

# **LBA: Learning By Authoring, a new pedagogy in learning**

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## **Abstract**

The purpose of learning is to acquire knowledge, skills, or values. In order to provide a better and more efficient learning environment for long-term retention and transfer, proposed is a new learner-centered paradigm that incorporates digital media authoring to share with peers as a part of learning process. A case study shows the approach is motivating the student to work harder and promising to maximize the student's learning.

## **Introduction**

During the 1960s, Edgar Dale theorized in his Cone of Experience model that learners retain more knowledge by what they “do” as opposed to what is “heard”, “read” or “observed” (Dale 1969). What is the best way to “do” in classrooms, then? Chung has learned that one of the best ways of doing is to participate in competitions (Chung 2008). However, the problem of competition is that there will be only a few winners, which became a discouragement for some non-winning students. A proposed solution to this problem is to encourage students to author and publish books integrating all the learning experience from the competition season. The publications will be valuable since they will include both success stories as well as lessons learned from failures. The extended idea in the cone of learning model is diagrammed in Figure 1.

Why books? In human history, people wanted to record what they have learned in the form of books. It is true that human nature has a desire be authors of books. The earliest dated printed book known is the "Diamond Sutra" from China in 868. In 1041, movable clay type was first invented in China. Gutenberg in Germany introduced a technology that changed the world of printing. He invented the printing press with replaceable/moveable wooden or metal letters in 1436 (completed by 1440). This method of printing can be credited not only for a revolution in the production of books, but also for fostering rapid development in the sciences, arts and religion through the transmission of texts.

After Gutenberg, books were impacting society, culture, religion, politics, and human history. However, you may think that publishing a paper book is an unrealistic and non-

practical method, since it is expensive, turn-around time is long, and no publishing company is interested in printing books authored by students. Yes, that is true. Publishing traditional paper books is not feasible for learning in classroom environment.

<i>After two weeks</i>	<i>Activities</i>	<i>Types of involvement</i>
90+% of what we use/author/teach	Author a book based on every experience below. Teach others using the book Update the book based on feedback	Active+ (leadership)
90% of what we say and do	Develop a tangible system; Conduct a demo; Participate in a competition	Active
70% of what we say	Presentation; Participation in discussions	
50% of what we hear and see	Watching a video or demo	Passive
30% of what we see	Looking at pictures or diagrams	
20% of what we hear	Hearing words	
10% of what we read	Reading	

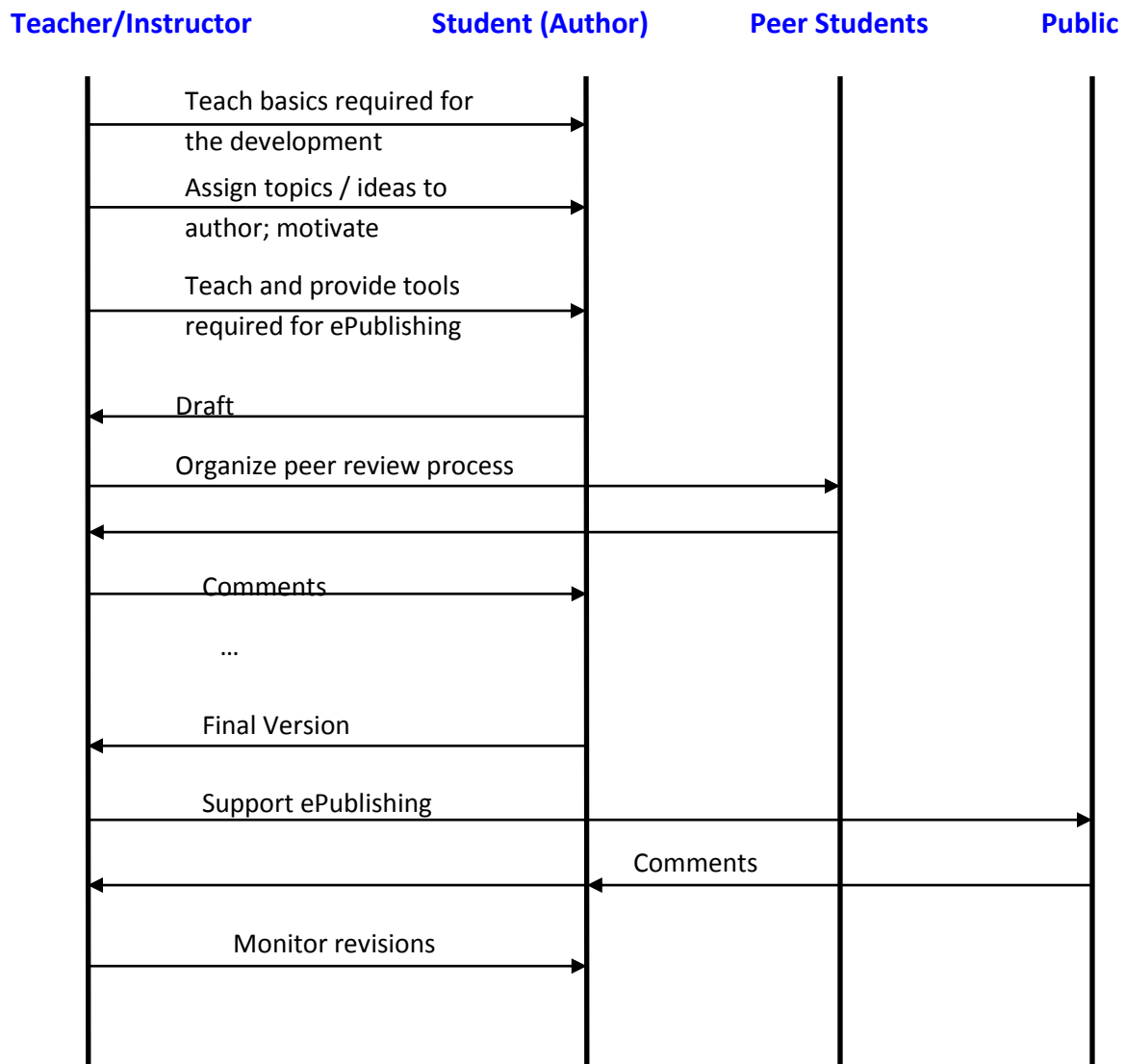
(Figure 1) Extended Cone of Experience, adapted from (Dale, 1969)

However, recently, the Internet changed the whole concept of book publication. It is easy, simple, and affordable to publish digital e-books online that can be shared by people all around the world. The e-book with hypertext may contain not only static images, but also dynamic videos and animations. Ryu (2004) studied a grounded theory of knowledge transformation in the hypertext text authoring process.

We must use this remarkable innovation for pedagogical purposes. Proposed LBA (Learning by Authoring) is a new paradigm that provides a learning framework for students to author digital media (tutorial, handbook, FAQs, blogs, manual, video, animation, e-books, etc.) and publish online so that it can be shared by other students around the world. It is believed to be a very effective learning paradigm for several reasons. First, authoring gives a good motivation for the student to work hard to study, collect data, visualize, animate, analyze, synthesize, generalize, and summarize what they have experienced and learned regardless of success or failure. Second, the author can use the book to teach other peer students. Third, the author needs to update the book through constant feedback from other students who use it, which makes the learning process very effective. This new paradigm can be applied to K through PhD classrooms.

### Suggested LBA Paradigm and Roles of Instructors

The role of teachers/instructors is important in this learning model. First of all the teacher must inspire students to author eBooks. Then the teacher needs to provide all the technical details for the ePublication including tools and accounts. Before the official publication, it is recommended to organize peer review processes. After the publication the teacher must supervise to produce revised versions. The whole process is described in Figure 2.



(Figure 2) Sequence chart of essential LBA activities

## Case Study

Emily Trudell, who earned a master's degree in computer science at Lawrence Tech, has written an eBook at LULU.com, "Beginner's Programming Guide to Robotics using AIBO®," an introduction to AIBO programming with C++. The book costs \$5, and she is donating 50 percent of the sales profits to Robofest at Lawrence Tech.

Trudell has been involved in the Lawrence Tech AIBO robot dog soccer team since summer 2005. She went to RoboGames 2006 in San Francisco where her team won the gold medal in the AIBO performance division. Later she was the captain of Lawrence Tech's AIBO soccer team that went to RoboCup 2007 in Atlanta. Only 24 teams from around the world qualified after submitting a video and a technical paper.

Based on what she had learned during the RoboCup soccer competition, Trudell taught AIBO robot programming at a Robofest summer camp for young gifted students in summer 2007.

The book was written with help from other members of Lawrence Tech's AIBO team as an educational tool for programming AIBO robots. It is intended for students with some programming experience, but prior specific knowledge of AIBO technology isn't necessary.

"The contents of this book are based on our learning experiences over several years of AIBO use and code development and I learned more while authoring this book. I also got a lot of feedbacks to correct and improve it from readers who purchased my book." Trudell said.

## Issues and Conclusion

A similar approach was proposed by (Fu, Hohne, Barkel, & Woolf, 2007) to co-author wiki textbook from a large class collectively. Proposed LBA approach is slightly different from that. The cons of the collective approach are the lack of sustainability and responsibility. Since there is no owner of the developed wiki material, it is highly possible that the wiki site might become obsolete. This LBA approach assigns an author or a few authors for each material developed. This will motivate students who own copyrights to do the extra work, even after the formal learning period to revise the work by collecting all the feedback and comments from the readers, which will result in more active learning. LBA is an effective pedagogy to provide systematic methodology to let students learn more by authoring eBooks.

## References

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