DESIGNING MOOCs

A White Paper on Instructional Design for MOOCs

By
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Abstract:

The year 2012 saw a “massive” boom in the higher education world, making MOOCs—Massive Open Online Courses—the new buzzword. From talks by educators in ed-tech conferences and forums to media reporting and micro blogging by thought leaders, just about everyone connected to the world of higher education has been talking about MOOCs since then.

And rightly so. Hyped or not, MOOCs are bringing about a revolution in education, a thought affirmed by forerunners like Andrew Ng, Director, Stanford Artificial Intelligence Lab and Co-Founder of Coursera, who says …

“When one professor can teach 50,000 people, it alters the economics of education.”

- Andrew Ng, Director, Stanford Artificial Intelligence Lab and Co-Founder of Coursera

Indeed. So, if MOOCs are going to disrupt traditional education, then shouldn’t there be some deeper thinking around their design and development? Although the content is drawn up by subject matter experts (faculty), just how much thought is given to pedagogical and instructional design issues? Are MOOCs even reviewed for quality before they go public?

Not all MOOCs—especially the ones that are informal—probably need to go through a thorough and formal cycle of review for conformance to quality. However, if a university is considering offering MOOCs as part of their formal curriculum, would it then not be worthwhile to develop a pedagogy that is unique to the institute and that delivers a quality product to their learners, even if it does so free of cost?

This white paper draws attention to some of the design and quality aspects of MOOCs and goes on to propose an instructional design philosophy that integrates sophisticated e-learning technologies (interactive content, games, simulations, story-based approach et al) to enhance the design of MOOCs and take them a notch higher in terms of learner engagement.
Given the buzz around them, this white paper assumes that the readers from higher education are familiar with the basic definition of a MOOC. The white paper, therefore, starts off with only a brief introduction to the different types of MOOCs, more so to differentiate the more popular xMOOCs from the original cMOOCs. Thereafter, the paper remains focused on design and quality aspects of MOOCs.

In the end, a critical question—whether every university should offer its own MOOC—is raised. A question that can be answered best by the specific institute; the paper, however, presents some thoughts from articles and posts on this specific question, and then goes on to explore possible business models and partnerships a university can get into for developing a unique MOOC that could, in fact, become a signature course for the university.

**About Preeti Jasnani:**
With 18+ years of experience across design, academia, training, and technology, Preeti brings in instructional design expertise to higher-ed learning solutions engagements. In her role as a Learning Designer and Consultant at Tata Interactive Systems, she works with universities to understand their unique education process and maps the university-specific business and technology requirements to relevant instructional strategies and latest technologies with a focus on student success and feasibility. For more than a decade now, she’s been designing and delivering pedagogically robust solutions with a blend of instructional components well suited to meet learner preferences in an online environment.

**About Tata Interactive Systems:**
Tata Interactive Systems (TIS), a division of TATA Industries Limited, is an acknowledged global leader in the e-learning industry. As part of the Tata group, TIS has an international presence and offers diversified and innovative bouquets of learning and training solutions to corporations, universities, schools, publishers, and government institutions across the US, Canada, the UK, Australia, New Zealand, the Middle East, India, and mainland Europe. Our offerings range from Web-based Training, Instructor-led Training to Simulation-based Learning Objects (SimBLs®), Story-based Learning Objects (StoBLs), Courseware and Curriculum Design, Special-needs Education, Assessments, Electronic Performance Support Systems (EPSS), Mobile Learning, and Game-based Learning along with other Corporate Training and Consultancy Services.
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Introduction

The summer of 2011 saw a free artificial intelligence course being offered by Stanford University and the academic world woke up to a phenomenon that is since then moving at breakneck speed. In a decade when the need of the hour for academic institutions is to expand their reach, MOOCs have managed to get their timing right.

MOOCs are impacting higher education, and the “MOOCs rising” infographic from an article by Nature News emphasizes this well. The stats that read: 328 different courses, 62 universities, 220 countries, 2.9 million registered users, speak volumes of the impact MOOCs are having on higher education.

In less than 2 years, MOOCs have already had a journey—from free online video lectures to integrating multiple-choice questions and online discussion forums to hosting these courses on a platform that allows students to review and grade each other.

However, in spite of their impressive enrollment figures, MOOCs have yet to produce equally impressive completion rates. An excerpt from a recent article, titled “Coursera Takes a Nuanced View of MOOC Dropout Rates” from The Chronicle reads …

“Although millions of students have registered for courses through Coursera, the company and its university partners have awarded only 280,000 certificates of completion. In general, the rate of completion in MOOCs is believed to be around 10 percent.”

- Coursera Takes a Nuanced View of MOOC Dropout Rates
  The Chronicle

Educational researcher Katy Jordan also compiled a Visualization of MOOC Completion Rates using publicly available data. Her research indicates an average 50,000 enrollments in MOOCs, with the typical completion rate of below 10%, approximately 7.5%, that amounts to 3,700 completions per 50,000 enrollments.

What are the reasons for the low completion rates? Is the MOOC format (i.e. design) the major contributor to the low rates? One online survey lists down the top 10 reasons for the low completion rates, and lecture fatigue and poor course design figure at numbers 4 and 5 respectively in this list. Interestingly, the article from The Chronicle goes on to state that Coursera does not attribute the low completion rates to the MOOC format.

In response to this burning question about low completion rates, John Ebersole, President of Excelsior College, states the following reasons …
“In my opinion there are multiple reasons for the low completion rates (under 10%) of MOOCs.

a. The participant is not truly interested in the topic but wants to see what all the hoopla is about.

b. With no psychological or financial investment, it is easy for the participant to become engaged in other activities/interests.

c. Work is too hard for the participant’s level of preparation.

d. Participant is fatigued by the lack of instructional diversity and the absence of any meaningful engagement with either the instructor or the material. Methodology feels more like a classroom lecture on steroids with all interaction taking place, or not, with peers.

Instructional design that provides for opportunity to engage with materials (not just the other learners) would allow for both deeper understanding and self-assessment of progress. Experience has shown that early student ‘wins’ are important to persistence. Difficulty at the start creates frustration and self doubt. There needs to be feedback from the ‘course,’ if not the instructor.”

- John Ebersole
President, Excelsior College, Albany, New York

Likewise, in his post What’s the “problem” with MOOCs, Doug Holton from the Center for Teaching and Learning Excellence of the Embry-Riddle Aeronautical University also emphasizes on the lack of professional instructional design for MOOCs. He says …

“Especially disturbing is that none of the major MOOC providers have hired anyone trained in instructional design, the learning sciences, educational technology, course design, or other educational specialties to help with the design of their courses.”

- Doug Holton
Center for Teaching and Learning Excellence, Embry-Riddle Aeronautical University

Surely some more data is required but that instructional design and, therefore, quality of MOOCs are concerns and may be significant contributors to the worrisome low completion rates cannot be denied.
So, now the question is—if a university decides to offer MOOCs, should they not be concerned about having a robust framework that will help them build an instructionally sound solution and provide an implementation strategy that best suits the requirements of the university and their students?

Given that MOOCs are literally mushrooming these days, it is highly likely that soon students will have multitude options to choose from. Learner engagement, robust pedagogy, and efficient implementation would then become important criteria for a MOOC to stand the test of time.

However, the more important question is—should every university offer a MOOC?
What’s With This xMOOC-cMOOC Jargon?

The author of this paper first participated in a MOOC sometime in mid-2011, in a course called Change 11, facilitated by Dave Cormier (of the University of Prince Edward Island), George Siemens (of Athabasca University), and Stephen Downes (of the National Research Council, Canada), who are believed to be pioneers of MOOCs in the true sense of the term. At the time of writing this paper, the Change 11 course is still active. However, the author considers herself nearly but not really a dropout more so because of the design of the original MOOCs that are based on the connectivist theory and have, after the 2012 boom, eventually got categorized as cMOOCs—the “c” referring to connectivism.

The more popular MOOCs, now called xMOOCs, are the ones offered by companies like Coursera, Udacity, and edX and are based on behavioral/cognitivist learning (Mak 2012). At the time of writing, the author is enrolled in the Model Thinking course by Scott E. Page (University of Michigan) offered on Coursera.

So, what’s with this xMOOC-cMOOC jargon?

<table>
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<th>cMOOC</th>
<th>xMOOC</th>
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<td>Social networked learning</td>
<td>Traditional approach</td>
</tr>
<tr>
<td>Non-linear, chaotic</td>
<td>Linear, straightforward</td>
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<tr>
<td>Individualized learning</td>
<td>Mastery of concepts</td>
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<tr>
<td>Distributed knowledge</td>
<td>Centralized repository</td>
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<tr>
<td>Scalable network</td>
<td>May not be scalable</td>
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<td>Comparatively more learner action</td>
<td>Comparatively less learner action</td>
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cMOOCs vs. xMOOCs

cMOOCs, as explained by George Siemens (MOOCs are really a platform, July 25, 2012) emphasize social networked learning. The learning experience (and the author can confirm this by way of participating in the Change 11 course) is chaotic. This very nature of a cMOOC distinguishes it from an xMOOC, which uses the more traditional approach of learning via video lectures followed by short quizzes, assignments, and tests.

In a cMOOC, knowledge is open and is generated as participants progress through the course. Learners contribute to the generation of this knowledge via blogs, articles, images, videos et al. Although, cMOOCs have defined
learning outcomes, course readings, and a weekly schedule to follow, the learning experience, as mentioned earlier, can get chaotic and messy. Learners are free to explore and go beyond the scope. Consequently, learners end up treading on their individual paths, making their own sense of the distributed knowledge, and may even end up with unique takeaways.

xMOOCs, on the other hand, are more formal and quite straightforward in their approach. They are, for most part, linear; although in some courses, the content maybe organized such that learners don’t necessarily have to go through the previous weeks’ material in order to follow the current week. For instance, in the Model Thinking course, the professor clarifies in his introductory video that this course is like “a trip to the zoo,” and so if you miss going through a specific topic, you’d still follow the others.

Students in xMOOCs are expected to go through the assigned readings and video lectures for each unit (or section) and then attempt quizzes and/or assignments. Although, some real-time content and knowledge generation happens in the discussion forums and via assignments and peer feedback, the xMOOCs are not driven by learner-generated content. The xMOOCs, by no means, are totally passive, but there is clearly more learner action in cMOOCs.

Teacher-learner relationship in an xMOOC is mostly traditional and the priority of the learner is to master concepts taught to them, although nothing stops them from going beyond and sharing experiences. On the other hand, learners in cMOOCs are expected to generate their own content, expand the scope, and collaborate and share experiences within and outside of the course arena.

xMOOCs have a centralized discussion forum support, whereas cMOOCs use distributed blogs and learner-created spaces on the internet.
Components of a MOOC

To summarize, MOOCs typically comprise the following:

A **syllabus** that lists the learning objectives and defines the scope of the topics and accompanied readings, discussions, assignments, and quizzes or tests. The syllabus may also include a weekly schedule especially for discussions and assignment submissions.

Then, there are **readings** and **video lectures**. In an xMOOC, these are mostly archived; in a cMOOC, the facilitators either give a presentation each week or invite a guest lecturer. While some of these presentations may be recorded and made available to the students, there are quite a few that are delivered in real time.

**Centralized discussions forums** (in xMOOCs) or **distributed open spaces** (mostly blogs, wikis, Facebook pages, and Twitter in the case of cMOOCs) is where most of the learner interaction happens.

**Quizzes, assignments, and projects** allow for self-evaluation and may, in some cases, lead to **certification**.
Designing MOOCs: Some Considerations

In the month of February 2013, Insider Higher Ed published an article titled “MOOC Mess” reporting the crash of Coursera’s “Fundamentals of Online Education: Planning and Application.”

Although technical glitches were reported to be behind the crash (mostly the inability of the Google Docs server to handle the traffic), design-related flaws were also pointed out in some blog posts (such as no clear instructions for assignments, especially for the group activity that was responsible for the crash).

Here’s an excerpt from a post about the course’s disastrous fall that featured on the Online Learning Insights blog.

“The example here from the class, Fundamentals of Online Education: Planning and Application demonstrates why a sound strategy is needed, and what happens when one is lacking. MOOCs require a unique instructional strategy, one that is different from small online courses.”

- How NOT to Design a MOOC: The Disaster at Coursera and How to Fix it Online Learning Insights

Precisely! Designing a MOOC is definitely different from designing an online course that sits on an LMS and is accessed by not more than 20 students, on an average. In a course that is “massive,” “open,” and “online,” due consideration needs to be given to the technological platforms (and/or tools) students will be using. One cannot, however, be sure if faculty—who are most likely working on their own to put up this massively open and online course and who may or may not have the requisite technical know-how or enough experience teaching online—would be able to predict the technical glitches that could hamper delivery of such a course. Even experienced instructional designers are often not able to predict all technological anomalies and may end up having high expectations in terms of technical feasibility from some of their design recommendations. Technology is, by no means, limiting but requires savoir-faire.

At most, the faculty would have been able to come up with a strategy that may have helped them better manage such large groups in an online environment. Furthermore, the need for clear instructions is an essential instructional design requirement for all online courses, not just MOOCs.
A review of discussions, blogs, and comments in different forums brings up quite a few relevant questions related to the design of MOOCs. For instance, Doug Holton, in his blogpost, asks …

“The question is, are MOOCs an example of imposing an existing world-view (traditional instruction, courses, and instructors) on a new medium for learning? Is it necessary for all the ‘students’ in a MOOC to be learning the same topic at the same time (synchronous learning)? That appears to be a common defining characteristic of all MOOCs. Does there have to be a single, unchanging instructor? Does it have to be a ‘course’ at all, with a finite beginning and end?”

- Doug Holton
Center for Teaching and Learning Excellence, Embry-Riddle Aeronautical University

Interesting! A few of the questions raised by Doug could possibly draw up design considerations for instructional designers to keep in mind when designing a MOOC. The author of this paper collated similar design-specific questions from the internet and then tried to answer them as follows:

Relevant Questions Related to Design of MOOCs

- What would be an ideal course structure for a MOOC?
- Would a competency-based curriculum work better?
- Should a MOOC end with the course?
- Can a MOOC run without a facilitator? If not, then should multiple facilitators be assigned to a MOOC?
- How much didactic instruction should be included?
- Should MOOCs include a pre-assessment?
- Is a chaotic learning experience good?
- Should the instructional flow always be linear?
What would be an ideal course structure for a MOOC?
The overall structure and organization of content in a MOOC depends substantially on the subject matter and how easy it is to chunk content into smaller, modular units of learning (See Appendix: About Learning Nuggets). Overall, granular courses are more digestible. Long pieces of lecture content (in text or video format) may not sustain the learner’s interest. However, granularity may not always guarantee effectiveness, which is an important criterion for delivery of instruction. Granularity may also lead to overloading, with having to manage numerous learning units. Therefore, from a usability design perspective, due consideration should be given to how learners can access these bite-sized learning units from a user-friendly menu. A simple table of contents navigation format that runs into a long scrollable page may not work.

Would a competency-based curriculum work better?
Current xMOOCs are mostly offered as individual courses and are based on the Carnegie unit credit hour system, even though most don’t award certification. The higher education world, however, is already buzzing about transitioning to the competency-based education (CBE) system. Therefore, it is worth considering designing future MOOCs around competencies, especially so if the individual MOOCs are part of a curriculum that leads to a degree. Thus, each competency (or a set of related competencies) will be like a mini course, and there will not be an overarching course at all. A series of “can do” statements will instead constitute the curriculum. The relevant instruction will be built around each “can do” statement.

John Ebersole, however, has a different but very sound viewpoint. He says …

“While the spotlight is on all things competency related these days, I wouldn’t feel compelled to use them in MOOCs. Instruction is not usually a part of the competency determination process. Most often, it involves the assessment of knowledge and skill gained through other means. I DO think that focusing the MOOC’s design on achieving desired outcomes is appropriate. Toward this end, it should provide for self assessments along the way. The lack of valid forms of learning outcome assessment is a major weakness of those MOOCs evaluated to date.”

- John Ebersole
President, Excelsior College, Albany, New York
Should the instructional flow always be linear?
Academic courses are mostly linear with the learning outcomes and content spread across 8-12 weeks. A linear flow provides a standardized approach to learning and aligns well with the credit hour system. If, on the other hand, you want the journey of the learner to be personalized, then an amorphous course structure with a nonlinear flow will allow them to make the best of the learning and their experience.

Another benefit that nonlinearity in flow and organization of content brings is that it allows learners who may have joined the course late, or are lagging behind, to progress through the course at their own pace and yet catch up with their peers and faculty. So, if a faculty is currently discussing a topic in the 5th week, for instance, and some students have not had the chance to complete all portions of weeks 1 to 4, they can still participate in week 5 along with the faculty and their peers while trying to complete the previous weeks (akin to how the Model Thinking course on Coursera was designed).

Is a chaotic learning experience good?
An amorphous and nonlinear structure inevitably leads to a chaotic learning experience, which in fact is advocated by the pioneers of cMOOCs. Some amount of fluidity in structure and chaos, in fact, is good, as it helps learners become active participants as they try to bring order into the chaos and thereby make sense of their learning. In the process, they elaborate and extend their learning by generating newer ideas.

Should MOOCs include a pre-assessment?
Most MOOCs recommend prerequisite knowledge, but because of their open nature, do not restrict learners from taking the course even if the necessary prerequisites are not met. (Note that one of the top 10 reasons for not completing a MOOC in the online survey is “Assumes Too Much Knowledge.”) Including a pre-assessment that gives the prospective learner an idea about all that they need to be familiar with before they sign up for the course is a good instructional strategy. The pre-assessment evaluation may also recommend some primer modules or, alternatively, prerequisite courses that may make the learner’s journey through the currently desired course more meaningful.

How much didactic instruction should be included?
In a course that is facilitated, the less the didactic instruction (i.e. lecture content) and more the application and discussions and interactions with faculty and peers, the better. A MOOC, by its very nature, should allow learning to happen incidentally, with all the new knowledge that gets generated as learners connect, collaborate, and exchange notes.
This, however, may not be true in the case of complex content like “Machine Learning,” where a significant amount of research has already been done. In such a case, adequate didactic instruction will play an important role in facilitating learners to generate their own “open-to-interpretation” content.

**Can a MOOC run without a facilitator? If not, then should multiple facilitators be assigned to a MOOC?**

This is an interesting question because so far all MOOCs are facilitated and follow the “personal lecture” method where you know your faculty and their credentials. The faculty teaching MOOCs, in fact, are the star attraction to the learners. Having a face—that too a face with high credibility—has been so far working well in MOOCs.

However, do all MOOCs need facilitators? Depending on the group and the aim of a MOOC, could all MOOC participants be kept on the same role?

A number of self-paced online courses, which do not require facilitators and include assessments that can be graded, have been developed. So, one could definitely try developing a fully self-paced MOOC and run it without a facilitator. The challenge will be to build a highly engaging learning environment that keeps the self-learner motivated through the course to completion (given that the completion rates of the current facilitated courses are quite low).

If MOOCs have to be facilitated, then depending on the scope and duration of the course, multiple facilitators can be designated. For longer duration courses, having more than one facilitator is helpful. Not only does it reduce the workload of a single faculty, but helps bring in varying perspectives, thereby providing more opportunities for constructive discussions and debates. Even with a single facilitator, guest lectures may be organized.

**Should a MOOC end with the course?**

A MOOC need not necessarily end after the course closes. Most participants (especially working professionals) should find it interesting to continue to network and collaborate with their peers. The MOOC may then also provide guidelines for recommended post course assignments that can continue after the course ends officially.
Design Strategy for MOOCs

So what constitutes a good design strategy for MOOCs? The answer is far from obvious or easy, as MOOCs are still evolving and discussions by researchers and educators about the need for an instructional design model are in progress.

However, it is easier to consider the question of whether one unified instructional design theory or model will work for all MOOCs.

Designers at Tata Interactive Systems with their two-decades long experience believe that “one size does not fit all” and that learning designers need a combination of theories and models to address real-life learners and academic or business needs.

Our instructional design philosophy, therefore, combines elements from learning research over the last few decades and delivers custom solutions based on learner centricity. Our focus, when designing learning solutions, is on the learner and their learning experience. Learning is a constructive process where the learner should be actively involved. As research indicates, learner engagement is a key factor in the effective transfer of learning. Simply put, engaged learners learn more.

Hence, the learning experience, which drives engagement, becomes critical to successful transfer and reinforcement of learning. Additionally, the learning needs to be applied and reinforced to ensure retention in spite of the natural process of forgetting over a period of time.

Finally, it is important to evaluate how effective the learning has been, both for the learner to feel a sense of completion and for the mentors to assess the benefits derived from learning.

Instructional Design Philosophy for MOOCs

An attempt to build on TIS’ instructional design philosophy and form one for designing MOOCs starts with the identification of the distinguishing characteristics of a MOOC that would eventually shape up the “Learning Experience,” which is central to our philosophy.
Some of these characteristics are:

» **Integrated and Seamless**
Besides being open (and therefore massive) and online, one of the key distinguishing characteristics of a MOOC is that it provides a networked (or connected) learning environment.

“A network can simply be defined as connections between entities. Computer networks, power grids, and social networks all function on the simple principle that people, groups, systems, nodes, entities can be connected to create an integrated whole. Alterations within the network have ripple effects on the whole.”

- (George Siemens, 2004)

Leveraging the connectedness aspect of a MOOC’s learning environment is critical. Learners and faculty in this networked environment should be allowed to collaborate and connect with each other to exchange ideas, concepts, and thus bring in perspectives from different fields and experiences to make an integrated whole.

Likewise, technology in an online course plays a significant role and due consideration needs to be given to the tools being used in order to make the learning experience seamless. Blending of cross-platform implementation like PC, smartphones, and tablets as well as web-based options should be considered.

» **Individualized and Active**
The learner’s path through such a learning environment needs to be individualized. For this to happen, learners should stop being mere learners. They have to be active participants and take control of their learning. They should be expected to construct knowledge and make sense of their learning as they progress through their individual paths. Finally, they have to choose what they want to learn and from whom or where.

This then brings us to the role of the faculty in such an environment. By no means, their role can be undermined, especially so when at this time, the star attraction to MOOCs is the faculty teaching them. However, the question is—whether the traditional “Sage on the Stage” role still works? In all probability, not. In an environment that is learner-centric, the faculty has to leverage the online medium (and technology) and upgrade their own role to that of an expert rather than a mere lecturer. They need to move from a “Teacher” to a “Mentor” role, and sometimes even switch to being just another peer.
Immersive and Contextual

If the faculty end up playing mentors, the learning solution itself needs to be highly immersive and contextual.

21st century skills, Web 2.0 collaborative, social-networking tools, story-based and engaging graphic novel approaches, videos, avatars, mobile learning, immersive learning (3-D virtual worlds, simulations, gaming) are proving to increase knowledge transfer and learner engagement.

Contextualization of concepts is done through real-world situations or examples. Explanations for facts and ideas are provided in the context of a practical and real framework, which in turn facilitates organization of knowledge for retrieval and application. This approach helps learners apply their knowledge in situations that extend far beyond the borders of the classroom.

As per the experiential theory (proposed by David Kolb), experience is transferred via concrete experience and abstract conceptualization. So, either the learner can have actual hands-on experience (in the real or a simulated world) or may learn via reflection by learning from the experiences of others. In short, a MOOC, like any other university course, should be based on a career-oriented (or knowledge-transferable-to-skill-at-workplace) curriculum.

The diagram below summarizes the characteristics that would form the instructional design philosophy for designing MOOCs.

Instructional Philosophy for MOOCs

Having an optimum mix of the above criteria should ensure a superior learning experience in a MOOC.
Integrating Sophisticated E-Learning Technologies in MOOCs

Today’s xMOOCs typically begin with a video introduction by the professor and the learners are then expected to progress through material in the form of readings, lecture videos, assignments and so on. All of us are familiar with such a course format.

Now picture this …

You’ve enrolled for a Life Sciences course, let’s say Field Ecology. And when you sign into this course, instead of the regular readings and lectures, you are directed to enter a mysterious virtual island with a sunny beach, dense forests, caves, a “hatch” and a “hydra station” – à la LOST, the popular American serial drama television series, first aired in 2004. The island is populated with people from across the globe and you form groups to complete a mission.

Field Ecology on a Virtual Island

Or, consider another example, where you enroll for a course in Criminal Justice. And instead of going through a case study or an example, you are asked to visit a 3D virtual city. It’s 7.30 a.m. on a Wednesday morning, and traffic is at its peak in the downtown area of the city. Amidst the traffic noise, radio jockeys on the FM radio are reporting the kidnapping of a 7-year old from the neighborhood. As the local police get read to investigate the crime, you join them and start to observe, and react, and investigate the case via interactive content, simulations, games et al.
Sophisticated e-learning technologies such as 3D virtual worlds [See Appendix: About 3D Animations and Virtual Worlds], simulations, games, and engaging instructional approaches such as graphic novels, case scenarios, and story-based approaches have been used to create highly interactive online courses. Simulations [See Appendix: About Simulations], for instance, imitate the operation of a real world process or system over time. They are based on the “learn by doing” approach and allow learners to practice in a risk-free environment.

Similarly, games [See Appendix: About Game-Based Learning] have often been used as tools to enhance the learning experience, reinforce concepts that have been taught and even extend learning where appropriate. And, stories [See Appendix: About Story-Based Learning] have been used often as an instructional approach to deliver learning effectively and promote active learning.

With the growing popularity of mobile and hand-held devices, the use of mobile apps for educational purposes is also growing. An example of such an app is Leafsnap—a mobile app that identifies plants by leaf shape and has been launched by The Smithsonian Institute, Columbia University, and University of Maryland.

With over two decades of experience in integrating e-learning technologies in several online higher-ed programs across multiple disciplines, Tata Interactive Systems has a number of case studies and success stories to talk about. John Ebersole, who is a strong promoter of e-learning technologies in online learning, also believes …
“Regardless of subject matter, it is important to offer the learner multiple forms of instructional support. We know from learning theory that we do not all learn best in the same way. While some may get by with lectures alone, others do better with the help of visual stimulation.

Additionally, we know that case studies and stories help create context and guidance as to application of concepts. The HEAR, SEE, DO mantra comes to mind here. By combining what we know from both learning and communications theory, we see a need for the “elearning technologies.”

The result will almost certainly lead to greater student attention and retention.”

- John Ebersole
President, Excelsior College, Albany, New York

If due consideration is given to the technology platform and the key characteristics of a MOOC learning environment, then integrating these technologies will definitely enhance the learner experience and keep them engaged.

The learner experience will be further enhanced when these e-learning technologies all come together in a live session on a collaborative platform.

However, when designing a MOOC, due considerations need to be given to the cost of developing such interactive technologies for the course.
MOOCs: Course Structure and Flow

Keeping cost considerations aside for the time being, one possible structure and flow that integrates e-learning technologies in the design of a MOOC could be represented as below.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Welcome Note/Video</td>
</tr>
<tr>
<td>2</td>
<td>Participants and Mentor Introductions via Discussion Forum</td>
</tr>
<tr>
<td>3</td>
<td>Live Session: Course Overview and Guide</td>
</tr>
<tr>
<td>4</td>
<td>Learning Outcome - 1, Learning Outcome - 2, Learning Outcome - n</td>
</tr>
<tr>
<td>5</td>
<td>Learning Guide</td>
</tr>
<tr>
<td>6</td>
<td>The Course Content can be divided into</td>
</tr>
</tbody>
</table>
Designing MOOCs – An Example

In this section, the author presents an example—a hypothetical case that illustrates the application of the proposed instructional design philosophy and flow for MOOCs.

The Case
Consider a nonprofit mandatory continuing legal education (MCLE) organization with a mission to enhance the professionalism of attorneys and other qualified persons by providing cost-effective, high quality, innovative programs, publications, and other services. The organization now wants to offer a MOOC on a Pro Bono Law topic viz. Advocating for Veterans.

Design-specific requirements from the firm include:
» Modular structure
» Engaging solution
» Demonstration of skill through interactive exercises
» Centered on the expertise of the faculty, but not dependent on it
» Provision to add custom content by faculty

The Proposed Design Approach
Continuing legal education (CLE) is about keeping lawyers current, proficient, and on top of law. Most lawyers will do what it takes to stay current and upgrade their skills without the need of a requirement, and so if the CLE programs do not make good use of their time, the CLE providers will inevitably end up with diminishing interest levels from the participants. TIS' instructional design philosophy for developing MOOCs leverages multiple modalities offered by the online medium (Video, Audio, Animations, Interactions, Visuals, and Text formats) and provides participants with opportunities to interact with the content and peers, thereby making them active learners.

The proposed solution that stems from TIS' instructional design philosophy (Immersive, Contextual, Individualized, Active, Integrated, and Seamless) to deliver effective instruction has the following characteristics:
» An instructional design approach that helps bring in relevance to the learning process (Contextual)
» A highly interactive and engaging learning environment with an optimal mix of modalities such as Video, Audio, Animations, Interactions, Visuals and Text formats (Immersive, Active, Integrated, Seamless)
» Inquiry-based “Interactive Case” at the heart of the pedagogy (Immersive, Contextual, Active)
   • Based on Langdell’s case methodology
   • Providing opportunities to practice critical thinking and apply concepts
» Scaffolding “Primer Modules” providing didactic instruction (Immersive, Contextual)
» Individualized experience in live chats and discussions with instructor and peers (Individualized, Active)
» Modular Structure clearly segregating the static content from the dynamic content, allowing instructors to customize and update the dynamic content (Active, Integrated, Seamless)

The Solution at a Glance

At the core of this approach will be the skill-based “Interactive Case” that finds its roots in Langdell’s case method of instruction. Scaffolding for the Interactive Case will be provided in the form of instructional elements that will:
» Provide didactic and supporting instruction
» Facilitate extensive and in-depth discussions
» Allow for sharing of knowledge and experiences
» And facilitate review of the learning
Course Structure and Flow

The following diagram depicts the structure and flow of the course.

1. **Welcome Note/Video**
   - A welcome note or video of the mentor(s) welcoming the participants to the course

2. **Participants and Mentor Introductions via Discussion Forum**
   - Participants and mentor(s) post their profiles/introductions in a discussion forum

3. **Live Session**
   - **Course Overview & Case Introduction**
     - The course kick starts with a live session with the mentor who presents an overview of the course and briefly speaks about the interactive case

4. **E-Learning Content**
   - The Self-Paced E-Learning component begins with the Interactive Case and then delves into the theory/instructional content, which will be organized into modules
     - **Interactive Case - The Virtual Case File**
       - Each module will comprise instructional screens interspersed with some knowledge checks and the case touch points that will build on the interactive case
       - **Primer Module 1**
       - **Primer Module 2**
       - **Primer Module 6**
       - **Interactive Case - Your Take!**

5. **Collaborative Exercises**
   - Where applicable, the instructional module will include Instructor-Led Collaborative Exercises in the form of Discussions and Further Challenges*
     - **Discussion Forums**
     - **Further Challenges**

6. **Live Session**
   - **Final Review and Feedback**
     - The course will end with a Live Session where the instructor will provide generic feedback to participants

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* Further Challenges will allow instructor to add their own content and engage participants in new assignments/activities that can go beyond the MOOC

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Advocating for Veterans: MOOC Structure and Flow
After faculty and participants introductions in a discussion forum, the course kick starts with a live session by the faculty who presents the course overview and introduces the Interactive Case. Following this, the participants progress through the self-paced e-learning content and also participate in collaborative exercises facilitated by the faculty. The following section provides a brief description of some of the instructional components in the course.

**Self-Paced E-Learning – The Interactive Case**

Learning can be made relevant if it is contextualized and the participants are able to relate concepts to how they will apply in real life. The design goal of the Interactive Case is to present to the participant a relevant real or fictitious case and allow them to review and analyze this case as they progress through the didactic instruction. The Interactive Case will use an inquiry-based approach to stimulate critical thinking skills and allow participants to interact with the content, the subject matter itself, thereby creating an engaging and meaningful learning experience.

The interactive case includes these sections:

» The Case – that introduces the case and provides the relevant background
» Touch Points – that will build on and take the scenario forward
» Activity – that stimulates participant’s thought process and allows for interaction with the content

The case will end with a summative report of participant interactions and provide conclusions and feedback.

**The Primer Modules**

The Primer Modules comprise the instructional segment and present didactic instruction with an aim to providing foundational understanding (and hence the name “primer”) of the core concepts and principles in the given course topic. These concepts will be presented against the backdrop of specific examples and scenarios in a very concrete manner rather than abstractions.

The teaching of the concepts in the primer modules will be centered on the Interactive Case. While the modules will include other relevant examples, where applicable, the instruction in the modules will time and again relate concepts to the main case/scenario and continue building the same via Interactive Case Touch Points.
Collaborative Exercises – Driven by the Instructor

Besides acquiring relevant knowledge and skills, the holistic approach to learning, especially in the context of continuing education, should also involve sharing of knowledge and experiences to increment the participant’s prior experiences. To this effect, the following instructor-led activities are recommended.

» One or more discussion forums – The faculty can post one or more discussion questions after the first 2-3 primer modules and facilitate a constructive discussion around the questions. The forum can also be used to bring in industry practitioners, who can answer queries posted by the participants and thereby clarify doubts.

» Further Challenges – All additional content in the form of videos, examples, etc. that the instructor and participants wish to share with the group can be posted in this section. The instructor can use this opportunity to present “further challenges” to participants (in the form of a collaborative group activity) based on the material posted. The participants (and the faculty) may continue working on these further challenges even after the course is closed.

Should Every University Offer a MOOC?

With a possible instructional design philosophy that integrates e-learning technologies in the design of a MOOC in place, let’s now turn our attention to a critical question—should every university offer a MOOC?

In March 2012, Insider Higher Ed published an article “Why Every University Does Not Need A MOOC.” The author, Joshua Kim, responds to the question as follows:

“Should your university offer its own MOOC? Probably not. Higher ed is a “me too/follow me” business. We are risk adverse because most of us have lots to lose. So when an MIT does an OpenCourseWare/MITx or a Stanford does a MOOC we are all much more likely to follow along. But offering open course materials or learning environments may not make sense for your institution.”

- Why Every University Does Not Need A MOOC
  Inside Higher Ed, March 2012

Through the article, the author lists down some key criteria and scenarios
when it might make sense for an institute to offer classes on the internet for free and ends the article as follows:

“Every college or university does not need a MOOC or an MITx, but every institution should have at least one signature program. Something in which the entire world knows that to study X they must go to your school. The internet economics of low information sharing costs and global reach demolishes any excuse for not creating your own tent-pole program.”

- Why Every University Does Not Need A MOOC
Inside Higher Ed, March 2012

The author’s stance that the university should be more concerned about developing a signature course makes sense. The stance can be taken forward to the case of a MOOC offering because if a university does decide to offer a MOOC, then the MOOC should also be unique to the university. The facilitators or the pedagogy or a combination of both can make the learner experience in a MOOC unique.

The value proposition of a MOOC offering as cited in an EDUCAUSE Executive Briefing titled “What Campus Leaders Need to Know About MOOCs” is as follows:

**Education Access** – The primary purpose of offering MOOCs is to provide access to education on a massive, international scale. The students receive free instruction and in turn the institution and its faculty receive recognition.

**Experimentation** – MOOCs are an experiment to come up with a new pedagogy for the digital era. Data mining from MOOC platforms is being used to refine adaptive systems and tutoring algorithms that enhance learning effectiveness.

**Brand Extension** - International recognition and acclaim of both the institution and its faculty helps enhance and extend the brand and creates new opportunities for the institution.

One can also add “Social Corporate Responsibility” to the above list. Providing access to education at no or minimal cost can become a way for the university to give back to a global community.
Furthermore, universities can look at creating a “hook” or “stickiness factor” for some of their critical programs by offering one or more courses free of cost. MOOCs can also serve as primers (prerequisite courses) for a degree program.

John Ebersole from Excelsior College goes on to confirm ...

“Excelsior will offer at least two MOOCs. One will be an introduction to Cybersecurity and the other will deal with “serious games” and their potential for problem solving and learning. In both cases the purpose is to create awareness of the fact that the College has programs and expertise in these niches. Our expectation is to generate enrollments in our regular courses and degree programs rather than to see income from the MOOCs themselves.”

- John Ebersole
President, Excelsior College, Albany, New York

Thus, how a MOOC can be integrated within a curriculum is something that can be determined after due considerations to various factors. Furthermore, which of these MOOCs could integrate sophisticated e-learning technologies is also something that can be determined on a case-to-case basis. [See Appendix: John Ebersole’s Taxonomy of MOOCs]

The important question then to ask is—how universities can generate revenue, if any, from these offerings? The EDUCAUSE briefing goes on to list revenue opportunities as:

- “Data mining: Sell student information to potential employers or advertisers.
- Cross- or up-sell: Course materials (e.g., videos) are freely available, but ancillary services like assignment grading, access to the social networks, and discussions are fee-based.
- Advertising model: Courses have named sponsors.
- Tuition model: Students pay the originating institution for course credit.
- Spin off/licensing model: Sell the course, parts of the course, or customized versions of the course to institutions or businesses for their internal use; license institutional use of the MOOC platform itself.”

So, in conclusion, whether or not an institute should join the bandwagon and start offering MOOCs is a question answered best by the institute. A thoughtful self-appraisal of key operational and pedagogical requirements should help determine the optimum approach for a successful implementation.
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Appendix

John Ebersole's Taxonomy of MOOCs

Although xMOOCs and cMOOCs are the two most prominent types of MOOCs, many other categories and taxonomies have emerged. Here’s a categorization of MOOCs proposed by John Ebersole.

The CONTINUING EDUCATION Domain
Many observers suggest that the highest and best use of MOOCs is in the offering of professional continuing education, where the emphasis is on access to cutting edge content. Busy professionals seeking to maintain their competitiveness by staying abreast of research and new thinking, and not caring about academic credit, have expressed great satisfaction with the MOOC approach to disseminating knowledge.

The REPUTATION Domain
MOOCs allow faculty to demonstrate both their subject matter expertise and their presentation skills. In an era when text books rarely sell even a thousand copies, MOOCs present an attractive alternative for those faculty seeking prominence within their discipline and greater name recognition. In fact, many informed participants have suggested that MOOCs are more akin to texts than to courses.

The INSTITUTIONAL Domain
The public relations value of a MOOC is considerable. Not only does it enable an institution to “follow in the footsteps of giants” - MIT, Stanford, Harvard, such offerings also convey the impression that the school is both tech savvy and concerned about open access to knowledge.

When over 70% of current MOOC participants are from outside the U.S., this is also an effective way to build brand awareness for lesser known institutions.

The PROMOTIONAL Domain
Some MOOC providers, like Excelsior, see these models as an effective way to aggregate interest in a program that might otherwise require tremendous investment to market, and achieve a similar level of interest.

By offering an initial experience for free, schools are hoping to attract some number to related programs, at full fee. Even a small percentage is likely to exceed those attracted through conventional marketing activity.
The RESEARCH Domain
The MOOC provider edX has publicly stated that its intent is not necessarily
to make money, but, rather, to inform the delivery of instruction across a
spectrum of models. Thus, research and development, along with the diffusion
of innovation are seen as legitimate applications of the MOOC methodology,
as well.

The ACADEMIC Domain
The sixth and perhaps least effective application of MOOCs is that of delivering
instruction for purposes of degree completion. The lack of instructor contact,
mentoring and one-on-one interaction is a significant limitation when the
needs of traditional age students is considered. Here, their use may need
to be as a supplement to more traditional forms of instruction. For older,
experienced, self-motivated and self-directed students, MOOCs MAY be an
option for the satisfaction of certain credential requirements. However, the
absence of valid and secure learning outcome assessments leaves this an
open question. Until there is some proof of actual learning, MOOCs may be
better considered for one or more of the above applications.

About Learning Nuggets

Learners from the digital era need small bites of information just-in-time
and quickly. Therefore, there is a trend toward shorter, more concise learning
modules. At TIS, we’ve designed Learning Nuggets that are short capsules of
information dealing with wide range of topics. Nuggets are focused in topic
and duration for efficient cultivation of critical knowledge, skills, and attitudes.
Rather than overloading the learners with lots of information at a time, these
nuggets provide information in a concise and focused manner.

Learning Nuggets or the “100 Seconds Learner” bridges the huge gap between
formal learning and informal learning.

Read more about Learning Nuggets at http://www.tatainteractivesystems.
com/learning-nuggets.html
About Story-Based Learning

From the beginning of time, storytelling has been the means by which cultures and societies have preserved and celebrated their memories, passed on their values and belief systems, entertained, informed, and instructed. They were cognitive patterns of the society preserved for instructional and other purposes. The whole community could draw on the “truths” presented by them. Long before there were written records, storytellers taught through the oral tradition.

From the learning perspective, the story-based approach is powerful because stories promote active learning, as manifested in the CRUNCHED characteristics of stories: Contextual, Realistic, Unusual, Natural, Concrete, Human, Easily accepted and Discovery-oriented.


About Simulations

Simulations follow the constructivist learning principle—performance in an environment that mimics the real world is more effective than training that is de-contextualized.

Simulations are effective learning interventions designed to help learners internalize complex concepts through real-world scenarios. Based on the constructivist learning principles, these projects allow students to apply concepts in a risk-free environment and reflect and learn from the impact of their decisions. The students are prompted to engage in critical thinking, assess the complex relationships that exist with the problem, and construct their own knowledge models.

About Game-Based Learning

Learning through games is fun, cost-effective, and low-risk. TIS creates captivating and educative games for adult learners that elevate the level of learner engagement and learning retention.

The Play-Practice-Perfect or P3 model developed by TIS is the foundation for a game-based learning approach that delivers:

» Higher engagement through play
» Higher skills and higher retention through practice
» Higher efficiency through perfection

The game-based approach makes learning fun, improves skills and knowledge, and elicits desired behavior. In short, serious games directly address business outcomes.

Read more about Serious Games at http://www.tatainteractivesystems.com/game-based-learning.html

About 3D Animations and Virtual Worlds

3D animations and virtual realms help create engaging and immersive learning environments that simulate the real world. These virtual worlds are based on the constructivist principles and allow learners to take up an active role and communicate with each other. Objects in such an environment often respond to learner action, giving a sense of 3D immersion.

Read more about TIS’ 3D and animations capabilities at http://www.tatainteractivesystems.com/animation-learning-solutions.html