

**eLearning Commission
Teaching and Learning Subcommittee**

Recommendations for *Digital Education Resources for K-12 Education*

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Introduction

We have rapidly entered the *digital information age*, in which digital books, newspapers, magazines, music and videos are distributed via the Internet for use with devices such as e-book readers (e.g., Amazon Kindle or Barnes & Noble Nook), tablets (e.g., Apple iPad or Samsung Galaxy), smart phones (e.g., iPhone, Android), MP3 players (e.g., iPods), video streaming devices (e.g., AppleTV, Roku), and computers (including desktops, laptops, and netbooks). With every passing month, the digital transition progresses further and faster; for example, Amazon now reports that it sells more digital e-books than traditional hard copy books, the iPod and other MP3 devices have fundamentally changed the music publishing industry and online streaming video is beginning to replace DVD's for distributing videos to homes.

In K-12 education, we are at the beginning of the impact of this digital transformation. While most students still use traditional textbooks, these are frequently supported with web-based supplementary materials. Some schools are already using digital textbooks; major publishers increasingly provide e-textbooks in addition to printed textbooks; and many *open-education resources*, including free digital resources designed to replace textbooks, are being developed, in some cases with support of major foundations and state departments of education. Some of the largest states, including Texas, California and Florida, have revised textbook adoption policies and adoption procedures to encourage schools to move to using e-textbooks. Virginia is working with a major publisher to develop digital textbooks and multiple districts in Virginia are planning to complete the transition to digital resources within the next year. While North Carolina's legislation already allows textbook dollars to be spent on digital curricula and the devices needed to use digital resources, there is a need for further planning to facilitate an effective and timely transition to digital educational resources statewide.

In K-12 education, the transformation to digital resources could lead to improved resources, lower costs, and other advantages as compared to traditional hard-copy textbooks and supplemental resources. Some of the major potential advantages include the following:

- *Up-to-date information.* Digital resources can be updated at any time, so that information can be revised and added on an ongoing basis to keep the materials accurate and up-to-date.

¹ This document was prepared by a working group of the eLearning Commission Teaching and Learning Subcommittee. The working group was comprised of Glenn Kleiman (Chair), Neill Kimrey, Melissa Thibault, Mike Shumake and Julie Keane (staff).

- *Multimedia and interactivity.* Digital education resources enable the integration of multimedia information, such as videos and animations, and interactive education applications, such as simulations, thereby providing means to better engage students in learning and address each student's individual learning needs.
- *Customization.* Digital resources, when well designed, provide flexibility for educators to customize materials to meet students' needs by selecting and sequencing different resources and providing links to supplemental resources.
- *Adaptability.* Digital resources enable immediate and cost-effective adaptations to meet special learning needs, such as providing larger text for visually impaired students, translations for English language learning students, computer generated read-alouds for students with reading problems, and reduced information displays for students with attention disorders.
- *Student annotations.* Digital resources can provide students with integrated tools for highlighting and annotating materials, without the damage caused by doing so in a hard copy book.
- *Availability.* With digital resources it is easy to ensure that each student has the educational resources when they need them, since they can be downloaded via the Internet and a vast amount of information can be stored on a small device. With digital resources, schools would always have sufficient copies of the same version of the materials, without issues such as waiting for publishers to print and ship copies, different students having different versions of a textbook or paying for too many copies of a text.
- *Potential cost savings.* Digital resources change the cost structure of educational materials and, over time, can reduce the cost per student.² With digital resources, there are initial costs for developing the materials and providing the networking infrastructure. There is then the cost of providing each student with the required device (i.e., ebook reader, tablet, or computer), but a student can use one device for all subject areas for multiple years, and the cost of these devices has been decreasing while the costs of hard copy textbooks have been increasing. On the side of cost efficiencies, with digital resources the costs of paper, printing, warehousing, and delivering books are removed; a digital copy of a book can be transmitted to a student device at virtually no cost. Also, a school can buy only the modules and content that it needs for its students. There are other tradeoffs. For example, there will be costs involved in updating digital learning resources, but these updates may remove the high costs involved in periodically providing all new textbooks. While the initial fixed costs for digital resources can be high, once these are covered the incremental cost per additional student is very low, so that over time there is the potential for cost savings.
- *Increasing competition.* Digital resources broaden the number of potential developers and publishers of educational resources. The consolidation of the textbook publishing industry has resulted in three major companies dominating the market.

² During the four academic years from 2005-2009, North Carolina spent an average total across all subject areas of \$639.35 for textbooks and related resources for each high school student.

The cost and complexity of producing and marketing hard copy textbooks can be prohibitive for smaller companies, and the investment to do so can only be made by companies that can anticipate a large number of sales. However, the cost structure for digital resources makes it possible for small companies and even some individuals to create and market core educational resources.

- *Open education resources.* A number of organizations are providing open-source digital educational resources that, like open-source software (e.g., Linux) and Internet resources (e.g., Wikipedia), are freely available to be used and adapted in K-12 schools. Several foundations, such as the Hewlett Foundation and the Carnegie Foundation, have been supporting the development of open education K-12 digital resources and processes for ensuring that open education resources are of high quality and meet curriculum standards. In many cases, these resources make good use of high quality existing resources, such as the National Science Digital Library that was funded by the National Science Foundation.
- *Addressing health issues.* Digital resources make it far easier for students to carry the materials between school, home, and other locations, and digital resources are available when and where they are needed. The American Association of Pediatrics has documented that many students have back and neck problems as a result of carrying backpacks filled with heavy textbooks, so there are also health benefits for students of replacing textbooks with digital resources.
- *Emerging resources.* Major textbook publishers, foundations, states, and federal agencies are planning for the transition to digital resources. For example, the Gates Foundation and the Pearson Foundation recently announced a partnership to create digital reading and math courses aligned with the Common Core Standards that have been adopted by more than 40 states, including North Carolina. The 24 new courses will use video, interactive software, games, social media, and other digital materials to provide K-10 mathematics curricula and K-12 English language arts curricula. In addition, Texas, California, Florida, Virginia and other states are actively facilitating the digital transition in their schools.

As a leading state in the use of technology to enhance K-12 education, as reflected in North Carolina's commitment to a robust technology infrastructure for all NC K-12 schools, along with the growth of North Carolina Learning Technology (1:1) initiatives, the NC Virtual Public School, the NC Learning Object Repository, the eLearning Portal, and the overall commitment to 21st century education, it is time for NC to plan to move to digital education resources in K-12 schools as the primary curriculum delivery medium. *The transition to digital resources will be an important step to enabling every school to provide every student with the up-to-date curricular resources needed to ensure a sound education.* Below, we provide specific recommendations for North Carolina to begin to move toward the digital transformation of educational resources.

Recommendations

1. The eLearning Commission recommends that North Carolina plan to transition to digital resources as the primary form of educational materials, in place of traditional textbooks and printed supplemental materials, in K-12 schools over the next five years.

Rationale: The major reasons for this recommendation are given above. The five-year time period is selected since it is the cycle for the textbook review, adoption and replacement process (although, given budget considerations, schools often use textbooks for far longer than five years). In addition, many high-quality digital resources will become available within the next three-to-five years, and this time period is consistent with emerging plans in other Southern states, including Florida, Virginia, and Georgia. New legislation in Florida (State Bill 2120) requires that by 2015-2016 all adopted K-12 educational resources be available in digital form and that LEAs use at least 50% of their state allocated instructional materials funding for digital resources. We recommend a similar requirement for NC LEAs.

2. North Carolina should begin the transition to digital education resources with the transition to the Common Core Standards for mathematics and English language arts, which have been adopted by NC and more than 40 other states.

Rationale: Since new K-12 standards have been adopted in these two core and tested subject areas, new curriculum resources will be needed. In addition, since for the first time in history more than 40 states have adopted the same curriculum standards, many private-sector companies, foundations, non-profit organizations, and perhaps state and local education agencies will be investing in developing resources aligned with these standards. Almost all of these resources will be available in digital formats and many will be available *only* in digital formats. Furthermore, assessments aligned to these standards are being developed by two consortiums funded by the U.S. Department of Education and will be administered online, which will hasten the transition to digital devices and resources in K-12.

3. North Carolina should consider the timeline for the adoption of the Common Core Standards and Assessments as they consider the adoption and purchasing of mathematics and English language arts textbooks. There is a major national effort underway to develop high-quality digital resources aligned with the Common Core Standards that will replace traditional textbooks.

Rationale: With the transition to the Common Core Standards, the transition to the new online assessments now being developed by two federally-funded national consortia of states, and the transition to digital resources, we recommend that LEAs be allowed to carry over funding across years for new mathematics and English language arts materials until the products being developed by the Gates and Pearson Foundations partnership, other publishers, and other organizations and perhaps state consortia developing innovative materials become available, which we anticipate will be in time for the 2013-2014 or 2014-2015 school year. This will enable NC to adapt the most up-to-date materials that incorporate the advantages of digital resources describe above as part of the transition to the new standards and assessment.

4. North Carolina should seek to participate in multi-state consortia to develop high quality, open education digital resources aligned with the Common Core Standards.

Rationale: The Common Core Standards provide an opportunity for states to work together and pool funding and expertise to develop digital resources that can be used in all participating states. This can build upon existing relationships with groups such as the Southern Regional Education Board (SREB) and the State Education Technology Directors Association (SETDA), as well as emerging collaborations among states that have received Race to the Top funding. While this will require some initial and ongoing investments, it can result in significant long-term savings.

5. North Carolina should develop or adopt technology requirements for K-12 digital education resources.

Rationale: These specifications should be designed to ensure that the resources could be used effectively on a wide range of devices, both current and future. The technology requirements should be consistent with emerging standards supported by national organizations, such as the Software and Information Industry Association and the Gates Foundation; with the Learning Resource Metadata Initiative; and with those used by the major education publishers. They should ensure that all digital resources are compatible with adaptations and devices for students with special needs.

6. North Carolina should also develop minimal specifications for the devices to be used by students to access digital resources.

Rationale: These specifications should ensure that the devices are usable with the full range of standards for text, graphics, audio, video, and interactive applications that will be used in digital educational resources. Different specifications for different grade levels should be considered and the specifications should address accessibility for students with special needs. Furthermore, the specifications should consider both school-provided devices and the use of student owned devices.

7. North Carolina should explore cost-effective collaborative purchasing of devices for students that support the use of digital resources, building upon the work of the NC K-12 Cloud Computing Collaborative Purchasing working group.

Rationale: The State should capitalize on the potential economies of scale for the original purchase and maintenance of the devices, as well as the economies for purchasing digital resources and providing professional development that can build upon common devices used statewide.

8. North Carolina should develop and implement a state level process for the review and approval of digital education resources to ensure that high quality resources are used in NC schools.

Rationale: This process can be based in large part on the existing textbook adoption process. It should include careful consideration of: (a) the curriculum content of the resources and its alignment to the standards; (b) the underlying approach to teaching and learning and the guidance provided to help teachers implement the approach successfully; (c) the use of technology, including multimedia and interactive resources, to enhance teaching and learning; (d) consistency with the defined technical standards; (e) assurances that the materials will be improved and updated on a regular basis; and (f) the

approach used to ensure that the materials are fully customizable and adaptable to meet individual students' and teachers' needs.

9. North Carolina should support the development, by North Carolina colleges, schools, and organizations, of open education digital resources to meet specific North Carolina needs.

Rationale: An excellent example is the open education multimedia digital textbook for grade 8 history developed by LEARN NC at UNC-Chapel Hill. Other resources specific to North Carolina history, geography, and environment can benefit North Carolina students and teachers, and the expertise to develop these is readily available within the State.

10. NC should develop a plan to prepare teachers to make effective use of digital resources and devices to support teaching and learning.

Rationale: Professional development about the effective use of digital resources should be integrated with programs used in North Carolina to prepare both pre-service and in-service teachers for the new content standards and assessments. Specifically, such professional development should be incorporated into the Race to the Top professional development programs and other programs that prepare educators for the new standards, assessments, data systems, and uses of technology to enhance teaching and learning.