AT&T FACULTY-STAFF AWARDS IN INSTRUCTIONAL TECHNOLOGY

2013-2014 Faculty-Staff Competition

Course Identifier: (e.g. TLC801) FS13-UP-488

Course Name: Sustainable and Climate Resilient Cities (UP 488/888)

Department: School of Planning Design and Construction & Global Urban Studies Program
Colleges: Social Science & Agriculture & Natural Resources

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Faculty and Staff Involved in Developing and Offering the Course *please list full name, position at MSU, email address, and project role for each person*

Name	MSU Affiliation	Project Role
Eva Kassens-Noor	Assistant Professor	Lead Instructor
Jessica Knott	IT Services	Instructional Designer
Nathan Evans	IT Services	Instructional Designer
Lukas Hagen	SPDC, undergraduate	Coder, course support
Cal Coplai	SPDC undergraduate	Coder, course support
Peilei Fan	URP faculty	Survey validation
Pat Crawford	SPDC faculty	Survey design & validation
Deb DeZure	F&OD	Survey design & validation
Nathan Moore	Geography	Guest lecturer
Tim Mrozowski	Construction Management	Guest lecturer
Julie Cotton	Sust. Ag. & Food Sys.	Guest lecturer
Wayne Beyea	SPDC faculty	Guest lecturer
Louise Jezierski	James Madison, Sociology	Guest lecturer
Christina Kelly	Dir. LandBank Flint	Guest lecturer

Which Competition Are You Entering (select one):
___ FULLY ONLINE COURSE (no required face to face component)
X   BLENDED/HYBRID OR FLIPPED COURSE (some face to face learning is replaced by online learning)
___ TECHNOLOGY-ENHANCED LEARNING INNOVATION (one specific technology innovation in a face-to-face, blended, flipped, or online course)

Semester(s) offered in 2013-2014 and number of students enrolled:

SEMESTER   # STUDENTS
 FS13   10

Please address these categories:

I. Course Description (400 word limit)

"How do you create a sustainable and climate resilient city?" is the central question that guides the course. It was built around a Lilly's Teaching Fellowship project that focused on flipping, moving and tweeting outside the classroom to teach applied knowledge, skills and attitudes through experiential learning, whereby we spend half the class outside and on field trips.

By comparing cities in Michigan, the US and international counterparts, we worked to understand the concept of sustainability and climate resilience and how cities attempt to move towards it. Ranging from master planning the city, via an analysis of different functions (construction, housing, transport etc.) to individual behavior, the class provides an overview of the different processes and approaches cities are taking to become more sustainable and climate resilient. Critical thinking about this process in the unique cities' contexts (their histories, their political environments, etc.) is crucial and requires looking at the problem from different viewpoints (e.g. citizens, engineers, policy makers, planners).

At the end of the class, students were able to analyze and broadly assess any city qualitatively on the effort it is making towards sustainability and climate resilience. They also learned to provide policy recommendations on how to improve a city's sustainability and climate resiliency efforts.

This course was intended for undergraduate as a cross-cutting class, engaging students from various disciplines, while being conducted as a mixture of "flipped lecture" and pre-class readings. In-person class time was devoted to apply knowledge in the field by taking tours, staging field trips and performing observations. These were completely mobile, utilizing social media tools to tie students to each other, the content, and their environments.

The course was envisioned as a multi-disciplinary course in which faculty and practitioners from across the disciplines would present topics, controversies, and cutting edge research aimed at achieving sustainable built and social environments, all tied together by social media technologies enabling students to move around the city and campus, gaining hands-on experience.

II. Learning and Interaction Goals of the Course or Technology-enhanced Innovation

The flipping, moving and tweeting classroom
To what extent does a combination of innovative teaching practices enhance student learning about sustainability?

To assist with your review of this application, the following video provides a 1:26 overview of teaching, quality, and design philosophies that were at play in the creation of this course experience. http://www.screencast.com/t/K7K401Ue.

The goal for this course was to synergistically integrate three innovative teaching practices, and empirically test the extent to which they enhanced student engagement and learning. The first was the idea of the flipped classroom, in which traditional, lecture-style course content is provided to students online prior to each class, to save in-class time for discussion (Fulton, 2012). The second was the idea that students retain more knowledge when they move – walk, exercise etc. (Doyle and Zakrajsek, 2011). The third was the idea that students learn better when they can frequently engage with the instructor and their peers throughout class (McKinney and Heyl, 2008). While much academic work has focused on a single teaching practice and its impact on student engagement and learning, the synergies among innovative teaching practices, carefully and sensitively chosen to suit the topic may yield new insights into advancement of teaching and learning.

UP 488 lent itself to the combination of these three teaching practices for a number of reasons. First, the core concepts of sustainability and climate change, which I usually deliver in lecture during the first 20 minutes of each class, can be flipped and offered to students online prior to class with little degradation in the quality of delivery. Using a combination of the Learner Management User Progress tools and release conditions, Desire2Learn provided the ability to ensure that students were watching the videos as anticipated. This freed up valuable class time to enable students to focus on the identification of unsustainable practices, engage with their environments to suggest remedies, and work on comprehensive plans for sustainable and climate resilient cities.

Second, implementing the "moving classroom" allowed students to move across and around campus, identifying and experiencing the concepts taught in the flipped classroom sessions.

Third, Twitter resolved the challenges of communication and connection inherent in the walking classroom. Twitter is a powerful tool in applying and creating ideas (Kassens-Noor, 2012) and extremely useful during field trips (Richardson, 2009).

References:
Doyle, T., & Zakrajsek, T. (2011). *Learner-centered Teaching: Putting the Research on Learning Into Practice*: Stylus Publishing (VA).
Fulton, K. (2012). Upside down and inside out: Flip Your Classroom to Improve Student Learning. *Learning & Leading with Technology, 39*(8), 12-17.

Kassens-Noor, E. (2012). Twitter as a teaching practice to enhance active and informal learning in higher education: the case of sustainable tweets. *Journal of Active Learning in Higher Education 13*(1), 67-79.

McKinney, K., & Heyl, B. (Eds.). (2008). *Sociology Through Active Learning*. Thousand Oaks, CA: SAGE/Pine Forge Press.

Richardson, W. (2009). *Blogs, wikis, podcasts, and other powerful Web tools for classrooms*. Thousand Oaks, CA: Corwin Press.

III. Points of Interest and Innovation

This course carefully blended online and face-to-face pedagogy, leveraging social media, the campus learning management system, and other tools to facilitate an active and experiential learning experience. A few examples of how technology facilitated this process include:

Twitter
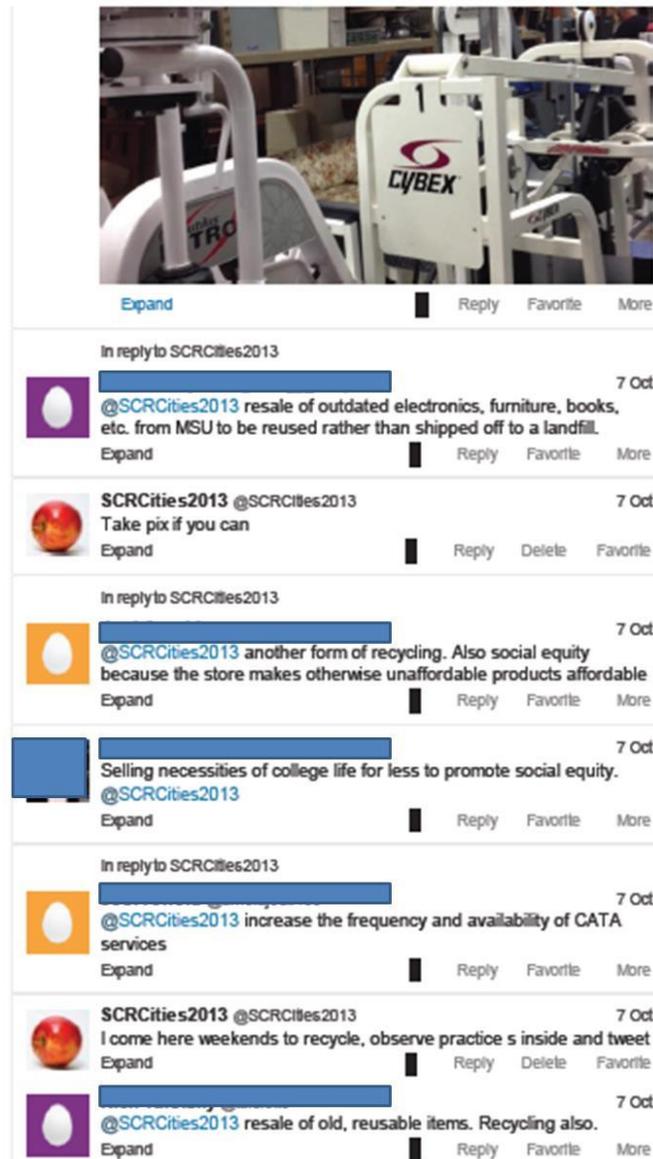
Course Twitter Example 1

The use of private Twitter accounts facilitated a mobile, active classroom and the ability to have sensitive conversations that would not be overheard. This was made possible by implementation of the flipped classroom model, which opened classroom time for active field trips. The screen shot above shows an example of the flipping, moving and tweeting classroom. The instructor is tweeting as @SCRCities2013, and is not in the same physical location as all of the students involved in the conversation, but is still able to facilitate a shared learning experience.

Moving

The course was built, in large part, on the premise of moving around campus. Consequently, instructions were released prior to class, and routes were designed with

the help of the guest lecturers. The intention was for students to take routes that would incorporate views of what would be learned in class that week. Below is an example of such course preparation:

Just a brief overview before out next class on Monday with Prof. Nathan Moore:

You should focus on the big picture land-uses (we will see 8 in total) as we will be walking across campus, for each land use, I will start a discussion on which features make them sustainable (always argue with economic efficiency, environmental stewardship and social equity) and what features do not make them sustainable.

Please get to our meeting location in the most sustainable way possible for you. Tweet about your choice while you are traveling along with the constraints you faced of making your most sustainable choice.

*Please remember that your Study Qs AND your pre-assignment are due before class.*
Best,
EKN

#1 Diagnostic:

    A. What makes a research lab sustainable/unsustainable?
    B. What makes a Gulf Course sustainable/unsustainable?
    C. What makes agriculture sustainable/unsustainable?
    D. What makes recycling center sustainable/unsustainable?
    E. What makes forest land use sustainable/unsustainable?
    F. What makes mixed land use sustainable/unsustainable?
    G. What makes residential land use sustainable/unsustainable?

Mapping out walking route to see:
    A. Forest Aker, Gulf course
    B. Sporting land-use (Parking lot)
    C. Agricultural/farm land
    D. Recycling Center
    E. Baker Woodlot - Tree coverage
    F. Wharton Center/Sport/libraries (Bogue & Shaw)
    G. Owen Hall: housing land cover (high-density vs low density)
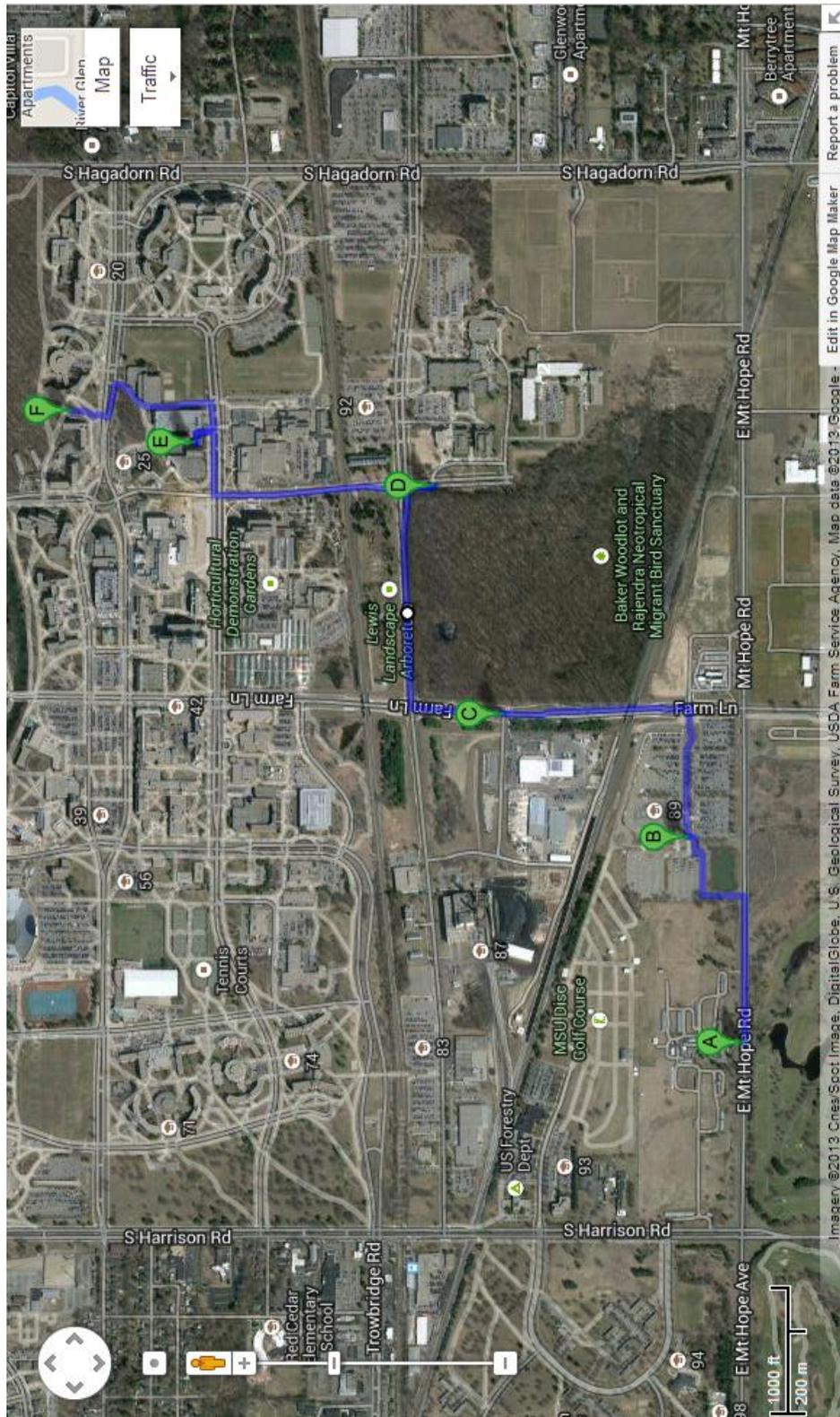
Course map route example 1

Application-based projects and activities

Each activity in the course was designed with a specific learning objective, each of which was communicated to the students. Some of these components built throughout the semester into to a culminating summative project. For the students' final research projects, they were asked to explore two cities of their choice (with the exception Miami and Abu Dhabi, the examples given in the Desire2Learn course), describing one or more of the cities' sustainability efforts based on their particular research question and hypothesis. Using the course content, outside research, and experience gleaned from course field trips in assessing municipal sustainability efforts, students were asked to review the cities' sustainability efforts. In addition to a simple analysis and summary of sustainable development efforts, they were asked to report on the city's sustainability plan or climate change plan and describe, to the extent possible, how the policies and action items in the plan were being implemented, especially focusing on any success stories they found.

This assignment was highlighted at the beginning of the semester, so that students could gain practice on their field trips, with an eye toward this final assessment. They learned to ask questions of local municipalities that one might ask of others, and gained insights that aided in their outside research efforts in the completion of this assignment. Everything learned, done, and seen in the course was created with an eye toward building students' confidence and ability to complete this project with the knowledge that they had already experienced, in real life, the things they would need to know to succeed in its completion.

Expert guest lecturers

Guest lecturers were brought in throughout the semester to lend outside expertise and additional insights into the field of, and practices surrounding urban planning and sustainable cities. These opinions contributed to course discussions, Twitter insights, classroom field trip mapping, and student projects. To adhere to the course design, each taught two courses, one inside the classroom and the second outside the classroom.

Desire2Learn – Release Conditions

This course was blended in its heavy use of technology enhancements and the Desire2Learn system to facilitate and enable class time to be used for outdoor activities. Though students were present in a face to face setting, care was taken with the design of the syllabus and online course space to provide clear instruction on how content was to be consumed, in what order, for what purpose, and to what end.

The release condition functionality in Desire2Learn was implemented on course content hosted in the system to ensure that students were not proceeding through the flipped lectures out of order, or skipping work that needed to be done. The graphic above

shows the general set up of the flipped lecture. First student were required to read one or two articles and answer associated study questions. Only after submitting the study questions, were they able to access the first online lecture (Sustainability week 2).

Based on the first part of the online lecture, they were asked to individually define sustainability through submission of PowerPoint slides in which they had to define the term, elaborate on it, exemplify it and draw it (define sustainability). Using a group activity and the Twiddla whiteboard (www.twiddla.com), they were asked to collaborate in designing a visual definition of sustainability. Finally, the link to the YouTube video, (Wicked Problems) showed them the perspectives that MSU faculty has on sustainability. This section continued outward from the individual, to MSU, to beyond with clips of former US presidents defining the origins of sustainability. Discussions throughout were facilitated in D2L forums. All of the exercises built upon each other, and only if the former was completed was access granted to the next. Students knew they had completed the online portion, when they were able to access the answers to the study questions.

In times where troubleshooting was required, 100% of the cases were solved by tracing back to where a student had not completed or submitted an assignment. In one case, early in the semester, a quiz was set in which grading was not automatically done. This was quickly remedied, and students were able to proceed unimpeded throughout the rest of the course work.

Introduction, Syllabus and Inside Diagnostic ▾   🖶 Print ⚙ Settings

Welcome to your first flipped class of this course. Each element of the flipped class usually has a release condition attached, meaning you have to complete the first element to have access to the second, you have to complete the second element to have access to the third. Please allow yourself sufficient time to complete ALL online sections before coming to class.

My best estimate as of now is that you need a maximum of 2 hours AFTER you submit your study questions. The average, however, should be more in the 30 min range.

If you have any problems in accessing D2L content, please ALWAYS email me and cc' Jess (jlknott@msu.edu). D2L still has some bugs so please be patient with us. Thank you.

Example of course instructions 1

IV. Accessibility

Transcripts were provided for all videos, and plans were in place for requests from RCPD for extra time, et cetera. Twitter exercises were ensured to be accessible, and campus routes were traversable by wheelchair. Alternate routes and plans were prepared in the event of a request for audit or enrollment for students with limited mobility.

V. Evidence of Effectiveness with Students

(Please include evidence such as comparative test scores, SIRs results, short student letters of support, your own observations of project or group performance, etc.)

The 0-hypothesis that drove this project was there is no difference in changes in knowledge, skills and attitudes between Subject A, which I will teach flipped, walking and tweeting, and Subject B, which I will teach non-flipped (lecture), non-walking (in-class), and non-tweeting (face-to-face). My current status-quo. (Figure 1)

$$\frac{\text{Triple Innovation}}{\text{Status quo}} = \frac{\bigstar \; \text{Topic A (F+W+T)}}{\bigstar \; \text{Topic B (NF+NW+NT)}} = 1$$

Figure 1

To test effectiveness of learning, we implemented two diagnostics, one before the start of the class on one in the finals week of class that tested, knowledge, skills and attitudes of students (marked by the start in Figure 2).
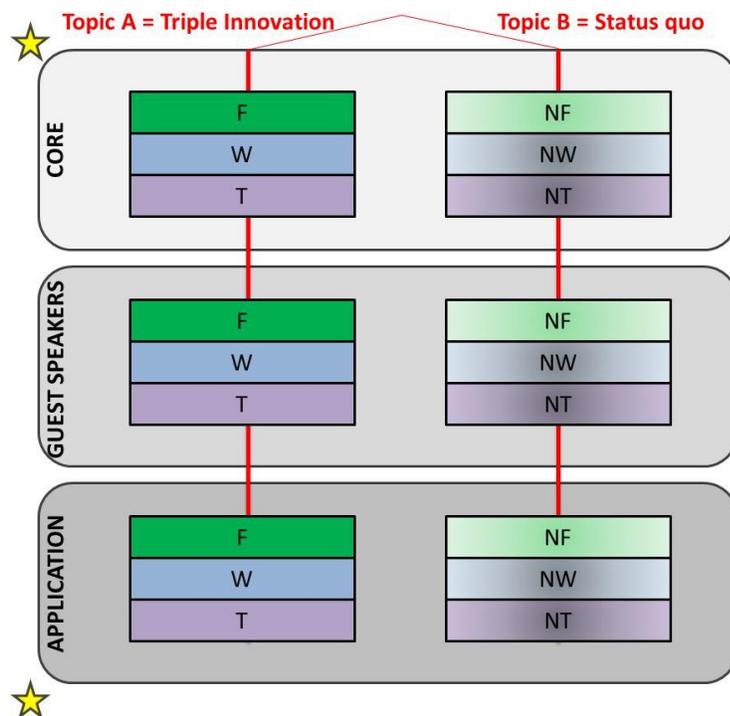

Figure 2

Twitter use for knowledge enhancement (student responses):

"Able to get a better understanding of my own views and understanding of topics that are 'current'"
"Easier to ask questions about material"
"Enjoyed more free flowing discussion"

Twitter use and walkability for skill enhancement (student responses):

"Seeing the concepts illustrated first-hand makes me remember them very well"
"It is a cool concept and I brag about it to my friends"
"It is very nice to actually see how the education fits into the world around us.
Sustainability and climate change impact us every day and I think this brings it to light in
a very real and tangible way."

Data gathering is in process that analyzes the number of tweets students sent, their
attendance percentage, their GPA, and their inside and outside diagnostic. While these
numbers are not yet complete, we provide a table of what is in progress as a description
of the direction this research is going, and to illustrate that Twitter was used frequently.
The research will be presented at "The Teaching Professor Conference"
(http://www.teachingprofessor.com/conferences/conference) and I intend to publish it in
a high-ranked, peer-reviewed journal.

Students	# of Tweets	Attendance % of total		GPA	Inside Diagnostic	Outside Diagnostic
Instructor	203	100%				
J	99					
W	51					
L	63					
A	60					
L	64					
O	101					
A	56					
N	63					
S	69					
SH	21					

VI. Plans for Sustainability

The experience in the flipping, moving, and tweeting classroom enhanced engagement
and the student's learning experience in many ways. Because of the diversity in
approaches by the instructor and the guest lecturers, we were able to identify key
insights that proved to be superior styles than others. Consequently I would like to
design the course targeted to such key insights. These were
   1. Assign individual tasks to tweeters
   2. Ask students to spread-out across defined areas
   3. Assign undercover tasks, such as interviews, observations about unsustainable
      behaviors etc.