Dials and Steering the Ship. In *Transportation Research Record: Journal of*  
36 *the Transportation Research Board*, No.1848, Transportation Research Board of the  
37 National Academies, Washington, D.C., 2003, pp. 57-63.  
38
- 39 15. Krizek, K., and D. Levinson. Teaching Integrated Land Use-Transportation Planning.  
40 *Journal of Planning Education and Research*. Vol. 24, 2005, pp. 304–316.  
41
- 42 16. Dill, J., and L. Weigand. Incorporating Bicycle and Pedestrian Topics in University  
43 Transportation Courses. In *Transportation Research Record: Journal of the*  
44 *Transportation Research Board*, No. 2198, Transportation Research Board of the  
45 National Academies, Washington, D.C., 2010, pp. 1-7.  
46

- 1 17. Stone, J., J. Martin, K. McDermott, J. D’Ignazio, and J. Hummer. Integrating Context  
2 Sensitive Solutions into University Transportation Education.” Presented at 3rd Urban  
3 Street Symposium: Uptown, Downtown, or Small Town: Designing Urban Streets That  
4 Work, Seattle, Washington, June 24-27, 2007.  
5 [http://www.urbanstreet.info/3rd\\_symp\\_proceedings/Integrating%20Context.pdf](http://www.urbanstreet.info/3rd_symp_proceedings/Integrating%20Context.pdf).  
6 Accessed July 9, 2013.  
7
- 8 18. Coalson, J. Principal of Green Building Services. Presentation to the 2008 April  
9 Sustainability Summit as quoted in Oregon State Board of Higher Education,  
10 Sustainability Initiatives Committee Final Report. 2010. <http://olis.uoregon.edu/node/40>.  
11 Accessed July 30, 2013.  
12
- 13 19. Lynch, K. What is the Form of a City, and How is it Made? In *A Theory of Good City*  
14 *Form*. The MIT Press, Cambridge, 1981, pp. 37-50.  
15
- 16 20. Muller, P. O. Transportation and Urban Form: Stages in the Spatial Evolution of the  
17 American Metropolis. In *The Geography of Urban Transportation*, Third Edition, edited  
18 by Hanson, S. and G. Giuliano. The Guilford Press, New York, 2004, pp. 59-85.  
19
- 20 21. Ewing, R., K. Bartholomew, S. Winkelman, J. Walters and D. Chen. Growing Cooler:  
21 the Evidence on Urban Development and Climate Change. The Urban Land Institute,  
22 Washington, D.C., 2008. [http://postcarboncities.net/files/SGA\\_GrowingCooler9-18-](http://postcarboncities.net/files/SGA_GrowingCooler9-18-07small.pdf)  
23 [07small.pdf](http://postcarboncities.net/files/SGA_GrowingCooler9-18-07small.pdf). Accessed July 29, 2013.  
24
- 25 22. Meadows, D. H. *Thinking in Systems: A Primer*. Chelsea Green Publishing, Vermont,  
26 2008.  
27
- 28 23. Tumlin, J. *Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy,*  
29 *and Resilient Communities*. John Wiley and Sons, New Jersey, 2011.  
30
- 31 24. Margerum, R. A Typology of Collaboration Efforts in Environmental Management.  
32 *Environmental Management*, Vol. 41, No. 4, 2008, pp. 487–500.  
33
- 34 25. de Haan, G. The BLK ‘21’ programme in Germany: a ‘Gestaltungskompetenz’-based  
35 model for Education for Sustainable Development. *Environmental Education Research*,  
36 Vol. 12, No. 1, February 2006, pp. 19–32.  
37
- 38 26. Orr, D. *Earth in Mind: On Education, Environment, and the Human Prospect*. Island  
39 Press, Washington D.C., 1994.  
40
- 41 27. Kyte, M., M. Dixon, A. Abdel-Rahim, and S. Brown. Process for Improving Design  
42 of Transportation Curriculum Materials with Examples. *Transportation Research*  
43 *Record: Journal of the Transportation Research Board*, No. 2199, Transportation  
44 Research Board of the National Academies, Washington, D.C., 2010, pp. 18-27.  
45
- 46 28. Smadi, O., and W. Akili. Infrastructure Asset Management Education: Active

- 1 Learning and Engagement-Based Practices. *Transportation Research Record: Journal of*  
2 *the Transportation Research Board, No. 1957*, Transportation Research Board of the  
3 National Academies, Washington, D.C., 2006, pp. 16–18.  
4
- 5 29. Fini, E., and M. Mellat-Parast. Empirical Analysis of Effect of Project-Based  
6 Learning on Student Learning in Transportation Engineering. *Transportation Research*  
7 *Record: Journal of the Transportation Research Board, No. 2285*, Transportation  
8 Research Board of the National Academies, Washington, D.C., 2012, pp. 167–172.  
9
- 10 30. Scheerer, A. OLIS Sustainable Transportation Curriculum. Oregon Leadership in  
11 Sustainability Program, University of Oregon. January 2013.  
12 [http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/FINAL%20Syllabus\\_OLIS%20612\\_Sustainable%20Transportation\\_01-02-13\\_4.pdf](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/FINAL%20Syllabus_OLIS%20612_Sustainable%20Transportation_01-02-13_4.pdf). Accessed July 31, 2013.  
13  
14
- 15 31. Scheerer, A. and L. Varela. OLIS Sustainable Transportation Applied Learning  
16 Projects. Oregon Leadership in Sustainability Program, University of Oregon. January  
17 2013. [http://olis.uoregon.edu/sustainable\\_transportation/assignments](http://olis.uoregon.edu/sustainable_transportation/assignments). Accessed July 31,  
18 2013.  
19
- 20 32. Groth, K., H. Neelson, and Q. Sui. 2013. 2013 University of Oregon Commuter  
21 Survey: Implementation and Analysis. Oregon Leadership in Sustainability Program,  
22 University of Oregon.  
23 <http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Commuter%20Survey%20Final%20Report.pdf>. Accessed July 29, 2013.  
24  
25
- 26 33. Buckley, G., J. Card, M. Norris, and J. Hinkle. 2013. Planning for a Eugene Bike  
27 Share Program: A Review of Programs in the United States. Oregon Leadership in  
28 Sustainability Program, University of Oregon.  
29 <http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/bikesharepaper.pdf>. Accessed  
30 July 29, 2013.  
31
- 32 34. Sweeney, B., A. Beal, and D. Marmor. 2013. Avoiding the Pump: Gas and Diesel  
33 Consumption Reduction in Eugene, Oregon. Oregon Leadership in Sustainability  
34 Program, University of Oregon.  
35 [http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Gas%20and%20Diesel%20Pro](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Gas%20and%20Diesel%20Project%20PPT%20FINAL.pdf)  
36 [ject%20PPT%20FINAL.pdf](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Gas%20and%20Diesel%20Project%20PPT%20FINAL.pdf). Accessed July 31, 2013.  
37
- 38 35. Nelson, M., A. Pasterz, and A. Staniak. 2013. Pay As You Drive Insurance: Options  
39 for the University of Oregon. Oregon Leadership in Sustainability Program, University of  
40 Oregon.  
41 [http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/PAYD%20Team%20Project%](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/PAYD%20Team%20Project%20Final%20Paper.pdf)  
42 [20Final%20Paper.pdf](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/PAYD%20Team%20Project%20Final%20Paper.pdf). Accessed July 29, 2013.  
43
- 44 36. Combs A., B. Farrell, K. Messier, and T. Sewell. 2013. Bikes Mean Business in  
45 Eugene An Economic Impact Study of the Downtown Silicon Shire. Oregon Leadership  
46 in Sustainability Program, University of Oregon.

- 1 [http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Bikes%20Mean%20Business](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Bikes%20Mean%20Business%20Final%20Report.pdf)  
2 [%20Final%20Report.pdf](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Bikes%20Mean%20Business%20Final%20Report.pdf). Accessed July 29, 2013.
- 3 37. Stilwell, C., G. Lakshminarasimhan, and C. McVeigh-Walker. 2013. A Study of  
4 Parking Characteristics in Eugene. Oregon Leadership in Sustainability Program,  
5 University of Oregon.  
6 [http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Parking%20Characteristics%2](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Parking%20Characteristics%20in%20Eugene.pdf)  
7 [0in%20Eugene.pdf](http://olis.uoregon.edu/sites/olis.uoregon.edu/files/images/Parking%20Characteristics%20in%20Eugene.pdf). Accessed July 29, 2013.
- 8  
9 38. Finnell, S. Movers & Shakers: UO Students Launch a Sustainable Transit Revolution.  
10 *Eugene Weekly*. June 2013. [http://www.eugeneweekly.com/20130613/lead-story/movers-](http://www.eugeneweekly.com/20130613/lead-story/movers-shakers)  
11 [shakers](http://www.eugeneweekly.com/20130613/lead-story/movers-shakers). Accessed July 28, 2013.







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