# Applying Open Source Principles to Collaborative Learning Environments

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## ABSTRACT

Open source software provides an example not only of a viable software development methodology, but also a model for collaborative construction of artifacts. Open source communities exemplify principles that are important in collaborative learning environments. This paper explores how open source efforts can be used as inspiration for the creation of collaborative learning experiences in a university course. Concrete public deliverables and use of collaborative technology help students explore ill-defined projects that are personally meaningful. This paper provides a description of open source principles, their role in designing collaborative learning experiences, the application of these principles in a university course, and the findings based on analysis of course projects and collaborative technology.

### Keywords
Open Source, Swiki, CoWeb, undergraduate education

## INTRODUCTION

One view of collaborative learning is as a compromise between two extremes of control. At one extreme, learning is a transmission of knowledge from instructors to learners. At the other extreme, learners choose the topics that are interesting to them and teachers serve as facilitators. In this dichotomy, collaborative learning is a compromise approach in which students and instructors both yield some control to create a more dynamic environment. Both extremes are similar, in that they imply a situation where one party is in control and the other acts in a more passive role. An alternative to this concept is to contrast "one-way" control models with a more community-oriented approach to learning settings (Rogoff, Matusov, & White, 1998). Participation in this manner transforms the roles and they become more shared and dynamic. This involves not a compromise between extremes but a departure from "one-sided" notions of control. Important to the community-oriented approach to learning is the notion of collaborative construction. Learners take an active role in constructing externalized artifacts in order to explore relevant concepts (Papert, 1980). Construction is a social activity involving both the artifacts created by the community and the relationships between community members (Shaw, 1996). This relation between learners and teachers may be asymmetric, and the roles may shift over time.

Open source software has been gaining attention recently as a viable software development methodology. In open source situations, diverse groups of individuals work together to create complex software systems. Much of this attention focuses on open source software as inexpensive alternatives to commercial software (Davis et al., 2000). One popular use of open source software is in teaching computer science principles such as operating systems and networking (Claypool, Finkel, & Wills, 2001; Nelson & Ng, 2000). Open source principles are also being used in MIT's "OpenCourseWare" project (Goldberg, 2001), in which all Web course materials will be free to the public. While this provides access to materials, it doesn't address the role the community will play in the evolution of academic resources or questions of intellectual property. An alternative perspective on open source involves the collaborative aspects of the open source communities themselves. Although open source communities may not be explicitly designed as collaborative learning communities, they exhibit many properties relevant to collaborative knowledge building activities. Open source communities provide a real-world example of how groups of individuals collaborate to create new software. Participants play an active role in the creation and refinement of software. The act of creating software is the vehicle through which the community learns about its own needs, explores solutions, and constructs something of benefit to the community.

In this paper, we will explore the relationship between collaborative knowledge construction and open source software. We will describe open source and how open source communities address problems in collaborative knowledge construction. We will then describe how open source principles were used in the design of a university course and some observations about that course. Finally, we will discuss the similarities and differences between open source and course situations as well as the challenges that face both types of collaborative learning situations.

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