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Implementation of Infrastructure Education Courses Across Multiple Institutions

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Support for Implementation of Infrastructure Education Courses Across Multiple Institutions

Introduction

Communities of Practice (CoP) are formed when individuals collaborate in order to share knowledge and develop solutions for collective problems[1]. They usually grow informally around a need and involve voluntary membership by participants who are motivated to take part in a learning community that serves a common purpose.[2] In higher education, CoPs often form with the intent of sharing best practices, resources, and knowledge around a common domain. They can serve to invigorate and advance the teaching and learning beyond what may be possible by individuals alone and thus have the potential to be transformative.[2]

Three interrelated dimensions are characteristic of CoPs: mutual engagement (negotiating shared meaning through collaborative relationships), negotiation of a joint enterprise (engagement and mutual accountability around a common goal), and development of a shared repertoire (resources created by the group for negotiating meaning).[3] CoPs are typically not static but rather evolve over time. Newcomers to the community learn from more experienced members and gradually take on more tasks as they move toward full participation.[4] CoPs are not dependent on size for maximizing efficiency. However if a CoP is too small it may quickly become static and if too large may inhibit the abilities for members to interact and remain engaged. Many individuals may participate on the periphery and benefit from the shared learning as long as on a core group remains actively engaged with moving the work forward.[5]

The civil and environmental engineering communities have incorporated many of the characteristics of effective communities of practice in their professional endeavors. The work described in this paper presents a unique undertaking of a CoP designed to develop a model course and curricular materials. This paper presents findings related to designing and implementing materials and resources shared through the Center for Infrastructure Transformation and Education (CIT-E) CoP and examines the ways in which those in the CoP are moving toward a shared vision of infrastructure education.

Mutual Engagement and Joint Enterprise: The CIT-E Community of Practice

With funding from the National Science Foundation, civil and environmental engineering (CEE) faculty members at University of Wisconsin-Platteville and the United States Military Academy established the Center for Infrastructure Transformation and Education (CIT-E). CIT-E has the following intended outcomes:

1. Establish and sustain the CIT as *the* source for infrastructure education materials that is continuously improved by a vibrant Community of Practice

2. Develop educational expertise in infrastructure topics and in pedagogy among faculty at collaborating institutions

3. Deliver, assess, and institutionalize infrastructure-themed courses or modules for CEE majors and other majors at collaborating institutions

4. Enhance the ability of CEE students to view components and systems designed in CEE subdisciplines as integral parts of a larger system (i.e., the infrastructure)

5. Enhance the ability of CEE students to view infrastructure challenges from a societal perspective, rather than solely from a technical perspective

The CIT-E project initially involved faculty from the two lead institutions and six partner institutions seeking to enhance infrastructure education at their universities. Since its inception in 2013, faculty members from more than 30 additional institutions have used or expressed interest in using the CIT-E materials and/or participated in the design of a model course. For the past two summers, 31 members have met for face-to-face workshops to provide strategies for effective instruction and to develop shared course materials.

During the academic year, the CIT-E CoP functions virtually through online meetings and email. The core project team meets monthly to bi-monthly for planning purposes. Working groups were formed prior to the first summer workshop and include the following: 1) a peer review panel to vet new materials, 2) an assessment team for cross institutional assessment, 3) module maintainers to update existing materials, 3) a first time instructor support group, and 4) a dissemination working group. Large group meetings via webinar occur monthly to bi-monthly with email communication in-between as needed. Online meetings in the first two years included time for working group updates, sharing of new course resources, updates and questions from first time instructors, and plans for workshops and other dissemination events. Most recently webinars and several rounds of online surveys served to create a model infrastructure course syllabus for which materials will be revised or developed.

The CIT-E project is being evaluated in many ways; this paper will report on aspects of the evaluation related to the usage patterns of the existing materials, perceptions of first-time course implementers, and preliminary findings related to the CIT-E CoP. Through faculty surveys and interviews, evaluators are examining use and implementation of CIT-E course materials and gathering feedback on the materials and support for implementing an infrastructure course. Evaluators are also examining the challenges, successes, and impacts of participating in a CoP around infrastructure education.

A Shared Repertoire: CIT-E Infrastructure Course Materials and Instructor Support

Through the CIT-E CoP, infrastructure course materials created at the University of Wisconsin-Platteville and the United States Military Academy are made available to partner institutions across the country. Both institutions offer an introductory infrastructure course for civil and environmental engineering majors. University of Wisconsin-Platteville offers a second course, Infrastructure and Society open to non-majors. The materials from these courses became the foundation for the CIT-E CoP. Course materials currently reside on Box.com and are organized by course and topics within each course. As new members learn about CIT-E, the project team invites them to view the materials. The project team is currently developing a website where

revised and vetted materials will reside for broader dissemination. Instructors who come to the website will be able to search materials by topic and lesson and download materials for their use.

Shared course materials include PowerPoint presentations, accompanying lecture notes, student assignments, and photos and other images related to varied infrastructure topics. Infrastructure topics include traditional infrastructure sectors (energy, transportation, and water), related engineering concepts (planning, design, and construction), and concepts related to societal impact (sustainability, financing, economic impacts, social welfare, equality of impacts among social groups, and ethics among many other topics). Among all of the topics, the inter-relations between the topics and system nature of infrastructure are highlighted. Currently, the core project team is developing a template for future course materials to ensure consistency and will include lesson objectives, structure for activities, links to resources and cited materials, and teaching tips.

Participating instructors have integrated these course materials into new and existing civil and environmental engineering and general studies courses. The project team has also made available a concept mapping assessment (developed at the University of Wisconsin-Platteville) that instructors can use as a pre/post measure of student learning about infrastructure from a systems-wide perspective.[6] First-time infrastructure course implementers are supported through mentoring from the CIT-E faculty members who developed the materials and have experience with teaching an infrastructure course.

In an effort to understand how members of the CIT-E community are implementing and adapting shared resources in infrastructure education courses at their institutions, project evaluators conducted interviews with seven faculty members who taught an infrastructure course in Fall 2014, Spring 2015, or Fall 2015 semesters. Of those instructors, five were new to teaching a course using the shared materials on the CIT-E Box.com website, and two had taught the course previously and had contributed to the development of the materials. Interviews examined the nature of the courses taught, use and perceptions of the CIT-E materials, successes, challenges to implementing the course for the first time, and perceptions of student learning and engagement. In addition to interviews, CIT-E CoP members implementing a course completed an end-of-semester survey in which they responded to a set of questions about the nature of their courses, what they used from the shared CIT-E materials (if they had recently taught the course), whether they modified or added materials to better address their needs, and their perceptions of the materials.

Using and Adapting CIT-E Course Materials

Civil and environmental engineering faculty are becoming involved in the CIT-E community to address needs within their own institutions. The need for infrastructure content comes as some programs are looking to address ABET outcomes related to understanding the impact of engineering solutions in a global, economic, environmental, and societal context (Outcome h) and a knowledge of contemporary issues (Outcome j). Others are using infrastructure content to frame topics such as engineering economics or sustainability. Some programs are trying to create introductory CEE courses using infrastructure as the core concept while others are looking to create general education courses.

Faculty members using the CIT-E materials since the Fall 2014 semester have taught courses on infrastructure or courses that had infrastructure modules to more than 400 students across institutions. Students ranged from freshmen through graduate-level participants. Courses were two to three credit hours and included introductory infrastructure survey courses, courses with a sustainability focus, and a graduate seminar. Seven courses targeted civil and environmental engineering majors, while one university offered a course as fulfillment of an elective in humanities that was open to all majors.

First-time instructors used the shared PowerPoint slides, course syllabi, and lecture notes as a basis for developing their courses. In interviews and on surveys, instructors emphasized that having previously developed course materials to draw from when designing their infrastructure courses was an invaluable source of support.

Instructors are making modifications to the original course materials or are developing new materials for their courses to meet their instructional needs. Most frequently, they are bringing in local infrastructure issues and highlighting real-world regional infrastructure projects to make the materials more geographically relevant for students. Instructors have also developed new course materials tailored to their region or to emphasize their own specialties and areas of research. Examples of several of these modified and newly developed materials have been added to the course materials on the website, thus broadening the repertoire of shared materials for future course offerings.

First-Time Implementer Experiences

First-time instructors commented that what was most successful about their classes was the course content and being able to build off of the recommended textbook[7] and CIT-E developed materials to create the class. The wide range of topics covered in the materials, access to homework examples, and lesson plans with learning outcomes already defined are particularly useful to those teaching the course for the first time.

Students were engaged and interested in the material offered in the courses. Adapting some materials to make them regionally specific increased student engagement. Specific topics that were of particular interest to students included ethical considerations in infrastructure, renewable energy, sustainability, natural disasters and their effects on infrastructure, and local infrastructure projects. Students were most engaged by material that allowed them to make real-world connections to the content and that helped them understand how engineering professions can have an impact on society. Instructors also commented that invited lecturers with expertise in applied engineering design and local issues were motivating to students.

Faculty members who are new to teaching an infrastructure course identified challenges. The volume of information on a variety of topics on the shared site made it somewhat difficult to decide what content to include while also keeping in mind course goals and their target audience. As the CIT-E website is further developed, resources will be incorporated to assist instructors with planning a course. These will include a master list of topics, the model course syllabi for majors and non-majors courses, and an index of the course materials. These resources, in addition to the searchable topic database, will support new course development.

Instructors noted that having deep expertise in some areas of infrastructure while not in others makes teaching a survey course challenging. Many instructors bring in guest lecturers to address this issue. Two institutions offered the course as a team-taught course with each instructor teaching sections of the course within his area of expertise.

Identifying Needs for New Material

First-time course implementers commented on needs for future offerings of the course. Instructors indicated a need for more material on sustainable solutions in infrastructure design, building types and building construction. Several individuals commented that they would like more homework, in-class assignments, or follow-up activities for students to "go deeper into the learning objectives" for the course. Others discussed the need for more active learning to enhance the lecture material so that students could have more opportunities to interact with the course content. Instructors also commented on the need to update some of the existing shared materials to make the content current.

Negotiating a Joint Enterprise: Developing Showcase Lessons and a Model Infrastructure Course Outline

A successful aspect of the CIT-E CoP has been to bring members together for summer workshops to build relationships and move the work forward (see Appendices A and B for agendas). In 2014, individuals came together for an initial three-day CIT-E workshop. Prior to the workshop, participants met regularly through webinars to discuss the shared vision for CIT-E and to understand participants' needs for materials and resources. The 2014 summer workshop included an idea exchange poster session where members shared their current or proposed infrastructure course models and solicited feedback and questions from others. An interactive session on the "flipping" the infrastructure classroom, to put more emphasis on active learning strategies during class time, provided concrete tools for increasing student engagement. Time spent on creating content together in the form of Camtasia screencasts on specific topics allowed members to begin to develop new materials for the CoP.

As CIT-E faculty members are designing and teaching their courses and coming together for collaborative workshops, they are building consensus on the need for a model course. To begin to respond to these needs, faculty members who came together for the summer 2015 *Pedagogies of Engagement* workshop worked collaboratively to design showcase lessons on four topics identified by the group: resilience, sustainability, green infrastructure, and bridges. Supported by an education faculty member with expertise in lesson design, and by drawing on the content expertise of those present, participants worked in small groups to design preactivities (to be completed by students outside of class prior to instruction), in-class activities, and after-class activities for each of the four topics. On the final day of the workshop, the groups presented their showcase lessons to the group for feedback and refinement. Post workshop activities included refining the showcase lessons and posting them on the Box.com website.

The four showcase lessons began the process of working toward a vision for creating a model infrastructure course. The development of a model infrastructure course continues as CIT-E CoP members from more than 20 institutions recently participated in an iterative process of

responding to surveys and attending virtual meetings to come to consensus on course objectives and lesson topics to ultimately develop the course outline.[8]

As with the prior summer workshop, participants in the 2015 workshop valued the opportunity to come together to advance the work of the CoP, highlighting the importance of face-to-face interactions. They rated their time together highly with respect to creating interest in the topics, opportunities for dialogue and participation, usefulness of the subject matter, and workshop content. The majority of those attending (86.7%) indicated that the emphasis on showcase lessons helped them to create model materials for an infrastructure course and to acquire tools and materials to teach their courses (80%). Perhaps most importantly, the majority felt that the workshop helped them to build relationships with others interested in infrastructure education.

Reflecting on the CIT-E Community of Practice

The CIT-E Community of Practice is evolving over time. Early work revolved around coalescing around ideas and generating materials and is moving toward broader dissemination. CIT-E CoP members are participating at varying levels of effort and involvement. Those in the midst of teaching an infrastructure course or preparing to teach the course are most engaged in the work of the community.

In reflecting on their participation, faculty members feel that being part of the CIT-E community is providing them with a support network of individuals who value teaching and the importance of an infrastructure course. Having a community around a common vision "provides motivation and excitement about teaching infrastructure." As one individual commented, "[Participating] helped me to solidify ideas I already had perking and to validate that infrastructure was a legitimate area of scholarly inquiry." Another stated,

> *"As new faculty, it has helped me expand my professional network to include more people who value the importance of teaching. I have learned a great deal during the past two CIT-E workshops about pedagogy and best practices in engineering education. It has improved my performance in the classroom and thereby the experience of my students."*

Members also appreciate the ongoing collaborations, support, and encouragement provided by the group. One stated, "I see the network as a group of mentors—people outside of my institution that I can ask for advice as I meet new challenges in my classes. It has been a true asset to me." Another commented, "The sharing of ideas allows me to both contribute and improve upon my own."

Ten CIT-E collaborators from ten institutions recently responded to a survey about the CoP. Of those, 100% *agreed* or *strongly agreed* that the CIT-E community has a shared vision for the work of enhancing infrastructure education, that members have a stake in what the CoP is trying to achieve, and that the work accomplished by the CoP would be difficult for any one institution to accomplish on its own. Nearly all members rated the CoP highly with respect to creating connections across organizational and geographic boundaries (40% *very good*, 40% *excellent)*, sharing information (20% *very good,* 70% *excellent*), and opportunities for collective learning

(30% *very good*, 60% *excellent*). Of those surveyed, 60% *agreed* or *strongly agreed* that the level of commitment among members of the CIT-E CoP is high. Half *agreed* or s*trongly agreed* that they have a clear sense of their roles and responsibilities as participants, indicating the possible need for clarification with respect to requirements for participation.

CIT-E collaborators identified challenges to the work of a Community of Practice for infrastructure education. Among these is the need to educate CIT-E members about additional funding sources and opportunities to support infrastructure education. Members commented that institutions place value on research funding, which makes participating in communities with a focus on education a challenge due to competing time commitments for research. Some members noted that communicating virtually can tend to slow down the processes of decision making and action. Finally, collaborators identified the challenges of keeping newly added materials organized and consistent with the existing framework and keeping existing materials up to date.

When asked in interviews and on surveys how the CIT-E community might better support infrastructure education efforts, collaborators commented on the need to

- emphasize the importance of dealing with infrastructure issues from a systems viewpoint,
- bring nonengineers into the conversation,
- provide faculty development around the course content through webinars presented by group members with expertise in pertinent infrastructure issues, and
- develop the CIT-E website to further highlight what the group is doing.

Creating a Community of Practice: Lessons Learned

CIT-E project leaders offer lessons learned with respect to creating a Community of Practice around infrastructure education. The CIT-E CoP is successful because it is responding to a common need with a timely solution. Strong leadership is required to keep the community moving forward. It is also essential that there be a sense of interdependency among community members who find the topic to be engaging and important and who benefit personally and professionally by participating.

Working virtually during the academic year presents challenges to creating and sustaining the CIT-E CoP. It is difficult for collaborators to sufficiently complete tasks during the academic year because they often do not have time to take on work that is outside of the requirements of teaching and research. Summer in-person workshops allow for uninterrupted productive work time and are invaluable to forming a sense of community. Project leaders reflect that it would be difficult to sustain the community without summer face-to-face workshops or other annual meetings. Summer workshops have provided the CIT-E CoP with opportunities for deep dialogue around shared interests that are difficult to duplicate in a virtual environment.

One of the strengths of the CoP is its diversity with respect not only to gender, race, and ethnicity but also to years of teaching experience, size and focus of institutions, CEE discipline expertise,

industrial experience, and location. Partners are diverse in their content knowledge, areas of specialty, and experiences, which is essential to the success of a project that spans subdisciplines.

Organizing the materials remains a challenge. The development of a searchable database with key attributes of topics and learning objectives is paramount. Another challenge is the management of change. For example, if a lecture is slightly modified, are both versions archived and how are the differences noted?

Prerequisite knowledge for any lecture is also a key attribute. In order to provide instructors with a wide array of materials and the flexibility to arrange topics in any order, there must be thoughtful design of instructional materials, perhaps with supplemental preclass readings or videos. The design of course materials requires intentional consideration of other instructors and students.

While team teaching may allow instructors to maximize content instruction based on their expertise, it can also mean stepping away from the course while the other instructor is teaching which sometimes leads to gaps in content and a lost connection with the class during off weeks. Programs need one faculty or small groups of faculty that take ownership of the infrastructure course so they can teach every topic and possibly teach the course nearly every semester to bring consistency and reliability to the delivery.

Needs of the community and reflections on its challenges and successes are informing the future work of the CIT-E CoP. Project leaders are looking at the following actions to sustain the work of the project:

- Creating a website to house and disseminate teaching materials and resources
- Assigning “Module maintainers” to update content and merge changes to materials
- Developing collaborations with (or endorsements from) established professional societies
- Getting promotion credit for the work of major contributors so that promotion and tenure committees recognize it

The CIT-E Community of Practice is bringing together faculty from diverse institutions that share a vision of infrastructure education for engineers and the general public. Participating instructors were able to capitalize on this shared vision to advance their teaching and learning as well as provide suggestions for improvement and expansion that resulted from facing challenges to the work. Thus, the community continues to move forward to develop quality materials, resources, and a collaborative model course outline. As the community grows, new challenges will emerge, as will new opportunities to transform undergraduate engineering education in a meaningful way.

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Infrastructure Education Workshop

Wednesday, June 25, 2014

8:30 a.m. – 11:30 a.m.	**(Optional) Technical Field Trip (Penn)** Details TBD; opportunity to socialize, to see "big" projects, to learn from practitioners	Meet in hotel lobby
11:30 a.m. – 12:30 p.m.	**Welcome Luncheon (Parker)** Opportunity to meet participants, socialize, and most importantly, eat	MU, Engineering Hall Room 136
12:30 p.m. – 1:15 p.m.	**Kickoff Session (Parker/Haden)** Share logistical information. We will also hold a discussion on the "community of practice" and review the logic model.	MU, Engineering Hall Room 136
1:15 p.m. – 2:00 p.m.	**Keynote presentation (Klosky)** Led Klosky (West Point) will give a presentation on motivation for teaching infrastructure to everyone.	MU, Engineering Hall Room 136
2:00 p.m. – 2:15 p.m.	**Educational Materials Availability (Thompson and Hart)** Brief review of materials available from West Point and UW-Platteville	MU, Engineering Hall Room 136
2:15 p.m. – 4:00 p.m.	**Idea Exchange Poster Session (Parker)** Using a "speed dating" format, participants will share their courses (proposed or existing) or a certain aspect related to their courses.	MU, Engineering Hall Room 136
4:00 p.m. – 5:00 p.m.	**Course Design/Improvement Work Session** Participants that arrived with no course outline will build an outline; participants with a proposed course outline will refine and improve their course.	MU, Engineering Hall Room 136 and 252
5:00 – 6:30	**Break**	
6:30 p.m. - ?	**Dinner (Penn)** John Goetter (retired from Graef) will present on WI infrastructure Report Card, progress made, and tie into the morning field trip.	

Infrastructure Education Workshop

Thursday, June 26, 2014

8:00 a.m. – 8:30 a.m.	**Continental Breakfast/Introduction to the Day** Relationship between flipped classroom, infrastructure education, and the community of practice Reviewing yesterday's assessments/updating the "parking lot"	MU, Engineering Hall Room 136
8:30 a.m. – 12:30 p.m.	**Flipped Classroom Presentation – Cynthia Furse, University of Utah** • Intro to the Flipped Classroom • Technology: Creating the video lecture • Active Learning strategies for the Flipped Class • Flipped Day Design (what to put in the video, what to put in the Face to Face time) • Assessment, What can go Right, What can go Wrong • The Elephant in the Room: Where is Flipping taking us?	MU, Engineering Hall Room 136
12:30 p.m. – 2:00 p.m.	**Lunch**	MU, Engineering Hall Room 136
2:00 p.m. – 3:30 p.m.	**Content Creation Workshop (Parker)** Training on how to use Camtasia and PowerPoint for screencasts; Participants, using their own laptop, will create content for either a) the flipped classroom or b) online and interactive delivery	MU, Engineering Hall Room 136 and 252
3:30 – 5:30	**Peer Review of Content** Participants will view and provide feedback on the electronic content created by others and revise their own content based on feedback.	MU, Engineering Hall Room 135 and 252
Evening	**Social activity or Work Session – choose one (Penn)** • Brewers game (vs. Colorado Rockies, 7:10 p.m.) • Milwaukee Art Museum (open to 8:00 p.m. on Thursdays) • Summerfest Transportation will be provided; meals on your own.	

Infrastructure Education Workshop

Friday, June 27, 2014

8:00 a.m. – 8:30 a.m.	**Continental Breakfast**	MU, Engineering Hall Room 136
8:30 a.m. - 9:00 a.m.	**Institutionalization (Hart)** Lessons learned in institutionalizing an infrastructure course and integrating the content in to other courses	MU, Engineering Hall Room 136
9:00 a.m. – 9:45 a.m.	**Community of Practice in Fall 2014 (Parker)** Action items will be compiled; each participant will describe their contribution to Community of Practice during the Fall 2014 semester (e.g. present a webinar; upload new content; etc.); NSF Reporting requirements	MU, Engineering Hall Room 136
9:45 a.m. – 10:30 a.m.	**Assessment (Haden)** Who is teaching what when? What are the assessment instruments? Institutionalization going to happen? and Community of Practice/Collaboration effectiveness. IRB approval process	
10:30 a.m. - 12:30 p.m.	**Future collaboration** • Pedagogical research • Joint assessment of flipped classroom effectiveness • Shared instruction of a single course at multiple institutions • Incorporating students into the community of practice • Continued updating/improvement of infrastructure education materials	MU, Engineering Hall Room 136 and 252

Second Infrastructure Education Workshop

Day 1: Wednesday, May 27, 2015

	Breakfast Continental breakfast is available at the University Guest House	
7:45 a.m. – 11:30 a.m.	**Field Trip** Daybreak development is a master-planned community on a former Brownfield site. It was designed using "Traditional Neighborhood Development" techniques. The tour will include presentations by one of the lead architects and an engineer involved in the project. Part of the visit will include a walking tour. This site was chosen for the field trip given its cross-disciplinary features (environmental, site design, transportation, etc.) and focus on sustainability.	Vans leaves at 7:45 from University Guest House.
11:30 a.m. – 12:30 p.m.	**Welcome Luncheon** Opportunity to meet participants and socialize.	Collegiate Room, Student Union
12:30 p.m. – 1:15 p.m.	**Kickoff Session** Introductions. Share logistical information. Review grant progress and the logic model. Update from Steve on the CE Department Heads meeting. Discuss the objectives of the workshop. Discuss assumed prerequisite knowledge.	Collegiate Room, Student Union
1:15 p.m. – 2:15 p.m.	**Keynote presentation** Ted Knowlton, AICP, Deputy Director of the Wasatch Front Regional Council (WFRC) will kick off the workshop with a local look at infrastructure and its importance to the region's economy and quality of life. The WFRC is an association of 60 cities and five counties that leads transportation and growth planning for one of the fastest-growing regions in the US.	Collegiate Room, Student Union
2:15 p.m. – 5:00 p.m.	**Idea Exchange Poster Session/Technology Showcase** Each participant will share a poster. Participants will rotate between posters at regular time intervals to allow participants to get to know each other. Participants will also be able to visit a "technology showcase" related to the flipped classroom, hosted by Nate Sanders of the University of Utah. Snacks provided at 3:00	Collegiate Room, Student Union
5:00 – 6:30	**Break**	
6:30 p.m. - ?	**Social Activities/Dinner** Salt Lake Bees game (AAA baseball), 6:35 p.m. vs. Oklahoma City. Travel via Trax from University Medical Center Station to Ballpark Station on Red Line (32 minutes according to Google Maps). Or Dinner at an area restaurant	

Second Infrastructure Education Workshop

Day 2: Thursday, May 28, 2015

	Breakfast Continental breakfast is available at the University Guest House	
8:00 a.m. – 8:15 a.m.	**Introduction to the Day** Logistics and the objectives for the day will be discussed.	Collegiate Room, Student Union
8:15 a.m. – 12:00 p.m.	**Workshop 1: Building a Model Lesson – Part I** Teams of participants will reverse engineer an individual lesson for a single class, based on the "Significant Learning Experiences" text by Dee Fink: • Define outcomes for the lesson • Define the teaching and learning activities and the assessments to support the outcomes • "Mine" content from the materials on Box.com to build the lesson • Identify content that should be discussed face-to-face	Collegiate Room, Student Union Breakout Rooms: 1. Parlor B 2. Room 319
12:00 p.m. – 1:30 p.m.	**Lunch** This lunch will be part social luncheon and also an opportunity for more-experienced instructors to interact with less-experienced instructors.	TBD
1:30 p.m. – 5:30 p.m.	**Workshop 2: Building a Showcase Lesson – Part 2** Participants will create a Showcase Lesson that will consist of: • Prerequisite knowledge/Outcomes • Readings for instructor • Pre-class activities for students • In-class activities, including "notes" • Post-class activities, with "key" • Practice demo At least one member of each group should have a laptop.	Collegiate Room, Student Union Breakout Room 319
Evening	**Social activity or Work Session** • Dinner downtown on Main St, walk around Temple Square and take in Mormon Tabernacle Choir Rehearsal or shopping.	

Second Infrastructure Education Workshop

Day 3: Friday, May 29

	Breakfast Continental breakfast is available at the University Guest House	
8:00 a.m. – 8:15 a.m.	**Introduction to the Day**	Collegiate Room, Student Union
8:15 a.m. - 9:00 a.m.	**Team 1 Showcase Lesson presentation** Participants will model the exemplary materials they have produced and receive feedback. Participants should devote approximately 15 minutes to an overview of the lesson, including outcomes and 30 minutes of active learning demo.	Collegiate Room, Student Union
9:00 a.m. – 9:45 a.m.	**Team 2 Showcase Lesson presentation**	Collegiate Room, Student Union
9:45 a.m. – 10:00 a.m.	**Break**	
10:00 a.m. – 10:45 a.m.	**Team 3 Showcase Lesson presentation**	Collegiate Room, Student Union
10:45 a.m. – 11:30 a.m.	**Team 4 Showcase Lesson presentation**	Collegiate Room, Student Union
11:30 a.m. – 11:50 a.m.	**Community of Practice in Fall 2015** A list of action items will be compiled - each participant will describe their contribution to Community of Practice during the Fall 2015 semester	Collegiate Room, Student Union
11:50 a.m. – Noon	**Assessment/Wrap-up**	