Chapter 1

Reading Data Possibilities From an LMS Data Portal Data Dictionary

ABSTRACT

A learning management system (LMS) data portal contains data collected as a byproduct of the running of the LMS. A data dictionary related to that data portal contains both critical information about the data and a list of terms and definitions describing the data contents. The modern LMS studied here has multiple channels for data capture and analytics: (1) the front-facing LMS (at both the instructor level and the admin level), (2) the reports feature (for system administrators), and (3) the data portal (for system administrators). This chapter describes some ways to understand data possibilities through the examination of an LMS data portal data dictionary and light LMS data exploration.

INTRODUCTION

A natural byproduct of learning management systems (LMSes), social media platforms, and most technology systems is data. Every time a person interacts with a computer system, they leave a record of their actions. In systems that enable online learning, this means a wide range of data about actions such as the following result in record creation:

- A teacher or graduate teaching assistant drafts an assessment.
- A learner logs in for the first time, navigates over to the discussion board, posts a message to several co-learners, downloads a slideshow, and then logs off.
- A team uploads a consensus-built learning rubric that is designed with a range of learning outcomes and shared across a department or college or university.
- A gradebook is downloaded, grades adjusted, and re-uploaded.
- An instructional designer uploads a digital learning object (DLO) linked to a cloud service that collects data about the learning.

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• A classroom of 250 students logs in and takes a proctored online exam with security features to prevent academic dishonesty.
• After a field trip, learners upload dozens of images depicting their experiences.
• After a semester, an online course is archived off-line and taken off web servers.

And so on. More simply, every command created by people result in a record. And if the technology system has integrations with other technology systems, every interaction between those systems will result in records as well. For every action and transaction taken by users in a system, there is captured information, to enable the technology systems to function. Oftentimes, this data remains on the back end and does not attract much attention.

In recent years, the data that is a byproduct of the functioning of learning management systems (LMSes), technological tools that enable distance or distributed (and blended / hybrid, and F2F) learning, has come to the fore. Much of this data has been made available to enable users to better understand the system and how people are using it, as well as considering ways to improve teaching and learning through it. In 2016, Instructure made much of its back-end data available (by instance) on an LMS data portal, and later that year, Kansas State University (K-State) requested access to their data portal and started some informal exploration of what was available. An LMS data portal is a website where selected data from the LMS instance may be accessed. The data types are common ones, including time data, integers, big integers, Booleans (true/false), floating point numbers, alphanumeric strings (as text labels, as text fields), and others.

An initial study of the data from their LMS instance was conducted, and the results of this were broadly published (Hai-Jew, Spring-Summer 2017). Over time, it became clear that there were three main channels for access to large-scale LMS data, through administrator access: the front-end of the LMS, the reports section of the LMS, and the LMS data portal (Table 1). In terms of the front-end of the LMS, there are other role-based accesses, including for librarians, graders (graduate teaching assistants), guests, instructional designers, and others, but their levels of access are lower than for instructors. Different institutions can set up their roles and role-based accesses in a variety of ways and with different term labels.

A “data dictionary” (or “database schema” or “schema docs”) defines the contents of the data warehouse; it contains a list of terms and definitions describing the data contents, and other information about the stored data. This work describes some ways to understand “data possibilities” (what may be practically learned from the data and applied to awareness, analysis, decision-making, prediction, research, and other applications) through the examination of an LMS data portal data dictionary and

Table 1. Types of data accessible from a learning management system (LMS) by role

<table>
<thead>
<tr>
<th>Data Source in the Learning Management System (LMS)</th>
<th>Access Level by Role</th>
<th>Access Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>user front-end of the LMS</td>
<td>faculty / instructor access&lt;br&gt;graduate teaching assistant (GTA) access</td>
<td>faculty-led courses, courses in which the faculty has role-based membership access</td>
</tr>
<tr>
<td></td>
<td>system administrator access</td>
<td>all courses</td>
</tr>
<tr>
<td>reports in the LMS (back end)</td>
<td>system administrator access</td>
<td>all courses</td>
</tr>
<tr>
<td>lms data portal (back end)</td>
<td>system administrator access</td>
<td>all courses</td>
</tr>
</tbody>
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