Blackboard Technology Services

Audit Report # 18-113
May 16, 2018

The University of Texas at El Paso

Office of Auditing and Consulting

The University of Texas at El Paso
Office of Auditing and Consulting Services

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May 16, 2018

Dr. Diana Natalicio
President, The University of Texas at El Paso
Administration Building, Suite 500
El Paso, Texas 79968

Dear Dr. Natalicio:

The Office of Auditing and Consulting Services has completed a limited-scope audit of Blackboard Technology Services. The audit was conducted to assess the effectiveness of processes and security controls for the hosted Blackboard Learning Management System now residing on the cloud.

We appreciate the cooperation and assistance provided by Technology Support staff during our audit.

Sincerely,

Lori Wertz
Chief Audit Executive

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EXECUTIVE SUMMARY

The Office of Auditing and Consulting Services has conducted an assessment of the effectiveness of processes and security controls for the Blackboard Learning Management System as a hosted application system now residing on the cloud.

During the audit we noted the following:

1. The Blackboard Learning Management System (Blackboard) experienced increased performance and a reduction in downtime since the conversion to a hosted application on the cloud. (See Appendix A: Glossary for definition of Blackboard and Appendix D: Blackboard Modules Usage)

2. UTEP's Blackboard contract adheres to Cloud Security Alliance (CSA) best practices related to Cloud Computing vendors in all material respects. (See Appendix A: Glossary for definition of CSA)

3. Auditors tested the following areas with no exceptions noted:
- Access management
- Change management
- Banner Interface Controls

BACKGROUND

The Blackboard Learning Management System (Blackboard) "is *a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs. Courses created with this software can serve as entire online courses or as a supplement to traditional classroom courses".* [1] Learning Management System is also referred to as eLearning.

Blackboard modules include elements such as:

- Professor to student and student to student communication
- Exams
- Research papers/assignments
- Grades
- Course materials and syllabi

Operations of Blackboard were previously maintained in house and the data was protected by UTEP's information security policies. A strategic decision was made by management to migrate Blackboard to hosted services on the cloud, and the contract with Blackboard Hosted Services was signed March 1, 2016. This change was made to reduce the application's downtime, expedite the maintenance and upgrade process and improve productivity.

The vendor currently stores confidential student information such as student grades on its servers. This information is covered by the Family Educational Rights and Privacy Act of 1974 (FERPA). See APPENDIX B: CRITERIA. Student information is now subject to the vendor's internal controls.This creates a risk for the University, and thus is the main objective for the audit.

For more details on the Blackboard see APPENDIX C: Blackboard Modules Usage.

AUDIT OBJECTIVES

Assess the effectiveness of processes and security controls for Blackboard as a hosted application on the cloud.

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[1] Blackboard.com

SCOPE AND METHODOLOGY

The audit was conducted in accordance with the *International Standards for the Professional Practice of Internal Auditing* and the authoritative guidelines of the *International Professional Practice Framework* issued by the Institute of Internal Auditors.

The audit criteria includes FERPA, TAC 202 Security Control Standards Catalog control groups, UTEP's Information Security Policies and Standards, and Cloud Security Alliance (CSA) best practices.

The scope of the audit was March 1, 2016 through January 2, 2018, and addressed the high risk areas identified in the University-wide risk assessment.

Audit procedures included:

> ➢ interviewing and requesting information from key personnel
> ➢ reviewing applicable laws, regulations, policies and procedures
> ➢ verifying the existence of appropriate institutional policies and procedures
> ➢ limited testing where appropriate

RANKING CRITERIA

All findings in this report are ranked based on an assessment of applicable qualitative, operational controls and quantitative risk factors, as well as the probability of a negative outcome occurring if the risk is not adequately mitigated. The criteria for the rankings are as follows:

Priority - an issue identified by an internal audit that, if not addressed timely, could directly impact achievement of a strategic or important operational objective of a UT institution or the UT System as a whole.

High – A finding identified by internal audit that is considered to have a medium to high probability of adverse effects to the UT institution either as a whole or to a significant college/school/unit level.

Medium – A finding identified by internal audit that is considered to have a low to medium probability of adverse effects to the UT institution either as a whole or to a college/ school/unit level.

Low – A finding identified by internal audit that is considered to have minimal probability of adverse effects to the UT institution either as a whole or to a college/ school/unit level.

AUDIT RESULTS

A. Contract Provisions

The University does not have formal guidelines to evaluate cloud service contracts. For this reason, Internal Audit conducted a qualitative assessment of the Blackboard contract and service level agreement. It was compared against best practices for cloud vendors in accordance with the Cloud Security Alliance (CSA). UTEP's Blackboard contract adheres to the best practices framework in all material respects.

No exceptions were noted.

B. Access Management

1. Access to Blackboard course shells is based on Banner Student Information System (Banner) enrollment information. Professors assigned to and students registered in a class per Banner are granted access to the respective course shell in Blackboard. When students drop a class, their access to Blackboard should also be removed.

Prior to the migration of Blackboard to the cloud, Banner enrollment data was transmitted to Blackboard at infrequent intervals. For this reason, students who dropped a class could possibly still access course content in Blackboard, creating inaccurate class rosters in Blackboard and providing inappropriate access to the student.

As of January 2018, the process to remove students from a Blackboard course shell has improved. Blackboard student access is now updated in real time to reflect changes in Banner enrollment.

2. Even though Blackboard class information comes from Banner, there are instances in which authorized users are not automatically added to the class. Examples include teaching assistants, research assistants, peer leaders and instructor changes. In order to add these individuals, manual requests must be made through the UTEP Helpdesk. Internal Audit tested a sample of these manual access requests to Blackboard course shells.

The testing result(s) indicated the Blackboard team checks Banner records and seeks appropriate approval before making the requested changes. In addition, supporting documentation of the requests is kept on file.

3. Internal Audit also verified that Blackboard's administrative or super user accounts were limited and used only for the intended administrative purposes. The process and approval is documented and supporting documentation is kept when granting users with administrative or elevated access. The access is monitored regularly by the Blackboard administrators.

No exceptions were noted.

C. Change Management

Based on Internal Audit's assessment of change management, Blackboard Hosting Services performs change management and configuration management on separate controlled environments, has an approval process and keeps the supporting documentation on file. As part of the Blackboard support, the University is provided with three non-production environments: 1) Test Environment, 2) Development Environment and 3) Staging Environment (pre-production environment). The University has also documented the process flow for change management between UTEP and Blackboard Hosting Services.

No exceptions were noted.

D. Banner Interface Controls

Internal Audit verified that the Banner Interface process with Blackboard is documented. In addition, data is transmitted via an encrypted website connection. Segregation of duties is achieved due to developers extracting the code from Banner and a separate team implementing and executing the code in production.

No exceptions were noted.

E. Survey Blackboard Hosting Services (Cloud) Experience

The audit department conducted a survey of the *Blackboard Management Team* to measure the Blackboard Hosting Services experience, with the responses listed below. Based on the results, services have improved and the team has received positive feedback from the customers.

Internal Audit also noted that there is a dedicated Blackboard management team performing strategic planning, administration, monitoring and training.

	Question	Response
1	Dedicated environments for testing and production environment?	Improved: • three non-production and one production environments
2	Implementation and turnaround on upgrades/updates and downtime	Improved: • turnaround from two weeks to 12 hours, • downtime is scheduled or minimal
3	Frequency of upgrades/updates and staying current with upgrades/updates	Improved
4	Response time of application from onsite to hosted	Improved
5	Response time on issues resolution	Improved
6	What type of feedback have you received from professors	Positive
7	What type of feedback have you received from students	Positive
8	Planning and Support	Improved: • gained a dedicated resource for UTEP, • service provider meets weekly with UTEP for strategic planning, • scheduled down times, • upgrades/updates needed for restarting the system (Service delivery manager from Blackboard)
9	Any other comments going from Blackboard onsite to hosted services?	Monthly Operational Status Reports provided by Blackboard as specified in the contract.

CONCLUSION

Based on the results of audit procedures performed, we conclude that the processes and security controls for the Blackboard Learning Management system are generally effective. We did, however, provide Technology Support a separate management letter offering suggestions for further improvement of their processes.

We wish to thank the management and staff of Technology Support for their assistance and cooperation provided throughout the audit.

APPENDIX A: GLOSSARY

Access Management	Also known as Access Control The processes of granting access to the right information resources with the right approval for a predefined reason/requirement, monitoring access and finally removing access when no longer authorized or needed.
Blackboard	Also referred to as e-Learning. *Learning Management System (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs. Courses created with this software can serve as entire online courses or as a supplement to traditional classroom courses* *To use Blackboard Learning System software, you need an Internet connection, know how to use an Internet browser, have basic word processing skills and have basic computer file management skills.* Reference: Blackboard *http://www.ufh.ac.za/tlc/sites/default/files/GettingtoKnowtheBlackboardLearningSystem.pdf*
Change Management	*Process of controlling the communication, approval, implementation, and documentation of modifications to hardware, software, and procedures to ensure that information resources are protected against improper modification before, during, and after system implementation.* Reference: UTEP Information Resources Use and Security Policy
CSA	Cloud Security Alliance (CSA) *is a "not-for-profit organization with a mission to promote the use of best practices for providing security assurance within Cloud Computing, and to provide education on the uses of Cloud Computing to help secure all other forms of computing."* Reference: Cloud Security Alliance
Cloud Computing (Cloud Services)	*Has the same meaning as "Advanced Internet-based computing service" as defined in Texas Government Code, Section 2157.007(a): "a service that provides network access to a shared pool of configurable computing resources on demand, including networks, servers, storage, applications, or related technology services, that may be rapidly provisioned and released by the service provider with minimal effort and interaction. The term does not include telecommunications service or the act of hosting computing resources dedicated to a single purchaser."* Reference: UTEP Information Resources Use and Security Policy
Configuration Manager	*The organization develops, documents, and implements a configuration management plan for the information system that:* *a. Addresses roles, responsibilities, and configuration management processes and procedures;* *b. Establishes a process for identifying configuration items throughout the system development life cycle and for managing the configuration of the configuration items;* *c. Defines the configuration items for the information system and places the configuration items under configuration management; and* *d. Protects the configuration management plan from unauthorized disclosure and modification.* Reference: NIST Special Publication 800-53 (Rev. 4)
Contract Provisions	Requirements covering standard terms in purchasing contracts, such as delivery and payment terms, breach-of-contract and prescribed remedies. Reference: http://www.businessdictionary.com/definition/general-contract-provisions.html

APPENDIX B: CRITERIA

Family Educational Rights and Privacy Act (FERPA): is federal legislation in the United States that protects the privacy of students' personally identifiable information (PII), for example, student grades.

*Texas Department of Information Resource **Security Control Standards Catalog** Version 1.3, TAC 202.76(c), Texas Administration Code Title 1, Part 10, Chapter 202*

UTEP Information Security Office **Change Management Guidelines, 02/24/2017**

UTEP Information Security Office **Cloud Services Guidelines, October 19, 2016**

UTEP Information security office Information resources Usage and Security Policy
UTEP Standards

UTEP Standard 1 Information Resources Security Requirements and Accountability

UTEP Standard 4 Access Management, June 16, 2017

UTEP Standard 5 Administrative/Special Access Accounts, May 10, 2017

UTEP Standard 7 Change Management, March 16, 2017

UTEP Standard 8 Malware Prevention

UTEP Standard 9 Data Classification March 16, 2017

UTEP Standard 11 Safeguarding Data, page 11-5 Protecting Data in Transit

> *11.5 Protecting Data in Transit. Data Owners shall implement appropriate administrative, physical, and technical safeguards to adequately protect the security of Data during transport, including electronic transmission. The following shall all be addressed:*

> *(a) Identification and Transmission of the least amount of Confidential Data required to achieve the intended business objective;*

> *(b) All Confidential Data transmitted over the Internet must be appropriately encrypted;*

> *(c) Confidential Data transmitted between Institutions and Shared Data Centers must be appropriately encrypted;*

> *(d) Confidential Data transmitted or received must be deleted upon completion of the intended business objective unless otherwise subject to records retention, in which case it must be encrypted or password protected.*

> ...

UTEP Standard 21: System Development and Deployment, page 21-2 June 16, 2017

> ...

> *21.5 IT Systems Contracts. Contracts for purchase or development of automated systems that are associated with Confidential Data must address security, backup, and privacy requirements, and should include a right for UTEP to conduct a security assessment or a right to review security assessments performed by third parties and other provisions to provide appropriate assurances that applications and Data will be adequately protected.*

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UTS165 Standards

UTS165 Standard 8 Malware Prevention

UTS165 Standard 22 Vendor and Third-Party Controls and Compliance, page 41

UTS165 Standard 4 Access Management, page 17

UTS165 Standard 5 Administrative/Special Access Accounts, page 20

UTS165 Standard 7 Change Management, page 22

UTS165 Standard 9 Data Classification, page 24 9.5

UTS165 Standard 11 Safeguarding Data, page 28 11.5 Protecting Data in Transit

UTS165 Standard 20 Software Licensing, page 40

UTS165 Standard 21 System Development and Deployment, page 41

Cloud Security Alliance (CSA) *Cloud Controls Matrix Version 3.0.1*

APPENDIX C: BLACKBOARD MODULES USAGE

The following graphs represent the usage of different tools within Blackboard. Usage is presented in terms of the number of times each tool was utilized within the April 1, 2016- April 1, 2017 timeframe. The graphs were provided by the Blackboard management team.
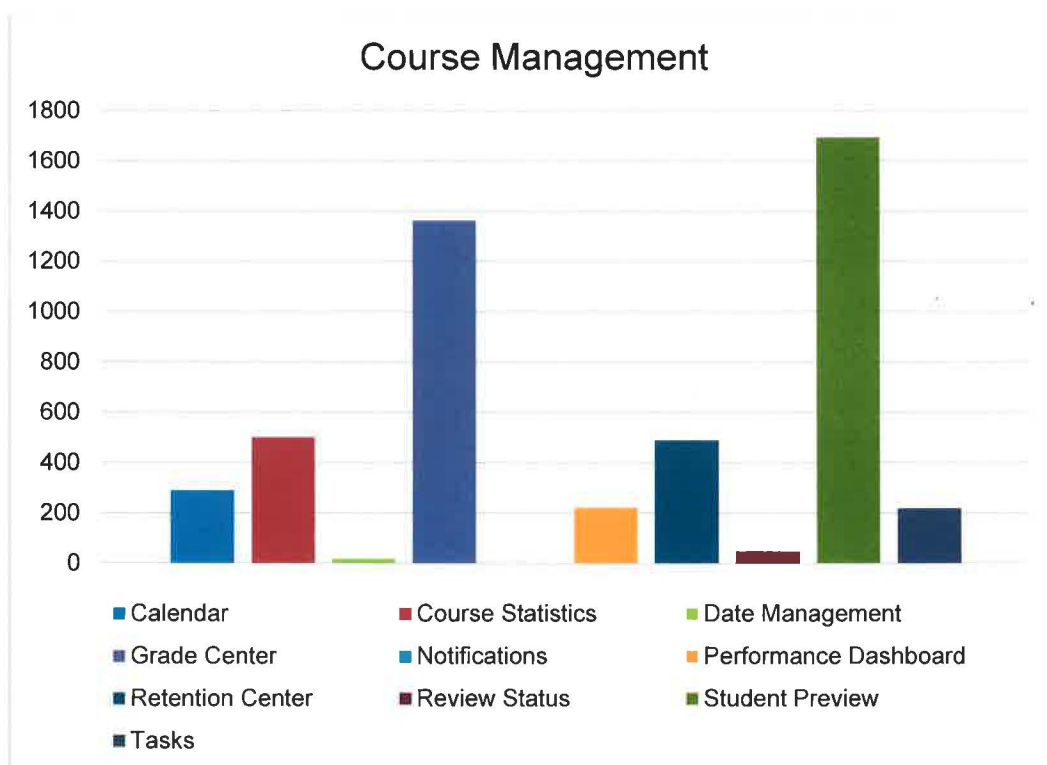
1. Assessments: The assessment tools can be utilized to facilitate learning activities for students.
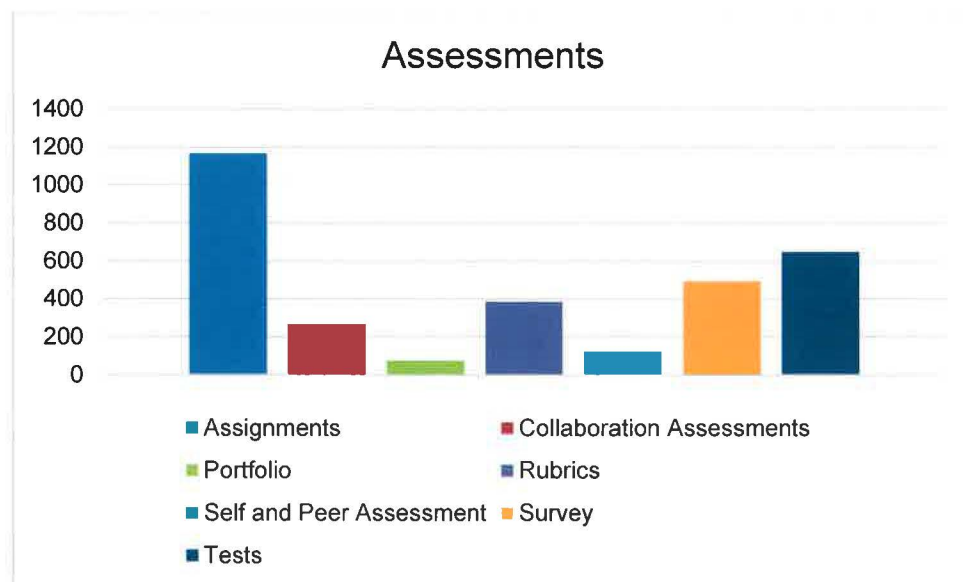
2. Communication: Tools available for faculty to communicate with students and foster collaboration during the course.
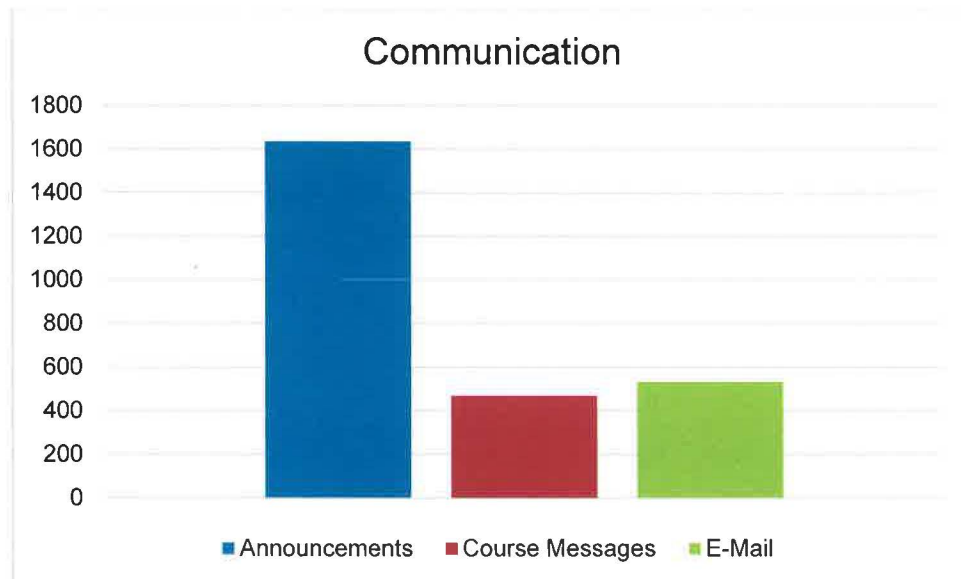
3. Course Management: Tools available for faculty to direct course activities.

4. Collaboration: Learning tools for students to facilitate teamwork as well as communication with faculty and their peers.
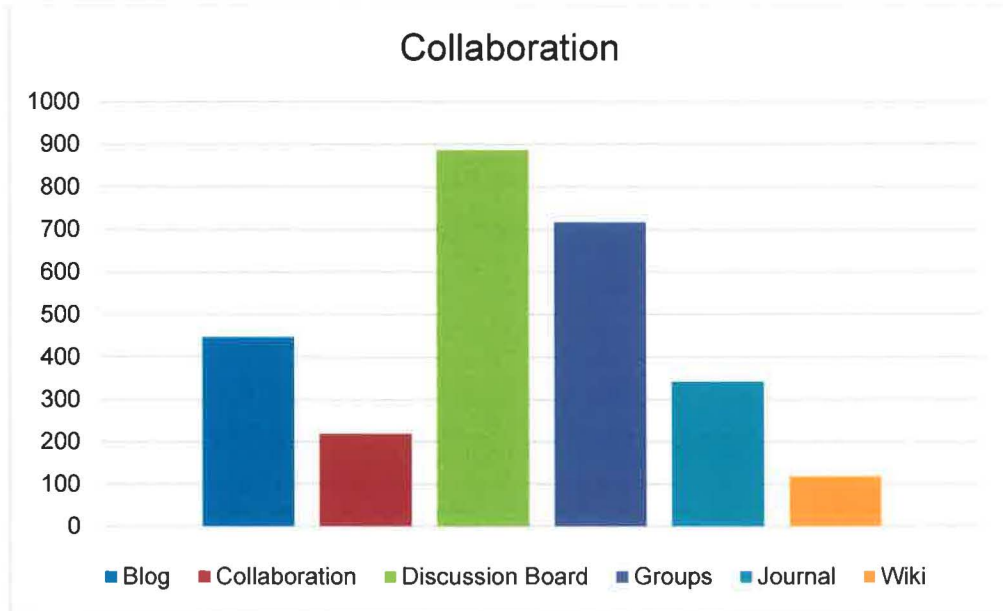
5. Content: Tools for faculty used to share course materials with students.