Introduction
Creativity is an essential skill that can be taught, strengthened and measured. As a concept, creativity is subject to social, personal and cultural standards. These two facets provided both the pedagogical groundwork and the challenges in designing a massive open online course, or MOOC, adapted from an in-person class on Creative Problem Solving. In their current stage of evolution as an educational model, MOOCs provide free, online courses from higher education institutions to a global and diverse population. Currently, most MOOCs center around didactic methods of content delivery and assessment. We approached the MOOC model as a method of cultivating an environment for the global exchange of ideas and critical feedback. The Coursera platform was used to host our seven week version of the class, in which we emphasized creative skill development and collaboration, rather than rote instruction, supported by creativity theory, critique training, and a diverse network of ideas. The challenge of teaching creativity as a culturally subjective concept was met by utilizing design alongside a set of tools and techniques for universal communication of expectations throughout the course.

Creative Problem Solving Course overview
Our MOOC developed from a successful semester-long course on Creative Problem Solving, housed within the College of Design at the University of Minnesota. The class ran every semester for several years in its current form, and was open to all undergraduates at various stages in their education, across a range of disciplines. The course emphasizes the development of divergent thinking, and cultivates the ability to continually generate many ideas as quickly as possible, along with the techniques to develop those ideas for solving problems. Though grounded within the culture of the graphic design studio critique, the crux of the class focuses on coming up with ideas across topics that are novel, useful and applicable, depending on student-defined constraints.

The core curriculum combined an active learning environment with instruction in creativity theory and technique. The assignments were composed of weekly creative prompts that required students to investigate their own definitions of creativity by ‘doing something different’. Each prompt was structured
around a different constraint, such as eat differently, do something only done as a child, or re-interpret the idea of a gift. Students generated their own creative ideas for each ‘different’ prompt, and executed each assignment situated within both social and individual constructs of creativity. Each week, students presented their activities to the class and engaged in discussion of the creative nature of their involvement through the lens of their own personal sphere, what is different and challenging to them, as well as through the lens of the public, to gauge the potential novelty of an idea.

Additionally, students in the in-person class had the unique advantage of taking the Torrance Tests of Creative Thinking on the first day to measure their overall creative ability based on metrics of fluency, flexibility and originality – the ability to generate many answers, each different from one another, and the ability to come up with unique or rare answers. Halfway through the semester students were given the Torrance Tests again to measure the change in creative ability. On average, each metric of creative ability increased significantly. In the most recent semester of the course, fluency increased by 44%, flexibility by 22%, and originality by 66%. This consistent measured increase seen within the three main facets of creative skill provided the basis for the course design of the open online version.

The MOOC Model – Challenges

The design of the MOOC iteration of the course required careful attention to the subjective nature of creativity, especially in cultivating positive, constructive peer critiques. All cultural standards of creativity needed to be considered, as did potential language barriers for students who were non-native English speakers. Student projects each week were uploaded as image and video files, with written descriptions. With a large-scale class, student work could not be evaluated by a small team, nor could the platform’s assessment tool be used to grade subjective projects. Our goal as instructors was to foster a constructive, networked environment of ideas for the assessment of assignments through peer evaluations – we aimed to teach how to critique. One challenge that became apparent through this system was the sheer volume of work. Students were encouraged to share their work with others in the class in forum discussions, which helped us discover some of the most engaging, unique or innovative projects. Each week we created a live critique video in which we discussed a few of these projects, both to highlight and to teach methods of critique.
MOOC Numbers

While developing the MOOC, the ultimate size the class would be was difficult to gauge. When the Creative Problem Solving MOOC began in February 2014 over 52,000 had enrolled. At the time this was the largest registration for any course, other MOOCs included, at the University of Minnesota. Of those enrolled, 184 countries were represented, and about 41 percent of those countries were considered to be of ‘emerging economy’ status. MOOC students tend to be an extremely diverse group, with a range of educational backgrounds. With all free, massive courses, student involvement drops off after the second week, so we looked to include a variety of material and a range of projects to cover the seven-week run.

While the technological requirements were made clear to students from the beginning, we had a limited idea how this may impact the way in which students engaged in the class. The scale and manner of the class meant we had an assortment of different types of learners. Some aimed to achieve the course certificate and some were more selective about which activities, quizzes, and forums to participate in, if any; some students chose to only watch lecture videos and review the content. Thus, the learning experience of the course was similar to the nature of the class assignments – largely self-directed, with the level of engagement determined by the student. At the time the course ended in April 2014, over 200,000 lecture videos had been watched. One month later, students were still accessing the course and engaging in discussion. Over 5800 lecture videos had been watched in the most recent week alone at the time of this presentation in May, which shows significant outreach (the course had closed but forums and archived material were still available to enrolled students).

Networks and Domains

One fundamental aspect of creativity requires a space for ideas to form and develop based on networks of individuals. Creativity and innovation develop heavily through the sharing of ideas rather than protecting them. Research also shows that the size of the network determines the level of innovation, and people who are in a large city are exponentially more creative than those in more remote and isolated areas (Johnson 2010, 10). The forums and peer evaluation tools inherent to the MOOC platform allowed for a diverse network of individuals to be built, in which multiple viewpoints could be shared. Essentially, a large amount of the class content – discussions that occurred, ideas shared – was constructed by student involvement.
For the majority of the students actively engaged in the course, interaction was essential. Students would discuss ideas in the forums prior to implementing assignments, to gauge the validity of their idea, as well as their own particular set of beliefs, habits and cultural norms. We used design to foster creativity in a global context, with the idea that students would identify and explain their cultural, social, and personal domains. This communication of one’s specific worldview turned out to be crucial in both documenting assignments to be graded, and being objective when evaluating the assignments of peers. One idealistic outcome of applying these types of design-thinking assignments in a real-world situation is the development of empathy, and cultivating a stronger connection to the surrounding environment. The global network of students sharing their everyday experiences through discussion of ideas on how to do something different aided in a deeper understanding of how to come up with meaningful ideas.

**MOOC Adaptation of Assignments**

We developed our own design identity to help navigate through the various aspects of the course and to establish a visual language for the class. The seven-week MOOC included adaptations of six of the ‘Different’ assignments. Each assignment was built into a module, with one week to complete the assignment and the following week to complete peer and self-evaluations. Lecture videos to introduce the topic had a clear visual syntax to group the ‘Different’ assignments as the homework segment of the class, as each assignment had several parts to follow. Each weekly prompt turned out an extreme spectrum of interpreted ideas, based on the sole fact that this was now a global community. To keep each project consistent, students needed to identify and define what constitutes ‘unique’ and ‘different’ for them, for their own culture and comfort zone; define their idea or problem context, if it considers word usage, material usage or an activity in a new way; students were also expected to consider the social critique in determining the creativity and novelty of an idea, by executing their idea in public.
Along with assignments, each week’s set of lecture videos focused on a particular topic relating to creativity, such as technique, theory or research. Lecture content was supplemented by quizzes and further material. Many students chose to only watch the videos, or watch and discuss lecture topics in the forums, without engaging in the exercises. Students who chose this route did not receive a course certificate, but technically stayed with the class until the end and gave positive feedback. Additionally, as part of a series of creative exercises, we had an online program developed to work in tandem with the MOOC platform. The tool worked to exercise the ability to generate as many ideas as possible within a time limit, to reach more original and inventive answers by coming up with uses for a random object. The tool served as both a weekly exercise portion of the class, as well as a way to longitudinally measure divergent, creative skill improvement over the course of the seven weeks. Anecdotally, we noted significant improvement in the fluency of ideas over time when students used their native language.

Outcomes
The high level of effort and engagement among the active learners in the class resulted in many surprising and inspiring projects. Many students consistently documented their projects in great detail, week after week, and have used both class forums and social media to discuss even further. At least a few ‘different’ projects resulted in ongoing endeavors to initiate real change in the community; several students noted they made unlikely friendships by talking to someone unexpected. One example involved a student engaging in discussion with a homeless man, one who she would frequently pass but indicated talking to him was far out of her comfort zone. His story and her resulting ongoing discussions with him were shared over the run of the class in the forums, which generated an outpouring of comments and support and shared back with him. The important role
of empathy in became a pivotal part early on in developing consistently creative ideas and maintaining learner enthusiasm for creating meaningful, unique projects.

Students also reported a high level of enthusiasm for how they’ve applied techniques and concepts taught into their daily lives; everything from coming up with what to make for dinner to landing a job. Many projects utilized the creative exercises in generating new uses for materials. Some highly creative projects that generated highly inspired feedback were also the most simple and elegant, such as an ice scarf for warm weather, and a skirt constructed from an umbrella.

Forum discussion early on in the course properly emphasized the role of the cultural domain in coming up with creative approaches to the prompts. One student explained that in her country, tarantulas are a snack food and eating one as part of the first project wouldn’t be different for her at all. She instead turned them into a sandwich, making that aspect of her idea completely unique and a novel way of eating. The course allowed us to see specifics of everyday life in almost every country across the globe and gain a stronger perspective of the true subjective nature of creativity. Future iterations of the course would most likely contain a strong emphasis describing the surrounding context of one’s ideas, through both course and material design.

We were intrigued to see the number of students accessing the course weeks after it ended, to watch lecture videos and engage in forum discussion. Students have shared lecture videos with friends and co-workers, cultivating extended engagement in the projects while the class was running as well as future interest in upcoming versions of the class. Much of the success of the course came when students recognized that the level of engagement in the ‘different’ assignments was dependent on their contribution. Students who came in to the class expecting a static learning experience tended
to encounter difficulty at first in generating meaningful ideas to implement in their own habitat and realizing opportunity to affect change within their own domain. Students who engaged in the course as a holistic entity, applying techniques discussed in lectures to generate ideas for projects that were relevant to them, remained the most motivated and energetic throughout the course.

**Future Developments**

Presently, plans are for the MOOC to run again in the fall of 2014 in conjunction with the semester-long, for-credit version, which will be fully online. Many of the MOOC students expressed a high level of enthusiasm for the peer critique process, and found the opportunity to give helpful feedback on a diverse set of projects greatly rewarding. We view this as a remarkable opportunity to bring a new perspective to the internal student group. Many of the projects shared reveal intimate details of daily life from all different corners of the globe. We hope that seeing and discussing ideas to implement change in a foreign environment through the lens of ‘eating’ or ‘wearing’ something different will expand the network of possible ideas for each student.

**References**