

SATORI: OPEN-SOURCE COURSE MANAGEMENT SYSTEM

THE IMPACTS OF ONLINE LEARNING IN HIGHER EDUCATION

An Undergraduate Thesis Portfolio
Presented to the Faculty of the
School of Engineering and Applied Science
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By

Madison Flynn

May 6, 2021

SOCIOTECHNICAL SYNTHESIS

The COVID-19 pandemic caused a mass transition of university courses to an online setting which led to gaps in higher education. While the technical project Satori, which is an open-source course management system, was already useful before the COVID-19 pandemic, this year has increased its benefits in providing the necessary resources to aid students' online learning. The STS research topic focused on the impact of online learning on higher education, which has become more important due to the global pandemic as well. The most influential aspects of online learning for professors and universities to focus on when developing online courses were examined using the Social Construction of Technology (SCOT) framework to explain the different relevant social groups that influence online learning and what they can do to improve students' learning in online courses. Together, the technical project and research topic can give insight on where universities and professors can improve to make online learning environments more conducive for everyone.

The technical project started last year and is continued this year to create a new system that is better than the course management system that was being used for CS 2150: Program and Data Representation. The old system has many issues and is very slow when the system is busy such as when there are a lot of students in the office hours queue and when students submit a lot of support request tickets to the course staff. This year, we developed a support request ticketing system, a statistics interface to allocate teaching assistant help better during busy office hour times, and fixed issues in the office hours queue to be able to release Satori to the students.

Students have been using the office hours queue since the beginning of the semester and we just shipped out the support requests ticketing system and the statistics interface. We have fixed little bugs along the way, but we have seen that the students are adapting to the new system

quickly without any guidance and like the system more than the old one. We hope to extend Satori to other computer science courses at UVA and beyond, and that a new team will continue to build on top of the project.

The research question examined is what elements should be focused on when developing online courses based on the experiences of relevant social groups, such as students, instructors, and universities? This led to a thesis statement that feedback, engagement, and learning management systems should be the main points of concentration in online course development. Studies, subjective experiences, and the SCOT model were all used to support my thesis statement.

The SCOT model helped lay out all the relevant groups that contribute to online learning and the issues that each group has. For student-instructor feedback, multiple studies showed a correlation between timely and quality feedback with course satisfaction and grades. The issues in engagement are demonstrated through studies that show the important differences of class structure when in-person versus being online, subjective experiences from students about being in a less engaging classroom, and methods for professors to increase engagement that another university professor has learned from teaching online. Finally, for learning management systems, sources described many functionalities and benefits that these systems offer to online education and a study displayed increased learnings from students using a remote platform.

All in all, integrating tools that increase interaction, keep students engaged in a course, and provide a way for instructors to issue timely and quality feedback into a course management system could greatly benefit online courses. Students, instructors, and universities need to do their part in restructuring courses and/or restructuring their attitudes towards online learning for courses to succeed in an online setting as well. The technical project is a start for the solution to

the problems with online education as it incorporates feedback and interaction components into courses.

TABLE OF CONTENTS

SOCIOTECHNICAL SYNTHESIS

SATORI: OPEN-SOURCE COURSE MANAGEMENT SYSTEM

with Jelena Liu, Megan Marshall, and Daniel Mizrahi

Technical advisor: Aaron Bloomfield, Department of Computer Science

THE IMPACTS OF ONLINE LEARNING IN HIGHER EDUCATION

STS advisor: Catherine D. Baritaud, Department of Engineering and Society

PROSPECTUS

Technical advisor: Aaron Bloomfield, Department of Computer Science;

STS advisor: Catherine D. Baritaud, Department of Engineering and Society