Extending the H-MOOC Framework: Metrics for Evaluating the Success of Blended Learning Experiences

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Abstract. This work presents qualitative partial results from a mixed methods study that aims at identifying metric-based models for evaluating the success of different type of blended learning experiences. By coding qualitative information obtained from interviewing 15 key informants in MIT-USA, PUC-Chile, and UC3M-Spain, we identified online and face-to-face type of metrics to evaluate a blended learning experience, such as formative assessment scores and student evaluation of teaching surveys. More work is required to understand how these metrics are used for evaluating the success of different types of blended learning experiences. **Keywords:** Higher Education, Blended Learning, Hybrid Initiatives, Metrics, Assessment and Evaluation.

1 Introduction

Blended learning consists in the thoughtful combination of classroom face-to-face and online instruction [1], [2]. In Higher Education, many universities have started to combine Massive Open Online Courses (MOOCs) with traditional in-person courses in different ways [3]. To analyze the wide variety of existing hybrid designs that reuse MOOCs, Pérez-Sanagustín, Hilliger, Alario-Hoyos, Delgado Kloos, and Rayyan (2017) proposed a framework based on the experience of three institutions: Massachusetts Institute of Technology (MIT), Pontificia Universidad Católica de Chile (PUC), and Universidad Carlos III de Madrid (UC3M). Although they contributed with the characterization of different design alternatives regarding institutional effort invested

and level of curriculum alignment, the indicators that were proposed to evaluate its success were not validated. Some researchers have documented the use of indicators in hybrid learning experiences, such as student interaction patterns, course design patterns and student workload [3], [5], [6]. However, just as there are infinite hybrid designs, there can be infinite metric-based models to evaluate them. Thus, this paper expands the number of indicators proposed in the H-MOOC framework by presenting qualitative partial results obtained from interviewing 15 key informants from MIT, PUC, and UC3M about metrics used in their institutions.

2 Methods

The research question addressed in this study is: **What are the metrics to evaluate the success of the hybrid/blended learning experiences in higher education contexts?** To answer this research question, we adopted a **mixed methods approach** to collect qualitative and quantitative data [7]. First, we collected qualitative data from semi-structured interviews with 6 key informants from MIT, 4 from PUC, and 5 UC3M (see interview guideline in http://bit.ly/2CYhkQr). These informants were: 1) faculty members involved in the implementation of blended learning experiences, and 2) professionals involved in the instructional design and the deployment of hybrid experiences based on MOOCs. Second, we collected quantitative data from a questionnaire applied during the HybridEd workshop held at MIT in 2018. In this paper, we document qualitative partial results obtained from interviews to obtain feedback before triangulating qualitative and quantitative information to complement the H-MOOC framework.

3 Results

Table 1 shows the metrics identified from coding interviews with key informants from MIT, PUC, and UC3M. Most interviewees distinguished between two types of metrics: 1) learning process metrics, and 2) learning success metrics. On the one hand, the first group of metrics is used to monitor students' learning progress. For example, if the completion rate of a video is low and most students stop watching at the same minute, this might indicate that the concepts explained at that moment were not clear. On the other hand, the second group of metrics accounts for the success of the blended experiences. For instance, if pre-post learning gains are high, this might indicate that the blended learning approach helped students to learn content or develop skills.

Table 1. Metrics identified from interviews with key informants from MIT, PUC, and UC3M.

Learning process metrics	Learning success metrics
Student interaction patterns with online resources	Pre-post learning gains
Time on task (both online and face-to-face)	Positive student evaluations of teaching
Video completion rates	Improved course grades
Number of students who watched videos	Increased student satisfaction

Learning process metrics	Learning success metrics
Assessment scores (both online and face-to-face)	Demonstrated learning behaviors
Student classroom participation (face-to-face)	

4 Discussion

This study presents two types of metrics: 1) learning process metrics to monitor students' learning progress, and 2) learning success metrics to evaluate the effectiveness in blended learning experiences. Results show that faculty members and professionals collect data from both online and face-to-face environments to assess if students are understanding course concepts as expected, and then evaluate if the blended learning approach added value to its course experience. This assessment approach resonates with prior research work that has analyzed the relationship between design features associated to the learning process and learning outcomes [5]. Therefore, we contribute these metrics to the rising discussion about assessing blended learning experiences to promote the dissemination of its success and the lessons learned.

This study not only expands the list of indicators proposed in the H-MOOC framework, but also it reveals two dimensions that were not previously addressed: learning process and success. Still, further work is required to understand how these dimensions relate to the H-MOOC spectrum between institutional effort and curriculum alignment [4]. Future steps will imply triangulating qualitative evidence presented in this study with quantitative evidence collected from key informants that are part of other universities and colleges., in order to evaluate how representative metrics are to different blended learning designs and expected learning behaviors [6].

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