Using Web Based Education Technologies to Develop and Teach Traditional and Distance Learning Computing Courses

Daniela Marghitu, Shubbhi Taneja, Derek Gore
Department of Computer Science and Software Engineering,
Auburn University, Auburn, Alabama, USA
Email: *daniela.marghitu,szt0024,dag0018*@auburn.edu

Abstract— **Widespread use of the Web and other Internet technologies in postsecondary education has exploded in the last 15 years. Using a set of items developed by the National Survey of Student Engagement, research studies show a general positive relationship between the use of web-based education technologies and student engagement and learning outcomes. Recent studies forecast that by 2018, 51% of Science, Technology, Engineering, and Mathematics (STEM) jobs will be in computing. Bureau of Labor Statistics 2008-2018 Employment states that 75% of the engineering jobs in the U.S. are going to be in computing. This presentation will introduce innovative Web Based Educational Learning Management Systems, Video Management systems, and Training and Assessment application successfully used at Auburn University in developing traditional and distance learning computer courses.**

Keywords - Web-based education technologies; accessibility; learning management systems (LMS).

I. INTRODUCTION

There has been a rapid infusion of technology into traditional instruction methods utilized in higher education [9] [11]. Using a set of tools developed by the National Survey of Student Engagement, research studies show a general positive relationship between the use the of Web Based Education technologies, student engagement, and learning outcomes. Recent studies forecast that by 2018, 51% of STEM jobs will be in computing [1]. Bureau of Labor Statistics 2008-2018 Employment states that 75% of all engineering jobs in the U.S. are going to be in computing, organized as shown in Figure 1 [2].

Roadmap: In Section 2, we discuss the motivations to use educational technology in web-based courses. In Section 3, we discuss the video management web-based system used by Auburn to facilitate online learning for off-campus students. In Section 4, we talk about a tool that provides our students training to learn MS Office in the most convenient manner possible. We conclude our findings and experience in Section 5.

II. MOTIVATION FOR USING WEB-BASED EDUCATION TECHNOLOGIES

Auburn University enables all faculty members to use the Canvas learning management system [3] hosted by Amazon Web Services cloud [4] to deliver all courses.

Canvas is fully intergraded with Banner [5] (an administrative software package and a highly-integrated web-based system with a common database that is shared by everyone who uses it). Canvas is substantially conformant with Level A and Level AA of the Web Content Accessibility Guidelines version 2.0 (WCAG 2.0) [6]. Canvas includes: lectures, assignments, practice tests, exams, grades, links to other related sites, other student resources; see Figure 2. Students and instructors have constant access to these resources.

III. VIDEO MANAGEMENT WEB-BASED SYSTEM

For distance learning courses, Ponopto [7] video management system is used to manage, live stream, record, and share videos, and is fully integrated with Canvas learning system; see Figure 3.

IV. TRAINING AND ASSESSMENT WEB-BASED APPLICATIONS

MyITLab [8] is a personalized cloud-based application, providing high-fidelity HTML5 Office Simulations for teaching and learning digital literacy and Microsoft Office productivity.

Students have a realistic, simulated training environment that allows them to learn Microsoft Office skills. It offers help and hints that use multiple methods of completion, is automatically graded, and provides feedback so they can see what they've done incorrectly.

Instructors can easily assess their students' Word, Excel, Access, and PowerPoint skills by assigning projects that are submitted and immediately graded by MyITLab's Grader engine. The engine also captures potential integrity violations at both the document and

 ISBN: 978-1-61208-563-0

content level to ensure students are completing their own work.

MyITLab [8] includes a road map for continued accessibility enhancements that meets WCAG 2.0. The MyITLab interface features several aids for low-vision and mobility-impaired users, including: voicing, keyboard controls, and adjustable screen settings: The *Accessibility Mode* brings up the Accessibility Toolbar, which reads MyITLab aloud, highlights text as it is read, and provides options to translate the MyITLab interface into several languages [10][11]. The new MyITLab Virtual Keyboard is designed to ensure that every student can complete the simulation activity (see Figure 4).

This keyboard allows for users with visual impairments, with non-PC hardware, such as a Mac computer, to enjoy the same user experience.

V. CONCLUSION AND FUTURE WORK

Web Based Education Technologies are rapidly and fundamentally changing higher education, enabling students to learn what they want, when they want, and how they want. Many developing countries don't have access to Web Based Education

Institutions of higher education also have the ethical responsibility of providing learning opportunities to all. Constructive partnerships between publishing, education and assistive technology companies, academia and governmental education institutions are vital for maximizing the success, and inclusiveness of the Web Based teaching and learning.

REFERENCES

[1] CEW Goergetown. Computer scienc, 2012.

[2] U.S. Bureau of Labor Statistics: http://www.bls.gov/, [Accessed March 19 2017].

[3] Canvas: https://www.canvaslms.com/, [Accessed March 19 2017].

[4] Amazon Web Service Cloud: https://aws.amazon.com/, [Accessed March 19 2017].

[5] Banner: http://www.ellucian.com/Software/Banner-Student/, [Accessed March 19 2017].

[6] Web Content Accessibility Guidliness 2.0: https://www.canvaslms.com/accessibility, [Accessed March 19 2017].

[7] Ponopto: https://www.panopto.com/, [Accessed March 19 2017].

[8] MyItLab Accessibility: http://wps.pearsoned.com/accessibility, [Accessed March 19 2017].

[9] Mull, C. A., & Sitlington, P. L. (2003). The role of technology in the transition to postsecondary education of students with learning disabilities a review of the literature. The Journal of Special Education, 37(1), 26-32

[10] Burgstahler, S. (2002). Working together: People with disabilities and computer technology. [University of Washington], DO-IT.

[11] Timmermann, S. (1998). The role of information technology in older adult learning. New Directions for Adult and Continuing Education, 1998(77), 61-71.

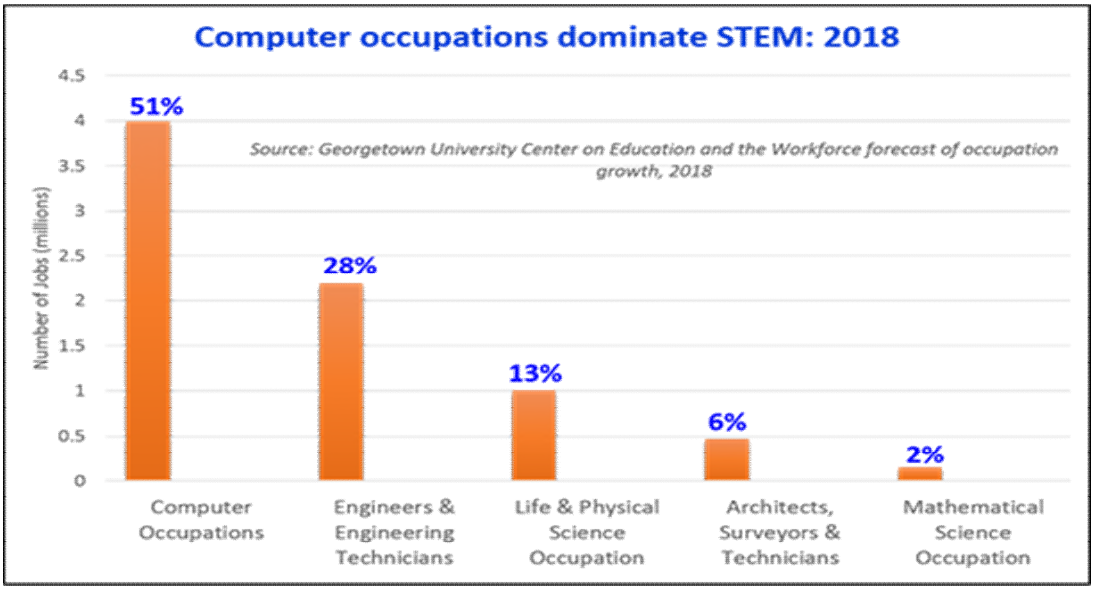

Fig.1 STEM jobs by the year 2018

 ISBN: 978-1-61208-563-0

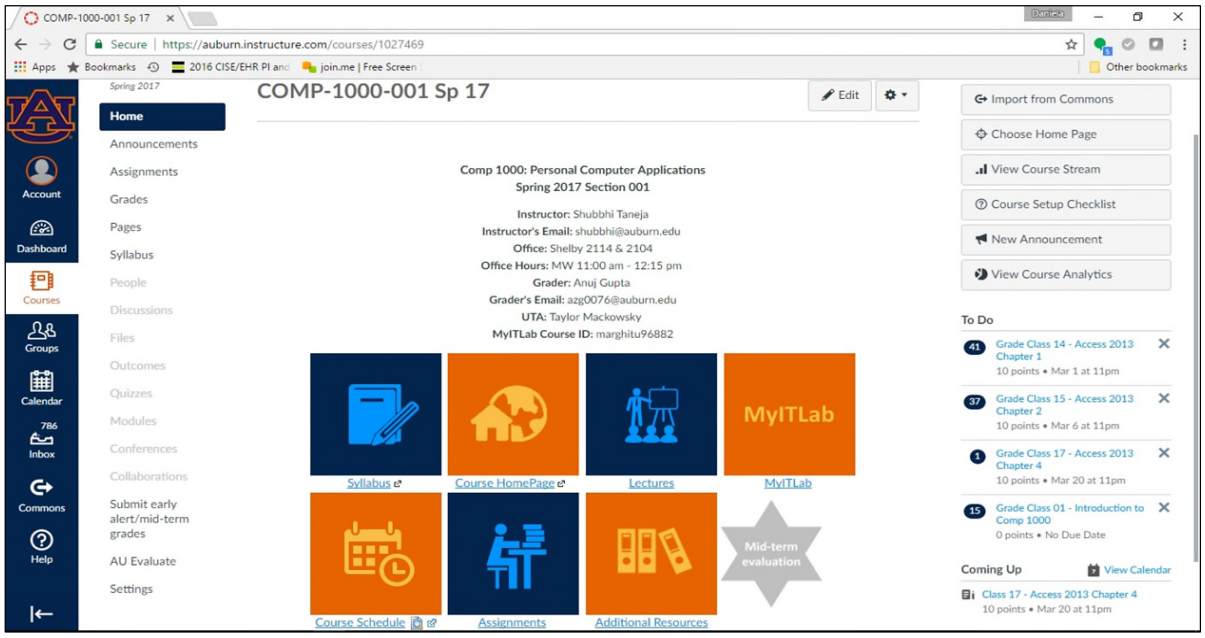

Fig.2 Canvas coures template

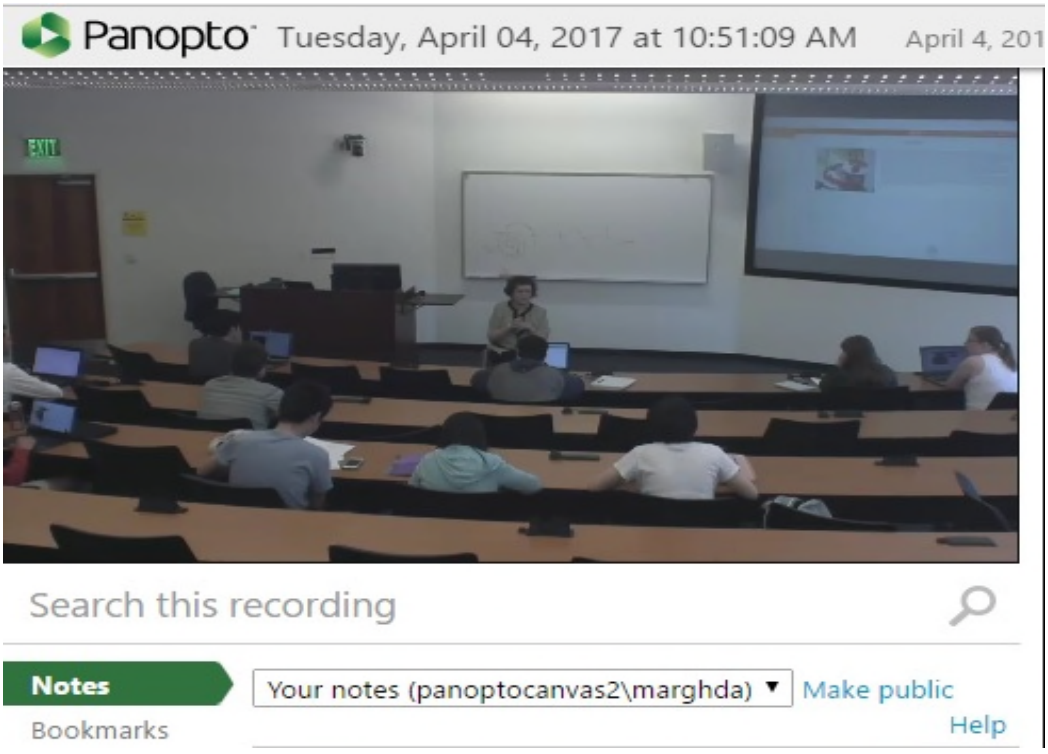

Fig.3 Ponopto recorded lectures

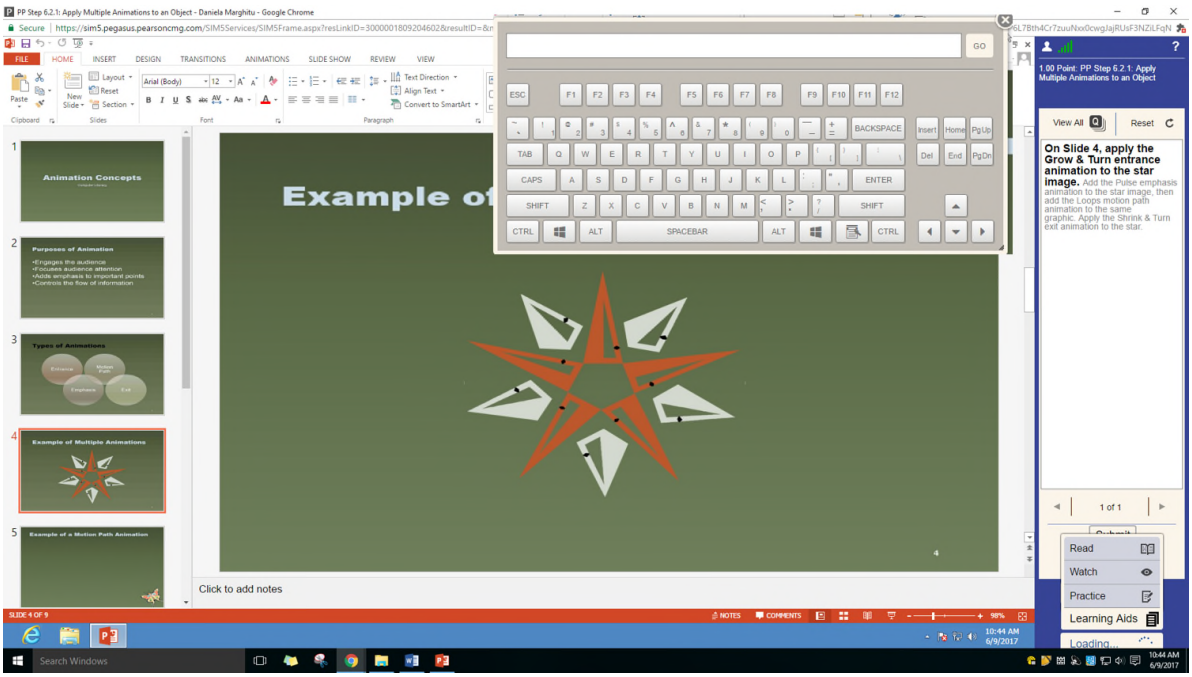

Fig.4 MyITLab student interface.

 ISBN: 978-1-61208-563-0