Cabot Science Library:
Creating Transformative Learning Environments in Library Spaces

Joanna Huang
Harvard University, USA

Anu Vedantham
Harvard University, USA

EXECUTIVE SUMMARY

Cabot Science Library has transformed from a traditional collections-based science library into an innovative hub for collaborative learning support. This chapter examines how a well-designed space and technology promotes effective learning and documents how Cabot functions as a smart learning environment. The interplay between a physical and digital environment at Cabot Science Library emphasizes learner mobility and engagement, collaboration, and discovery, enabling knowledge creation and sharing.

INTRODUCTION

It's almost midnight on a warm summer night in August 2017. The incoming undergraduates to Harvard University, close to 1,700 strong, are finishing up their Opening Days orientation events and preparing for the first day of classes. Over 450 students gather in the Cabot Science Library for Game Night. A rambunctious trivia competition is taking place at the Discovery Bar, with the live leaderboard displays on a large projection screen. About 120 students cluster in small groups, staring at the screen of a single smartphone. Each group includes four or five students who are new to each other and new to campus. They confer on a humorous name for their team phone. As a question pops up on the big screen, they whisper and choose a response on the team phone. As the timer clicks, they wait eagerly to see which team won the round. Some questions test knowledge of Harvard history. Some questions explore popular culture, news, and movies. Others tackle chemistry and mathematics. The energy in the room is contagious. Each round lasts only a few seconds and then a big cheer starts up as one team takes the lead. There will be a half-hour to relax with snacks before the next round starts.

In a departure from past practice, current undergraduate students have determined the structure and content of this library event. A sophomore created the trivia questions in an online app called Kahoots. Library administrators arranged for after-hours staffing to host this large event with music, cookies, and games until one in the morning.

Changes to learning spaces affect perceptions and usage of libraries as evidenced by the Game Night event. Library renovations brought in attributes of smart learning environments (SLEs) to emphasize mobility, engagement, knowledge sharing, media creation, collaboration and discovery. Consequently, the number of library visitors increased dramatically, tripling over pre-renovation numbers for some months of the year.

OVERVIEW

Although there is considerable debate surrounding the definition of the term SLE (Singh and Hassan, 2017, p. 9), researchers focus on adaptability to learner needs, and flexibility to promote effective learning. The Cabot Science Library provides learning spaces and technology infrastructure that redefine expectations of libraries. As Bennett (2011) argues, informal learning spaces complement the learning impact of classrooms and labs. These open spaces invite creativity, allow for exploration and play, and increase student autonomy.

The smart learning framework articulated by Zhu, Yu, and Riezebos (2016) identifies several elements of a space that make it an SLE. For example, students can "learn flexibly and working collaboratively in smart learning environments, and thus could foster the development of personal and collective intelligence of learners" (Zhu et al., p. 15) as a result of the customization of learning support and services. Gros (2016) reminds us that physical location and built-in capabilities play an increasingly important role in educational settings. As educators implement blended learning practices that combine virtual and in-person interaction, distinctions between the two modes increasingly blur. Students use phones to connect synchronously in class. Students stand next to peers while interacting with others who are geographically distant. Conversations in-person and online can overlap in real-time and can be represented on physical displays in creative ways. Library spaces that recognize evolving communication patterns support pedagogical experimentation by faculty.

Singh and Hassan (2017) describe how instructors use technologies familiar to many university faculty and students--for example, learning management systems--to help students develop metacognition. Self-graded quizzes with explanations help instructors embed subject knowledge within the constraints of a learning management system. For in-person collaboration, a trivia contest can function similarly.

The Cabot Science Library renovation reflects trends in library design to shift away from print collection storage towards collaborative learning support. This chapter examines how a well-designed and technologically enhanced space promotes effective learning. After describing the campus context, the space, and pedagogical background, we detail four use cases and describe changes in user experiences post-renovation.

Campus Context

Harvard is a large, decentralized and residential university, with an undergraduate body of close to 7,000 students and extensive infrastructure for science research and teaching. Student interest in science

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