

Editorial: Transmedia Publishing

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The *CITE Journal* was conceived as a scholarly publication that could transcend traditional boundaries. In contrast to previous print-based publications, an electronic journal offers the opportunities to incorporate sound, video, and interactive visualizations. The editors found that many scholars still find printed materials useful for a variety of reasons. A printed article can easily be placed in a promotion and tenure portfolio. Printed material also readily lends itself to annotation.

For that reason the *CITE Journal* is available in both formats (Figure 1). In addition to the electronic version, each issue has a link to download a printed copy of the article. The printed equivalent is generated once an issue is closed out. The pages are numbered consecutively across issues for each volume, and are indistinguishable from a printed journal. The electronic and printed versions of the media have complementary affordances. Consequently there is no particular reason that both formats should not be made available, allowing the reader to select the version that is best for a particular application or use.

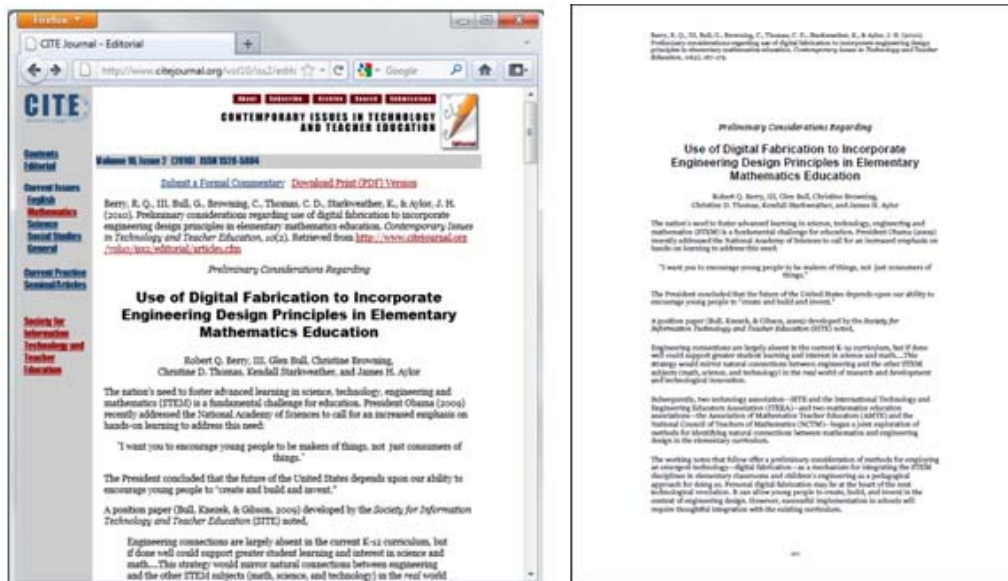


Figure 1. The *CITE Journal* is available in both electronic and print formats.

Electronic books are likely to represent an increasingly large share of books as a medium. In all likelihood, printed matter will not be completely supplanted but instead will continue to co-exist with their electronic counterparts in the future. Indeed, this has also been the case for other media: Live theater continues to exist even with the advent of film. Cinema, in turn, continues to exist even with the advent of television, etc. Each may have complementary affordances that are valued in a particular circumstance.

Recently, when we offered elementary students the option of using either video instructions or printed directions for an engineering project, the majority of the students elected to use the printed materials. There are several reasons why they may have made this choice. The printed materials were larger in format, easier to navigate (moving quickly to a specific page or section rather than advancing to a particular location in a video), and easier to annotate. For many students the printed materials were the right tool for the task.

Not only will books continue to co-exist in print and electronic form, but emerging technologies will offer new possibilities for both formats. In particular, future printed books will offer the possibility of seamlessly moving from not only a physical page to an electronic space, but also from an electronic space to a physical page. We have adopted the term transmedia book, or T-book, to describe this new possibility (Figure 2).

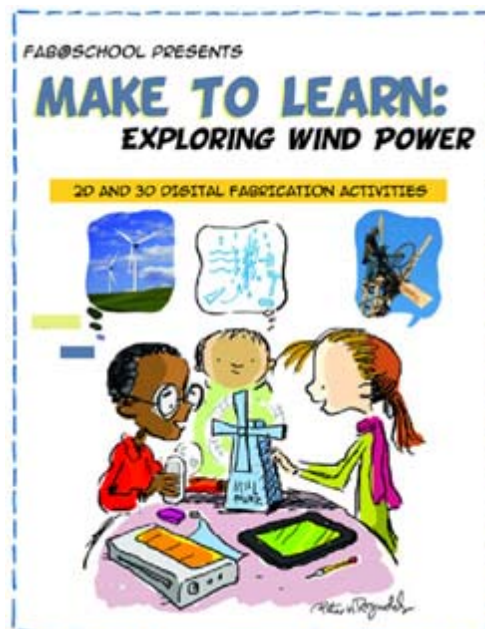


Figure 2. *Transmedia books (T-books) cross physical and virtual boundaries.*

Transmedia refers to the ability to cross media, in this instance from a digital design or image to a physical object and back again. A transmedia book has many characteristics of a traditional book, but in addition, it serves as a nexus for all of the digital resources and physical objects necessary to the telling of its story.

An initial prototype, *Make to Learn: Exploring Wind Energy* ([Appendix](#)), illustrates several of the characteristics of a transmedia book. It is anchored in the story of William Kamkwamba, a boy from Malawi, who "[harnessed the wind](#)" by bringing electricity to his

remote village. He accomplished this feat by building a working wind turbine from wood, scrap metal, leftover tractor parts, and a bicycle. With this wind turbine, he managed to power four electric lights and two radios in his house.

As students read William's story, they participate in a series of activities that parallel William's work, culminating in the production of a working model wind turbine that can illuminate a series of LED lights embedded in the back cover of the book itself, "lighting" the many homes in an African village.

For decades, educators have employed activity books that guide students through the steps of projects. T-Books, such as our prototype example, build upon and extend this tradition. The prototype T-book includes Quick Response (QR) codes with electronic links to videos and online simulations that expand content in the book. The book also includes links that allow the students to fabricate objects depicted in the book.



Figure 3. QR code for the *Make to Learn* wind project.

Gears, for example, are a critical component of effective wind turbine design. An introduction to gears and gear ratios includes links to electronic files that can be used to construct model gears using 2D and 3D fabricators (Figure 4). This feature allows students to produce and explore the objects discussed in the book and employed in later aspects of the turbine creation.



Figure 4. A link in the prototype T-book can be used to fabricate working gears that students incorporate into the book.

The Video 1 shows fifth-grade students beginning a lesson on ratios by working with fabricated gears (see <http://www.youtube.com/embed/c1qiyvjmO9Y>).

Similarly, links to digital files allow students to construct electrical circuits to facilitate understanding of the way in which electrical energy can be conveyed from a turbine to a light or radio (Figure 5).

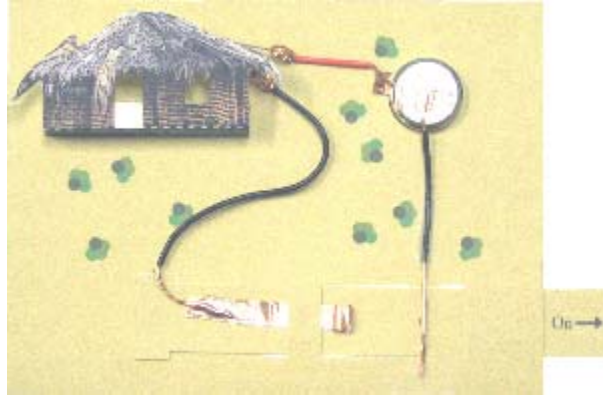


Figure 5. Students also construct working circuits that are incorporated into the prototype T-book.

Video 2 shows students creating electrical circuits using digitally fabricated components and a template provided in the book (see <http://www.youtube.com/embed/ekb9IV17PUk>).

Work pages designed to assist learners' acquisition of core mathematics concepts incorporated into these activities are not included in the book but are available at www.maketolearn.org/wind. Providing reproducible work pages at a separate site allows for greater narrative flow of the text and enables students the freedom of printing separate sheets for alternative solutions; this strategy differs notably from traditional activity books with single, bound worksheets. With the flexibility and nimbleness afforded by digital technology, existing work pages can be easily revised or added to in response to users' feedback.

The prototype T-book, like the *CITE Journal*, exists in electronic as well as printed form. The printed version offers a number of benefits for the novice. It serves as a platform for conducting physical experiments with circuits and gears. These real-world, physical activities anchor students' explorations in a concrete context, fostering the development of manipulable, abstract representations. Explorations in a physical medium can extend to unanticipated paths and directions. We have been encouraged by the innovative solutions students have developed when afforded this opportunity.

The physical T-book focuses the disparate elements of the activities—digital video, paper manipulatives, online simulations, electric circuits, and so forth—and binds them in a way that makes the various elements more approachable for readers. Background information is provided as needed regarding wind turbines, electrical circuits, digital fabrication, gear ratios and other aspects of the project. Photos, diagrams, and illustrations add visual interest and illustrate both concepts and concrete examples.

At this year's National Technology Leadership Summit (NTLS), leaders of the teacher education associations that publish the *CITE Journal* explored potential directions for future transmedia books. Four teams—representing science education, mathematics education, engineering education, and the arts—developed concepts that focus on each area. The mathematics team's proposal, *Water Wells for Africa*, focused on the issue of access to clean drinking water—a significant problem highlighted by the fact that one in eight people does not have access to clean drinking water, leading to more than half of the world's hospitalizations. The engineering team addressed the related issue of agricultural irrigation. The science team developed a proposal for a transmedia book featuring a

future NASA mission that will investigate the earth's magnetic fields. The arts team developed a Calder-based concept involving digital fabrication and mobile sculptures.

The [NTLS Editors](#) (editors of leading education technology journals who participate in NTLS) served as judges to evaluate the proposed T-book concepts. The editorial panel ultimately selected the *Water Wells for Africa* proposal as the concept best integrating the various physical and virtual attributes of a T-book, but judged all four concepts to be exemplary and recommended that each concept be developed and moved to publication. Development teams at four universities have agreed to produce and pilot the respective T-book concepts.

Additional information regarding the evolution of T-books will be published in other journals affiliated with the National Technology Leadership Coalition, including the *Journal of Technology and Teacher Education*, *Learning & Leading with Technology*, and the *Journal of Digital Learning in Teacher Education*. The T-book will be presented at the various conferences of affiliated associations.

The ability to replicate physical objects through digital fabrication has the potential to alter the nature of children's future learning. A T-book is a printed text that contains QR codes that lead to online resources, such as videos, images, or simulations, as well as physical manipulatives. Links in the T-book can be used to transform images and designs in its pages into physical objects.

The *CITE Journal* was conceived as a transdisciplinary peer-reviewed journal that could be used to explore concepts across media and disciplines. The T-book extends this concept to other published materials that explore the boundaries of emerging technologies in today's classrooms.

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Resources

William Kamkwamba: The Boy Who Harnessed the Wind website -
<http://williamkamkwamba.typepad.com/williamkamkwamba/2009/04/my-book-the-boy-who-harnessed-the-wind.html>

NTLS Editors - <http://www.ntlcoalition.org/editors.html>

**Appendix
Make to Learn Book**

(pdf download)

Go to <http://www.citejournal.org/vol11/iss3/editorial/AppendixA>

Contemporary Issues in Technology and Teacher Education is an online journal. All text, tables, and figures in the print version of this article are exact representations of the original. However, the original article may also include video and audio files, which can be accessed on the World Wide Web at <http://www.citejournal.org>