Assessment in MOOCs: A Comparative Analysis

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Overview

- History of MOOCs
- MOOCs and assessment of learning outcomes
- The purpose of the study
- The methodology
- The analytical framework and data sources
- Analysis Strategies
- Results & conclusion
The first MOOC was an open online course developed in 2008 by George Siemens and Stephan Downes at the University of Manitoba. The courses designed by this group became what would later be known as “Connectivist MOOCs” or cMOOCs.

Central to the cMOOC and its structure was the learner, firmly and fully connected to the platform and fellow students, and their contributions to the learning experience.

A second form of MOOC, the xMOOC, was ushered in by Stanford University professor, Sebastian Thrun, 2011 with his Computer Science course.

xMOOCs were developed along the constructivist approach and provided exercises, assessments, and a clear delineation between the teacher and their learners.
Characteristics of MOOCs

- Are free
- Were not originally intended for college credit
- Some schools started accepting MOOC courses for credit provided a fee was paid
- Other schools have sponsored MOOCs, but do not accept their own courses for college level credit
MOOCs & Assessment of Learning Outcomes

- From an organizational standpoint, **assessment is necessary in order to ensure standards of learning** and measurement are maintained to preserve the integrity of the school’s education and uphold its accreditation status.

- For students, **assessments provide a check for learning and verifiable proof** that personal learning has actually taken place.

- From both standpoints, **assessment requires systematic methods of measuring learning** and its outcomes.
The Purpose of the Study

Analyze MOOCs to see how assessment is currently being done and compare the findings with the learning assessment methods and models being used in other accepted and successful distance learning, for-credit courses.
The Questions of the Study

- How are achievement of learning outcomes assessed in MOOC courses and how are they documented within MOOCs to demonstrate learners’ successful achievement?
- How achievement of learning outcomes is documented within MOOCs and whether or not there is a mechanism for providing feedback to improve learners’ performance?
- How learners are progressing through achievement of learning outcomes in MOOC environments and how they receive feedback regarding their performance?
- How and in what ways MOOC courses are different from for credit distance learning courses?
The Method

- The study used the qualitative exploratory case study method (Stake, 1995; Yin, 2003)

- According to Yin (2003), a case study design should be used when:
  a) the focus of the study is to answer “how” and “why” questions;
  b) one cannot manipulate the behavior of those involved in the study; and
  c) the researcher wants to address the contextual conditions because they are relevant to the issue being studied.
The Two Cases

- The **two cases or units of analysis** in this study were defined as:
  - A MOOC learning environment (mainly courses offered not for credit); and
  - Distance or online learning environment (mainly courses offered for credit).
- The **focus was on the design and delivery of each course rather than individuals enrolled in the course**
- Two cases (MOOCs and online learning courses) with **embedded units (courses in each case)** were used in order to conduct comparative analysis across similar cases.
- The cases were **bounded by time and activities** to ensure that the study remained within its scope.
As suggested by Miles and Huberman (Miles & Huberman, 1994), in order to make the analysis and interpretation process more transparent, a framework was developed to provide a structure for the main issues to be studied.
Comparative Cases

The following **selection criteria** were used for the cases
- Timeframe: the Fall 2014 semester;
- Course level: targeted at the undergraduate level and;
- Courses: were within the same discipline.

For MOOCs, there were three primary platforms to choose from: Coursera, edX, & Udacity; **Coursera was selected** for MOOCs.

For Online Learning Courses (OLC) for credit courses: Permission was received for **two 100% online courses offered at the university** delivered through Blackboard.
Characteristics of each Course

**Titles of the courses**

- **MOOCs**
  - “Advanced Instructional Strategies in the Virtual Classroom”
  - “Gut Check: Exploring Your Microbiome”

- **OLC: for credit courses**
  - “Instructional Design & Evaluation”
  - “Principles of Biology”

**MOOC Vs. OnlineCourses**

- Is Free of Charge or Charges Fees
- Is Self-Paced and/or Self-Controlled
- Has Start & End Date
- Offers Different Role for Instructor
- Provide Real Time Interaction
- is for Credit or Not for Credit

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Data Collection & Analysis Strategies

- Data was collected from both primary and secondary sources (reliability & relevance).
  - Participant observation
  - Organizational documents
  - Organizational statistics through audio, video, and text formats
- Content analysis (using Quality Matters (QM) categories and rubrics), cross comparison of observation & other sources of data using tables & charts

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## Results

<table>
<thead>
<tr>
<th>Cases</th>
<th>Title of Courses</th>
<th># of Students</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MOOC Courses</strong></td>
<td>Advanced Instructional Strategies (AIS)</td>
<td>6,000+</td>
<td>5 weeks</td>
</tr>
<tr>
<td></td>
<td>Gut Check (GC)</td>
<td>18,000+</td>
<td>6 weeks</td>
</tr>
<tr>
<td><strong>Online Learning Courses</strong></td>
<td>Instructional Design &amp; Evaluation (IDE)</td>
<td>16</td>
<td>16 weeks</td>
</tr>
<tr>
<td></td>
<td>Principles of Biology (BIO)</td>
<td>53</td>
<td>8 (16) weeks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(compressed course)</td>
</tr>
</tbody>
</table>
## Learning Objectives.

**General Standard 2**: Learning objectives are clearly stated and explained. They assist students in focusing their effort in the course.

<table>
<thead>
<tr>
<th>2 - Learning Objectives (Competencies)</th>
<th>Pts</th>
<th>MOOCS</th>
<th>ONLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AIS</td>
<td>GC</td>
</tr>
<tr>
<td>2.1 The course learning objectives describe outcomes that are measurable.</td>
<td>3</td>
<td>MET</td>
<td>NOT MET</td>
</tr>
<tr>
<td>2.2 The module/unit learning objectives describe outcomes that are measurable and consistent with the course-level objectives.</td>
<td>3</td>
<td>MET</td>
<td>NOT MET</td>
</tr>
<tr>
<td>2.3 All learning objectives are stated clearly and written from the students’ perspective.</td>
<td>3</td>
<td>MET</td>
<td>NOT MET</td>
</tr>
<tr>
<td>2.4 Instructions to students on how to meet the learning objectives are adequate and stated clearly.</td>
<td>3</td>
<td>MET</td>
<td>MET</td>
</tr>
<tr>
<td>2.5 The learning objectives are appropriately designed for the level of the course.</td>
<td>3</td>
<td>MET</td>
<td>MET</td>
</tr>
</tbody>
</table>
Results

**Assessment and Measurement.**

| General Standard 3: Assessment strategies use established ways to measure effective learning, evaluate student progress by reference to stated learning objectives, and are designed to be integral to the learning process. |
|---|---|---|---|---|
| 3.1 The types of assessments selected measure the stated learning objectives and are consistent with course activities and resources. | 3 | MET | MET | MET |
| 3.2 The course grading policy is stated clearly. | 3 | MET | MET | MET |
| 3.3 Specific and descriptive criteria are provided for the evaluation of students’ work and participation and are tied to the course grading policy. | 3 | MET | MET | MET |
| 3.4 The assessment instruments selected are sequenced, varied, and appropriate to the student work being assessed. | 2 | MET | MET | MET |
| 3.5 Students have multiple opportunities to measure their own learning progress. | 2 | MET | NOT MET | MET |

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Results

Learner Interaction

**General Standard 5**: Meaningful interaction between the instructor and students, among students, and between students and course materials is employed to motivate students and foster intellectual commitment and personal development.

<table>
<thead>
<tr>
<th>5 - Learner Interaction</th>
<th>MOOCS</th>
<th>ONLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 The learning activities promote the achievement of the stated learning objectives/outcomes.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5.2 Learning activities provide opportunities for interaction that support active learning.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5.3 The instructors plan for classroom response time and feedback on assignments is clearly stated.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5.4 The requirements for student interaction are clearly articulated.</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

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General Findings

- The MOOCs used in this study were xMOOCs with constructivists foundations which included many of the design items (i.e., assignments, exams, projects) necessary to achieve student and institution objectives.
- Overall, the design of the MOOCs was not much different from the design of the Online courses used in this study.
- Coursera, as a platform, helped ensure the presence of necessary instructional design tools in the courses it published while still giving the individual institutions the ability to individualize coursework and delivery options.
- The primary differences found in the MOOCs were: the use of automated grading tools as the sole instrument of instructor feedback in performance achievement.
- Peer reviews were used in both MOOCs to assess learning performance demonstrated in the course projects.
- Common to both MOOC courses was the criteria used from the peer reviews to determine a student’s grade in the course. Students were not graded on the quality of their review but the quantity.
Discussion

- MOOCs do provide a resource that may continue to prove useful to the institutions and learners using them.
- While MOOCs had their own shortcomings regarding accepted instructional design practices, they also provided a number of positive factors that stimulated thought and hope:
  - The large number of useful and engaging online resources;
  - A social presence that stretched across the globe,
  - The ability to quickly connect learners from various cultures; and
  - The ability to efficiently assemble instructors from various backgrounds and disciplines to explore multiple facets of the same issue.
- There are more questions than answers regarding MOOCs and how best to design courses for such a large and diverse learning audience.