Rules of Engagement: Strategies to Increase Online Engagement at Scale

Anne Trumbore[a]

[a] NovoEd
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Rules of Engagement

STRATEGIES TO INCREASE ONLINE ENGAGEMENT AT SCALE

By Anne Trumbore

ONLINE EDUCATION

anyone, anywhere, anytime

In Short

- MOOCs hosted on the NovoEd social learning site produce sustained student engagement, leading to increased persistence and completion rates

- Completion rates for MOOCs should be calculated, as these are, using as the denominator the number of students who are interested and capable enough to submit the initial assignment and as the numerator the students who satisfy rigorous grading criteria.

- Three critical conditions for engagement are student collaboration; cohesive, open-ended assignments; and learning communities.

- We must expand the potential of both online and offline education by further experimenting with pedagogies that ignite students' intrinsic motivation to complete tasks of higher-order learning.

Anne Trumbore (anne@novoed.com) is the senior course designer at NovoEd. Beginning at Coursera in 2012, she has designed dozens of MOOCs with an emphasis on student-centered online instruction. She began designing, and teaching in, online environments at Stanford in 2004.

Massive open online courses (MOOCs) have been hailed as the answer to educational access and pilloried as failures, yet both claims are overstated and obscure the real value of these courses: the knowledge gained about student behavior, about the possibilities of technology-assisted instruction, and about pedagogical strategies that produce engagement.

If we ignore much of the rhetoric around their promise and their disappointment, we can look at MOOCs with a more critical eye as a powerful series of experiments that have produced masses of yet-to-be analyzed data about student behavior and learning. And when we closely examine their course designs and conditions, we see a clear picture of the elements which produce sustained student engagement. They include student collaboration; cohesive, open-ended assignments; and learning communities.

The Study

I surveyed eight MOOCs hosted in the NovoEd social online learning environment during a nine-month period in 2013. The courses I studied shared the following prerequisites for admission: They were free, open to the public, and required no college-level knowledge. Pedagogically, all utilized key elements of active-learning and project-based-learning design. My aim was to determine students' persistence across course projects, in order to determine what course design elements were successful in increasing their engagement.

The gauge of an online course's success that is mentioned most frequently is a completion rate calculated by placing the number of students who fulfill an instructor's grading criteria over the total number of students who enroll; it usually averages about 5 percent for MOOCs. This abysmally low rate is then cited as a sign of the MOOC's failure.

But this conclusion is based on a mistaken notion: that anyone who enrolls in a MOOC enrolls as a student. When the admissions process for a course consists simply of entering a name and email address, it is unreasonable to infer that these actions signal serious academic interest in course material, prior knowledge, the ability to complete assignments, and the motivation to finish the course. Using this rudimentary completion calculation distracts us from a much more meaningful and useful metric: student persistence in using the course material to create meaningful work or learning experiences.

In developing our own completion metric, we used the number of students who were interested, motivated, and capable of submitting the initial assignment as our definition of an engaged MOOC student and the denominator in the calculation. This gives us a more reasonable cohort against which we can measure the effectiveness of pedagogical strategies that encourage students to persist. Over this denominator, we put as a numerator the students who satisfy reasonably rigorous grading criteria specified by the instructor; this produces completion rates that use complex student work as evidence of engagement.

Stanford University offered five of the courses, and the following institutions offered one apiece: Pontificia Universidad Católica de Chile, The Strategic Decision Group and the Carnegie Foundation for the Advancement of Teaching.

All course assignments in the courses under investigation were designed to require the complex application and synthesis of course content, so that their successful completion would signal significant learning outcomes. They included open-ended projects such as strategic analysis, decision trees, design solutions, detailed business plans, and visual arguments based on quantitative analysis, among others. The coursework culminated in a final project with potential applications outside the classroom; all assignments were clearly related to the final project and the explicit learning objectives of the course.

These courses leveraged social technology to provide meaningful opportunities for students to collaborate, create original work, and communicate within a community of learners. In each course, students were given the opportunity to form their own teams for collaboration, and student work was displayed to the class and made available for open comments.

The NovoEd online learning environment enables collaboration and peer learning through team-based exercises, calibrated peer evaluation and feedback, visible student work, forums for the exchange of ideas, and direct communication between students. Every course home page displays student activity in order to create a dynamic environment that is responsive to students and their work. When students "go to class," they see students and teams that are currently active on the site, student work that other students are looking at or commenting on, and forum threads.

This visible activity shifts the focus from instructor-created to student-created content and presents the course as an ongoing learning event. Almost every student action on the platform is transparent and is reflected on a student's profile page to create accountability and a sense of belonging to the course community.

Profiles include a student's reputation or engagement score, team (if applicable), submissions, forum activity, endorsements, network, courses taken, number of peer reviews, and number of peer reviews that were rated by their recipients as helpful. Teams also have their own profile pages and collaborative workspaces where students can post and comment on assignments.

> " Students were given the opportunity to form their own teams for collaboration.

MOOC - Mobile Health Without Borders

Instructor: Homero Rivas, MD, Eric Leroux, MD
Course: https://novoed.com/mhealth/
Department/School: Stanford School of Medicine
Date first offered: 5/13/13 - 6/24/3
Audience: Anyone with an interest in designing mobile health solutions

Teaching and Learning Approach

Student-centered, project-based course designed to mimic a conference and to encourage active participation and original thinking.

Goals

By the end of the course, students will have identified a local health challenge, seen how experts have addressed a variety of health challenges, learned how to work within a global and multidisciplinary team, and been guided through the design process of a global and health solution. Assignments and peer review are designed to develop active participation and encourage constructive peer-to-peer interactions.

Approach

Created the feel of a conference by using a curated approach to lectures. Leveraged the social components, group formation, and team workspace of the NovoEd online learning environment to teach a process or way of thinking.

Strategies

- Employed a curated approach to content so students saw there is not just one expert. Instructors interviewed or introduced a number of guest lecturers on a wide range of issues.
- Used organic (self-formed) teams to create networks of peers interested in similar topics and to develop local communities of practice.
- Designed introductory assignments to have students identify and reflect upon their relationship to a health challenge and to connect with others who have congruent interests.
- Created ongoing membership in the global health community through:
  - Communication from the instructor and teaching team,
  - Mentors who advised on final projects and hand-graded them all (!),
  - Visible presence of instructors, with lectures in videos.

Lessons Learned

- Assignment participation was highest when students described something that interested them and lowest when they were asked to work on a team to create a complex group project.
- Instructions on the final project seemed to be too complex and led to confusion. We broke the final assignment into two parts for those who had trouble.
- The final assignments submitted were of very high quality, as judged by a mobile health expert, Kataryzna Wacs.

In Conclusion

Mobile Health Without Borders successfully recreated the feel of a mobile health conference, which gave students access to the content, experts, mentors, and peers they needed to create a mobile health solution for those who actively participated in the class. The instructors were impressed with the quality and thoughtfulness of the complex final project, which required several weeks of work and a few significant components. It might be useful to break this assignment down into a series of smaller weekly assignments to make the necessary components more explicit and to give more students a greater opportunity to succeed. We know at least one professor, at the International Technological University in San Jose, CA, who signed up (and saw to completion) over 30 of her students, which points to the value of both the content and the assignment design as valuable assets for entrepreneurship, medical, and medical entrepreneurship curricula. This course demonstrated the power of providing opportunities for interested individuals to connect across geographical boundaries to create useful and innovative solutions. One hypothesis is that the networks of peers created in this course may outlast the projects created. A follow-up survey has been designed to see if students are still in touch.

MOOC – Design Thinking Action Lab

Instructor: Leticia Britos-Cavagnaro
Course: https://novoed.com/designthinking
Department/School: d.school, STVP, Epicenter
Date first offered: 7/22/13 - 8/26/13
Audience: Anyone with an interest in design thinking

Teaching and Learning Approach
Student-centered, project-based, semi-synchronous workshop where the class text was student-generated and students learned by doing instead of watching lectures.

Goals
By the end of the course, students will have learned through experience the mindsets and basic tools for each stage of the design-thinking process.

Approach
Leveraged the social components, group formation, and team workspace of the NovoEd online learning environment to teach a process or way of thinking. Students interacted with like-minded participants from around the world to share their experiences and exchange feedback. Assignments and peer review were designed to develop self-reflection and to support and encourage effective peer-to-peer interactions.

Strategies
- Broke down each step of the design-thinking process into micro-lectures (1-8 minutes) to make the implicit components of a way of thinking explicit.
- Used teams and team workspaces where students could develop and explore their identities as design-thinking learners.
- Utilized elements of gamification to encourage and reward interaction with content and peers.
- Created cohesive community through:
  - Frequent and clear communication from the instructor and teaching team,
  - Expert design thinkers who were available to answer student questions,
  - Google Hangouts, and
  - Introductions of instructor and teaching team as facilitators of the learning experience.

Lessons Learned
- High engagement of instructor and teaching team was matched by high engagement of students.
- Approximately ¼ of all enrolled students formed learning squads.
- Not everyone who submitted an assignment joined a learning squad.
- Activity level of learning squads within the platform varied dramatically.
- Assignment participation dropped by approximately half once the assignments became more complex.

In Conclusion
Design Thinking Action Lab was a pedagogically ambitious experiment that succeeded in having a high percentage of students complete six of eight open-ended assignments that included creating and testing a prototype solution to a design challenge. The course featured pathways for students to interact with content and each other, and the specifics of these interactions, as well as their effect on engagement, bear further inquiry. Students who completed the fairly rigorous requirements for the statement achieved the learning goals of the course because the process of completing (and in some instances, peer reviewing) the assignments required the application of design-thinking principles. These principles were introduced with minimal recorded video; students acquired knowledge from each other in the forums, in their learning squads, and through the projects themselves. This course demonstrated the power of instructor and teaching-team presence in motivating students and also illuminated the pedagogical possibilities of project-based learning at scale.

MEANINGFUL METRICS

Using more nuanced metrics for measuring completion allows us to see what pedagogical strategies are effective for creating and maintaining student engagement when the traditional incentives of grades, degrees, and instructor approval are stripped away. (Non-traditional incentives, such as online learning certificates, were not available in these courses.)

In MOOCs that used collaboration, peer review, and a final project with applications both inside and outside the classroom, 33 to 63 percent of students who completed the first assignment persisted through subsequent ones to complete the course.

EFFECTIVE COURSES

Looking closely at the commonalities among these courses, three elements emerged as critical components of design and instantiation that keep students engaged: frequent formalized opportunities for collaboration among students for peer learning, the cohesion of assignments that connect to an open-ended final project with meaningful applications inside and outside the course, and the creation of a learning community. These elements provide numerous opportunities for students to engage deeply with course material, their own work, and each other, as well as to take ownership of their learning.

What follows is an examination of each of these elements, as well as specific details about how two MOOCs, Design Thinking Action Lab and Mobile Health Without Borders, implemented them to serve students.

Collaboration and Peer Learning

Based on the extensive research that shows students learn more when they work together, each course was designed to provide opportunities for students to collaborate and provide each other with formal and informal feedback. Each course offered students the chance to form groups or teams. Peer review was required on one or more assignments. Some courses included assignments that asked students to analyze work generated by their peers in the previous assignment in order to make student work one of the primary texts of the class.

Combined with other informal opportunities for collaboration—such as private conversations between individual students, forum posts, and public comments on assignments and in team workspaces—these practices created a rich web of social connections that supported collaborative learning and promoted engagement and persistence.

The formation of teams also had a clear and positive effect on both engagement and completion. Ninety-two percent of students who completed the Design Thinking Action Lab, which used groups for feedback, belonged to one of those "learning squads." When surveyed, 68 percent of all the course's students rated their learning squads in the range of "somewhat valuable" to "very valuable." Among the other courses surveyed, students ranked the ability of being to work in teams and form networks with other students as one of the most valuable aspects of the course.

Instructors used online teams either as small workshop groups in which students submitted their assignments individually or as working groups in which one project was created and submitted collectively. Both approaches enabled students to form a personalized network of fellow learners within the larger class cohort. This permitted the advantages of small-group learning to be coupled with the activity and diversity of a class of thousands, which has exciting implications for learning at scale.

The most formalized opportunity for peer learning in these courses was peer grading. By adding it to project-based assignments, along with a rubric that helped students learn critical evaluation, instructors not only created a connection between students and the work of their peers but also expanded students' identities as learners to include evaluation.

Students who are given the chance to evaluate each other's work learn to think like experts about a topic. This not only enables deeper understanding of the material but also promotes the development of critical-thinking skills. In addition, peer grading facilitates interaction and engagement by requiring students to look closely at each other's work.

While studies are being conducted on the accuracy of peer grading in MOOCs, what may be more critical to

COURSE	TOTAL ENROLLMENTS	COMPLETED 1ST ASSIGNMENT	COMPLETED COURSE
A Crash Course on Creativity	28005	6459	45.56%
Design Thinking Action Lab	48443	12073	35.14%
Mobile Health Without Borders	8416	1478	33.36%
Numbers for Life	2844	203	42.36%
DQ101:Introduction to Decision Quality	9045	1217	61.95%
Evaluación de Decisiones Estratégicas	120784	43130	63.00%
Technology Entrepreneurship 1	23683	1728	50.81%
Technology Entrepreneurship 2	5950	923	62.41%

student engagement is the act of doing the peer grading itself rather than the grade. In fact, students surveyed in both *Evaluación de Decisiones Estratégicas* and Design Thinking Action Lab rated giving feedback as more valuable than receiving feedback.

The Cohesion of Project-Based Assignments

The benefits of project-based learning in the brick-and-mortar classroom are well documented. Students learn course content more deeply and coherently when they apply it to the creation of a project that has meaning outside the classroom.

But most learning technologies have been unable to facilitate the creation, submission, and evaluation of collaborative open-ended projects, so students in online courses have generally been relegated to working in isolation. Now that technology can easily facilitate communication, collaboration, content creation, and peer grading, project-based learning can be used across disciplines, online and at scale, with promising results.

The eight MOOCs surveyed adhered to the key components of project-based learning. Assignments were authentic, with real-world applications; connected, in that each built knowledge that could be used in future assignments; student-driven, as students had the latitude to choose how, when, and whether to participate in the assignment; and organized around central concepts of the curriculum.

The cohesion of these elements created numerous opportunities for students to engage broadly and deeply with course content and each other to synthesize their knowledge and develop both personal and shared understanding of the content and its applications in a variety of contexts. Through this cohesion and the production of complex, meaningful, and authentic projects such as videos, presentations, flyers, multi-media analyses, and more, students moved beyond the mastery of content to develop higher-order skills.

And they produced a massive number of projects. Across the eight courses, students created 173, 031 projects of varying quality. While some submissions were described by the instructors as being as good as those they see in in-person classrooms, completion of the projects was not sufficient evidence of something having been learned well.

However, mindful of students' differing skills, the instructors designed the assignments so that the act of producing them served as an assessment: The assignments and the final project required students to synthesize enough content knowledge that their completion signaled that the students had mastered at least the courses' basic learning outcomes.

In open courses, designing assignments that encourage students at multiple skill levels to recognize, demonstrate, and expand their knowledge is the central challenge. Simply, instructors have to meet students where they are without actually knowing where they are.

But since the technology in the courses studied allowed students' work to be displayed to and available for feedback from the class, the first assignment in each course was designed to give them the chance to show their relationship

> **"Instructors have to meet students where they are without actually knowing where they are.**

to the course material. This completed assignment became a statement of learner identity, and it created a significant sense of classroom community as the students in the class became visible to one another. Students used this first assignment to help form collaborative-work or workshop groups, and in some courses, they regarded others' submissions as course content.

Subsequent assignments built upon the first and were linked to the final culminating project to provide not only a reason for each assignment but also a map of the larger course terrain. That map made explicit how the instructors thought about their subjects and gave students a way to locate their own emerging understanding of course content.

Surveyed students in A Crash Course on Creativity ranked working on open-ended experiential projects as what they liked best about the course, followed by seeing other students' submissions, working on a team, and watching the lecture videos. In DQ101: Introduction to Decision Quality, 83 percent of students agreed or strongly agreed that the assignments helped solidify their learning, and 93 percent of students in *Evaluación de Decisiones Estratégicas* found the group project useful, to varying degrees. Now that technology can facilitate active-learning practices, students are choosing to use them even when no traditional incentives (i.e., course credit) exist.

Communication and the Creation of Community

Multiple opportunities for collaboration and peer learning through design of project-based courses online can foster a sense of a learning community for many students. At the same time, the instructor presence in these massive online courses is important for helping students maintain their engagement. Clear and consistent communication from the instructor and teaching team throughout the course assists in defining the learning experience for students.

Weekly emails with encouragement about and instructions for working with course content correlate with more student engagement, even though those emails may be composed well in advance. In a MOOC, emails and announcements from the instructor are the on-campus equivalent of the instructor's or TA's showing up for class.

Instructor identity in MOOCs with a project-based component may expand from that of content expert to include

those of coach, facilitator, content curator, and fellow learner. Different courses use different approaches to this instructor's role.

In the MOOCs Numbers for Life, Mobile Health Without Borders, Design Thinking Action Lab, and Technology Entrepreneurship Parts 1 and 2, the instructors did not deliver most of the lectures. Instead, they introduced the course and/or other expert speakers as a way to move away from the "sage-on-a-stage" model and to demonstrate to students that there are many sources of knowledge to make use of in learning about a topic. Even when the instructors did deliver the bulk of the lectures, they did so in very short (1–8 minute) videos that helped students in the creation of their projects. In each approach, it is clear that what the students themselves did, not what they watched, was the central content of the course.

When an instructor creates an identity as a guide or facilitator, the learning community is defined by student work and engagement, which transfers course ownership from instructor to student. This shift is accelerated in the MOOC environment, where students don't expect the instructor to know students individually or evaluate student work. Course design can harness this expectation to amplify student autonomy and to promote students' taking ownership of their own learning.

In the on-campus classroom, part of an instructor's role can be to make thinking visible. In the project-based MOOCs in the NovoEd online learning environment, the technology and design assumed this role, leaving the instructor more latitude to facilitate thinking and to participate in the learning community as both guide and fellow learner. This shift helped define the community and empowered students to take risks in their work that are critical to furthering deeper understanding.

For instance, the last assignment for the lecture "Mindset of the Innovator" in Tina Seelig's Crash Course on Creativity was for students to create a failure resume. Given the highly personal nature of the assignment, and sensitive to the fact that this might be high stakes for many students, Seelig made this assignment optional, and it did not count towards the statement of accomplishment.

Seelig introduced the assignment by sharing her own failure resume. Then, over 2300 students submitted the assignment, knowing that their list of what they considered to be

> **" What the students themselves did, not what they watched, was the central content of the course.**

their greatest failures would be visible to and available for comments by all students enrolled in the course. Happily, no reports of disrespectful or harmful comments were received. Clearly, this learning community had developed an identity as one where academic risk-taking was both safe and desirable.

Instructors also encouraged communication among students through peer grading, assignments that required them to read and comment on student work, and forum postings. Each of these actions was recorded on a student's profile page, making these actions visible so that they became part of the grading criteria.

Because so many other rich opportunities for communication and collaboration among students existed, forum posts were neither the locus of all student conversation nor the sole measurement of student engagement as they are elsewhere. In each of these courses, the instructor guided and encouraged students to use different channels of communication, both through explicit direction and by modeling the behavior that characterizes a connected and open learning community.

Measuring Success

In order to measure completion in a MOOC and to determine what engagement strategies promote it, we must define participation in a way that will help us begin a conversation and not end it. By drawing the distinction between signing up for a MOOC and engaging in one, we shift the focus to student behavior inside the course and see the impact of technology that both enables and amplifies student collaboration, as well as the effects of community and creative work in combination with student-centered, project-based learning.

It is perhaps not remarkable that these strategies engage students in brick-and-mortar classroom, but it *is* remarkable that they can be effective online and at scale, in learning environments that are primarily created and supported by peers.

When students are empowered by technology and design to create work that requires them to synthesize and use course material, they persist in courses even in the absence of traditional modes of certification and motivation. We have seen an incredible investment of time and intellectual and creativity energy from students who have produced a tremendous volume of substantive and meaningful work. Within twelve months, the students in the free and open courses hosted on NovoEd produced over 200,000 presentations, videos, projects, business models and essays, as well as half a million instances of peer grading. What will be possible when we combine widespread access to education with proven pedagogies of online engagement that ignite students' intrinsic motivation to complete tasks of higher-order learning?

MOOCs have yet to define their full value to education, but they have so far proven to be a good laboratory in which to test engagement strategies for both online and offline learning. Blended learning environments that use social and collaborative technologies can also expand the walls of the physical classroom by blurring the boundaries between the classroom, the online learning environment, and the students' social lives, which are themselves already blended with social and collaborative technologies.

We have just begun to explore the possibilities of engagement mediated by technology, and we must continue to expand the potential of both online and offline pedagogical practices with further experiments in course design, content delivery, assessment, interventions, incentive structures, and the measurement of learning outcomes.

While engagement alone is not sufficient to ensure learning, it is necessary in creating optimal conditions for learning, on-campus, online, and/or at scale. Here are some of the questions we need to ask and answer in order to address the learning question:

- How can we better define learning outcomes for complex open-ended assignments?
- How can we measure learning outcomes so that we can improve students' learning while they are in the course?
- Can a learner's online identity evolve throughout a course, given certain interventions from the instructor and other students?

- What are the soft skills students acquire when they collaborate around academic content in an online learning environment? How persistent are those skills outside the online learning space?

We are on the cusp of being able not just to provide access to education but to create environments in which students may realize their potential for success through their own work. [C]
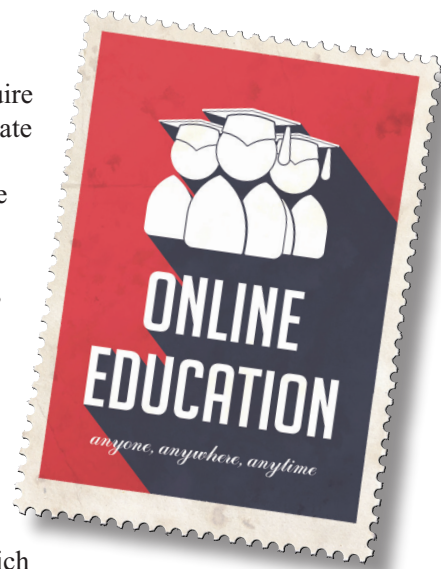
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