

Testing the Implementation and Impact of a Gamification Plugin for Canvas LMS in an Introductory Physical Geology Course

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INTRO

Implementation of a personalized gamified dashboard (Delphinium) integrated into the Learning Management System (LMS) of a large-enrollment introductory physical geology course showed that students with access to Delphinium performed on average 13% better than students in the control section when controlling for their Science Literacy Concept Inventory (SLCI) pretest score (Table 1).

METHODS

- We measured the impact of single gamification component on the performance of students enrolled in one section of the course (N=137) and compared it to the performance of students enrolled in a second section (N=86) taught in person by the same instructor in fall 2019.
- We compared the number of times users accessed the dashboard and the number of page views from the LMS, exam scores, and final grades (Table 2).

RESULTS

- Analysis of LMS data showed that students in the gamified section accessed the LMS more frequently and that the dashboard provided them with an early and significant advantage in the course (Fig. 1).

Students using Delphinium accessed LMS more regularly and performed better in course.

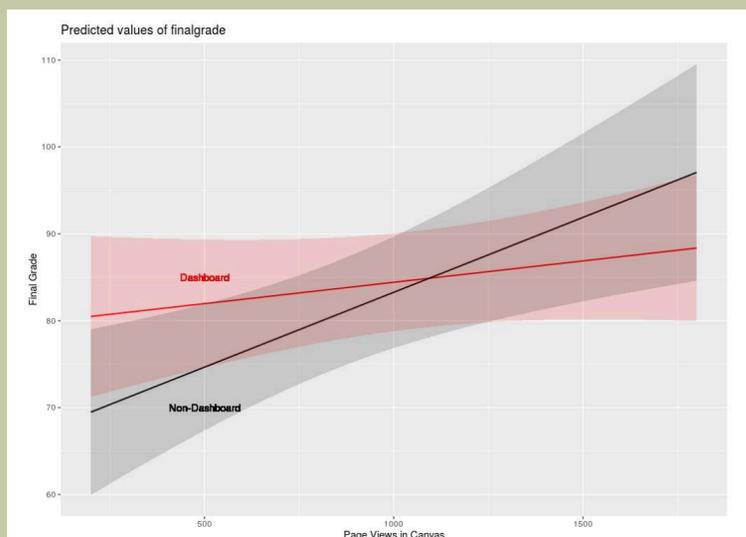


Figure 1: Performance difference and page views in the Canvas LMS.

Questions about this poster? Contact cinzia@iastate.edu



Want to learn more about Delphinium? Contact Jared Chapman jared@delphi-me.com

Table 1: Ordinary least square regression model for end of term academic performance out of 100 (N=103).

	Estimate (Standard Error)	95% Confidence Interval
Intercept	76.9 (9.97)	[60.02, 88.76]
Male ^a	0.51 (2.11)	[-3.67, 4.71]
Children of College Graduates ^b	4.49 (2.19)**	[0.14, 8.83]
Non-Science Major ^c	-1.827 (2.26)	[-4.32, 2.67]
Sophomore/2nd Year ^d	-3.26 (2.44)	[-7.95, 1.41]
Junior/3rd Year ^e	2.89 (2.31)	[-1.69, 9.27]
Senior/4th Year ^f	-1.65 (4.03)	[-9.62, 6.31]
Non-Native English Speaker ^g	3.45 (4.64)	[-1.78, 12.67]
SLCI Score	0.04 (0.04)	[0.02, 0.11]
Non-Gamified Section ^h	-13.48 (6.69)**	[-26.76, -0.19]
LMS Page Views	0.01 (0.004)	[-0.004, 0.01]
Interaction: Dashboard Access X LMS Page Views	0.01 (0.01)**	[-0.002, 0.03]

^aWomen, ^bFirst-Generation College Student, ^cScience Majors, ^dFreshman/First Year, ^eNative English Speaker, ^fQualified Section: *p < .10, **p < .05, ***p < .01

DISCUSSION

Our work recognizes the potential benefits of using gamified dashboards in introductory geology courses to address engagement and academic performance.

Table 2: Descriptive statistics of survey sample.

	Dashboard Access (n=137)	No Dashboard Access (n=86)
LMS Page Views (Average)	1011 (509.81)	748.19 (262.72)
Women	47.46%	49.31%
First Generation College Student	32.20%	34.09%
Year		
First Year	27.12%	31.82%
Second Year	52.45%	45.49%
Third Year	11.66%	15.91%
Fourth Year	8.47%	6.82%
SLCI Pre-Test (Average)	56.56 (10.51)	61.90 (27.6)
Science Major	38.98%	18.18%

Delphinium

The dashboard, called Delphinium, includes the most widely used gamification components, e.g., progress trackers, badges, rewards, and a leaderboard, to offer individual students accomplishment and instrumental goals to motivate them to engage with the course content organized in modules in the LMS (Fig. 2).

Figure 2: Dashboard health tracker showing performance in the last 10 assignments (left) and overall performance quality (right)

