Exploring How Canvas Learning Technology Tools Influence Course Success

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Academic Technology Services in Collaboration with College of Business

Research Questions

Topic:
This project aims to analyze the impact of Learning Technology Tools offered through the LMS on success in courses.

Goals:
To identify the largest contributors to success in courses and leverage technological tools to address those factors in a digital learning environment.

ATS and COB are partnering to focus on Online MBA program as a case study.

Research Questions:
1. How much does active student engagement with the Canvas Learning Management System (LMS) influence students' academic success and performance in the MBA programs?

2. Can we identify what success looks like in Canvas using various LMS metrics?

Introduction

There is a growing field of research on the Learning Management System's (such as Canvas) impact on student success. There is a wealth of data in LMS's that can be mined to provide valuable predictive insights on student success. It was found that ***regular and substantive interaction with activities and assignments within the learning management system showed a key indicator of predicting student success*** (Mueen, et al., 2016, Bonafini, et al., 2017, Jayaprakash, et al., 2014, Zhidkikh, et al., 2024). Several studies also showed that ***using these key indicators to provide warnings to students who are struggling early in the academic semester improved the probability of potentially struggling students to succeed*** (Arnold, 2010, Jayaprakash, et al., 2014).

Project Alignment with Campus Initiatives

- Engaging All Students (Beach 2030, COB, ATS)
- Fostering Student Success (Beach 2030, COB, ATS)
- Expanding Alternative Delivery Infrastructure (Beach 2030, COB, ATS)
- Be a Future Ready University (Beach 2030, COB, ATS)
- Identifying Academic Risk Factors (COB)

Methods

Sources of Data:
- Insight Platform Data
- Course Data from Canvas Learning Managment System
- Graduate Program Student Records
- Institutional Research and Assessment (IRA) Data

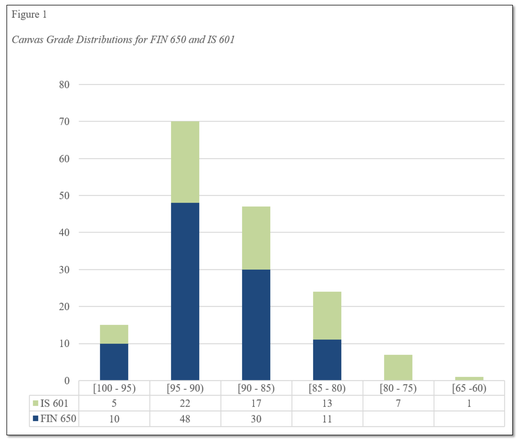
Participants:
- Students enrolled in online graduate courses:
  - IS 601 (N = 65)
    - Male (N = 29): Female (N = 36)
    - First Generation to attend college (N=29)
    - Most Represented Ethnicity Hispanic/Latino (N=36) and Asian (N =12)
  - FIN 650 (N = 99)
    - Male (N = 41): Female (N = 57)
    - First Generation to attend college (N=25)
    - Most Represented Ethnicity Hispanic/Latino (N=36) and White (N=22)

Data Analysis:
The study employed both descriptive and inferential statistical analyses, utilizing software tools such as SPSS and Microsoft Excel.

Results

Figure 1

Canvas Grade Distributions for FIN 650 and IS 601



Note: Figure 1 displays the distribution of grades, which fall within a range of 60 to 100, with a bin size of 5. While FIN 650 had the highest representation of graduate students, their scores were largely concentrated in the upper range. On the other hand, IS 601 had fewer students, yet exhibited a wider spread of scores across the range.

Canvas Code Book

Tables	Terms	Definition for Student View
1	View Syllabus	Syllabus content
1	Page as Module Item	Any Canvas page within "Modules"
1	External Module Items	An external learning tool within Canvas
1, 2, 3	View Individual Quizzes	Quiz result
1,3	View Course Announcements	Course announcement(s)
2	Take a Quiz	A page initiating of quiz attempt
2, 3	Individual Pages	Any Canvas page within course
2, 3	Course Home Page	Page viewed when first login to course
3	Modules overview	Module overview page

Before running a multiple regression, a backward stepwise regression was performed to identify key LMS (Learning Management System) interaction metrics for IS 601 and FIN 650.

Table 1

Results of Multiple Regression Analysis for IS 601

			95% CI			
Variable	Beta	*SE*	*LL*	*UL*	*β*	*p*
View Individual Quizzes	.251	2.815	2.312	3.318	.667	<.001
View Course Announcements	.342	1.473	.790	2.157	.248	<.001
External Module Items	1.151	3.132	.830	5.434	.104	.008
Page as Module Item	.119	.284	.046	.522	.123	.020
View Syllabus	.207	-.439	-.852	-.026	-.092	.038

The results of the Multiple Regression indicate that the five LMS engagement metrics (see Table 1) in the model displayed a significant relationship to the finale Canvas course grade for IS 601, specifically 94% of the variance in the finale canvas course grades could be explained by the five LMS engagement metrics listed in Table 1, R^2 = .94, R = .97, F (5, 60) = 216.107, p = <.001.

- View Individual quizzes, view course announcements, external module items , and page as module item in display a significant positive relationship with canvas scores
- View Syllabus, however, displays a significant negative relationship with final canvas scores

Table 2

Results of Multiple Regression Analysis for Fin 650

			95% CI			
Variable	Beta	*SE*	*LL*	*UL*	*β*	*p*
View Individual Quizzes	1.310	.386	.543	2.077	.429	.001
Individual Pages	-.180	.064	-.307	-.052	-.207	.006
Course Home Page	.307	.052	.203	.410	.260	<.001
Take a Quiz	2.709	.541	1.634	3.783	.512	<.001

The results of the Multiple Regression indicate that the five LMS engagement metrics (see Table 2) in the model displayed a significant relationship to the finale Canvas course grade for FIN 650, specifically 90% of the variance in the finale canvas course grades could be explained by the four LMS engagement metrics listed in Table 2, R^2 = .90, R = .95, F (4, 94) = 221.584, p = <.001.

- View Individual quizzes, Course Homepage and take a quiz in display a significant positive relationship to a student's final canvas score
- Individual pages, however, display a significant negative relationship with final canvas scores

Table 3

Results of Multiple Regression Analysis: Evaluating Course Types and LMS Behavior

			95% CI			
Variable	Beta	*SE*	*LL*	*UL*	*β*	*p*
IS 601 vs Fin 650 Indicator	21.395	4.582	12.346	30.444	.151	<.001
View Individual Quizzes	2.472	.202	2.073	2.871	.730	<.001
View Course Announcements	-.340	.138	-.612	-.068	-.093	.015
Course Home Page	.313	.042	.229	.397	.289	<.001
Individual Pages	-.157	.059	-.273	-.040	-.169	.009
Modules Overview	.133	.070	-.005	.271	.128	.060

To evaluate and isolate the impact of differences between courses on final canvas grades in the multiple regression model, both courses were coded (FIN 650 = 0; IS 601 = 1) And incorporated into the model.

The results of the Multiple Regression indicate that the 5 LMS engagement metrics along with course (see Table 3) in the model displayed a significant relationship to the finale Canvas course grade, specifically 89% of the variance in the finale canvas course grades could be explained by the 5 LMS engagement metrics listed in Table 3, R^2 = .89, R = .94, F (6, 158) = 234.74, p = <.001.

Course Recode (B = 21.39) was shown to have a significant positive relationship to a student's final canvas score indicating that the information system course (compared to the finance course) means that, all else being equal, students in the information system course tend to score – on average - 21.395 points higher on their final class score than students in the finance course.

- View Individual Quizzes, Course Homepage, Modules Overview, and Individual Pages display a significant positive relationship to a student's final canvas score
- View Course Announcements and Individual Pages, however, display a significant negative relationship with canvas scores

Conclusion / Discussion

- Students in the Information System course score, on average, performed significantly higher than those in Finance, suggesting the potential positive impact of external tool instructional methods and materials like PlayPosit on learning outcomes.

- In all three Multiple Regression analyses viewing Individual Quizzes was shown to be a significant and positive predictor on a student's final Canvas grade. This could suggest a possible benefit of engaging with quiz feedback for students in relation to academic success in a course.

- In the Final Multiple Regression Model "View Course Announcements" and "Individual Pages" had a negative relationship with final course grades, possibly indicating students' who are struggling with course material.

- In the Final Multiple Regression Model "Course Homepage" and "Modules Overview" had a positive relationship with final course grades, suggesting that students who visit these pages more may have a clearer understanding of the course structure and better access to resources.

- Holistically, the results of our analysis of the two courses in the Online MBA program reveal a possible link between pedagogical tools, student engagement, and academic performance, highlighting the importance of interactive and engaging course materials. This is in alignment with research (Mueen, et al., 2016, Bonafini, et al., 2017, Jayaprakash, et al., 2014, Zhidkikh, et al., 2024).

Implications for Action

Canvas Data:
Leveraging Canvas data can further course refinement and development and enhance learning experiences.

Interventions:
Early identification of key student engagement patterns could allow targeted interventions and boost student success. Faculty and student training may provide support.

Continued Research:
Finding strong correlations between Canvas engagement metrics and success in the Online MBA program may encourage research in various academic disciplines.

Next Steps / Future Directions

- Initial findings indicate a substantial potential for research into diverse engagement strategies and course designs to enhance student success, highlighting the importance of expanded analysis across academic programs.

- Utilizing comprehensive data analysis promises to refine educational models and develop a more nuanced approach to teaching, aiming to create a more supportive and effective learning environment for students.

- More data should be gathered from platforms such as Zoom for synchronous information.