

# Facilitating Co-adaptation of Technology and Education through the Creation of an Open-source Repository of Interoperable Code

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**Abstract.** Co-adaptation of technology and education is a daunting challenge because of the limited resources available to individual researchers. Without keeping ITS systems runnable on the latest computing platforms, the educational technology we develop will become obsolete by default. Without keeping ITS systems current with the latest advances in experimentation and educational research, our educational technology will become obsolete by design. To simultaneously address these challenges, we propose the creation of an open-source research consortium focused on educational code-sharing that will speed the co-adaptation of technology and education, allow for more cumulative progress in our discipline, and result in faster progress for individual projects and researchers.

**Keywords:** co-adaptation, intelligent tutoring systems, e-learning, instructional design

## 1 Introduction

The evolution of ITS work hinges on the co-adaptive relationship between education and technology. Educational theories are tested and validated through experimentation, and are manifested in some form of technology or task that provides the examples of that theory in action. Once a technology is validated by this sort of grounded experimentation, it can be applied within the classroom. However, if that technology is to have a broad effect in various educational environments, it must be generalized by providing multiple examples of its instantiation in different contexts. It is this progressive cycle of the experimental validation and adoption of new technologies for learning that drives ITS research. Unfortunately, because of the difficulty of generalizing the technological products, this co-adaptation of education and technology can move very slowly.

As early as 1998, Ritter and Blessing identified a key way to speed up this process, which was to design educational systems with a component-architecture according to unified standards that would allow these systems to *work together*. In their vision, one way to do this was with off-the-shelf components integrated through translation tools such as those presented in their paper [1]. Their vision is very similar to what we propose: *to form specific standards for communication by bringing together research-*

*ers from around the world in a consortium and then provide a community infrastructure to support these standards.* This Consortium for Open-source Development of Educational Software (CODES) will create a repository of interoperable/standardized code to foster communication and cooperation between sub-disciplines within the educational software research community.

We are not the first to consider the need for this community portal for sharing and finding educational software [2], but we are the first to attempt to create a consortium with the combination of the three following critical features. First, our proposed solution will create a new repository of standardized educational software code in order to enhance and accelerate research. A second important merit of the overall proposal will be the unification of the scientific effort (a function of the standardization) within the educational software community, which will provide similar benefits to those discussed by Allen Newell [3] in the context of unified models of cognition. Third, our proposal will, to enhance adoption, use a beginner-friendly application development approach instantiated by a final product that offers the researcher both individual components and full running examples of educational systems which the researcher can modify, improve, and dissect rather than having to start from scratch. Overall, the sharing, unification, and beginner friendly approach fostered by this proposal will enable faster development, allow for more constrained validation of theories, and encourage participation in our field.

## **2 Conclusion**

We advocate a radical solution to the challenges of co-adaptation of education and technology. We have proposed that the field as a whole should move away from fully independent bodies of research towards the goals of greater technological and theoretical unification. Our aim is to engage the community in creating the standards necessary for such unification, as well as helping to build, share, and continuously improve educational software through the open-source projects advocated by this proposal. Such an integrated effort specifically fosters co-adaptation of education and technology by grounding theoretical educational developments in specific shared technologies, and conversely, by bootstrapping the adoption of new technologies in education with much greater speed than has previously been possible.

## **References**

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