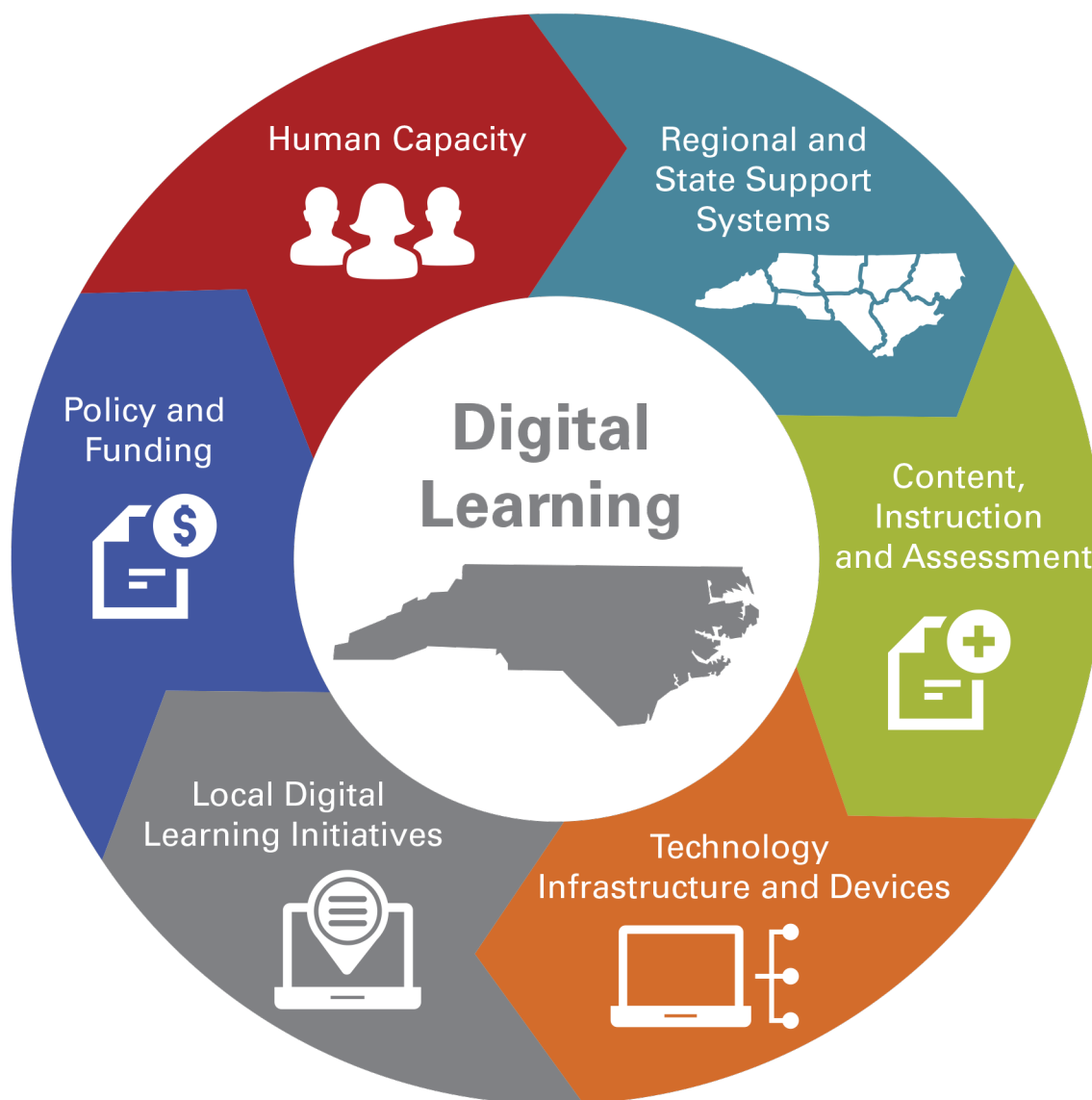


NORTH CAROLINA DIGITAL LEARNING PLAN

Selecting Digital Education Content: A Guide for North Carolina Schools and Districts

*Prepared by the Friday Institute for Educational Innovation for the
North Carolina State Board of Education-Department of Public Instruction*



Introduction

Printed resources are increasingly being replaced by online resources. Many newspapers and magazines are ceasing publication as people increasingly turn to online sources for news and information. Online educational content for both formal and informal contexts has been increasing in popularity, including such sites such as the Library of Congress, National Geographic, Khan Academy, and many others. NC Session Law 2013-12 mandates that North Carolina schools transition to the primary use of digital education resources in place of traditional textbooks. However, districts are faced with many challenges when purchasing digital content, including vetting the content quality; mapping it to their curriculum standards; ensuring that it effectively uses the interactive, multimedia potential of the technology; making sure copyrights are respected and student data is secured; and preparing teachers to make effective use of the digital resources with their students. This document provides educators with background information and recommendations to inform their selection of digital content.

For the purposes of this guide, digital content includes any material that is accessed via a digital device (computer, tablet or smartphone) and that provides curriculum materials or instructional content aligned to curriculum standards. This can include e-textbooks, intelligent tutors, online lesson plans, virtual simulations, educational games, and other learning resources. It does not include general web tools such as Google Docs, Instructure's Canvas, and other products that provide platforms for delivering content rather than specific content aligned to standards.

Generally, digital content falls into one of three categories based upon the source:

- **Commercial:** Content purchased from a vendor;
- **Open Education Resources (OER):** Content freely available on the Internet;
- **Teacher-Created Materials:** Content developed by teachers to use in their own classrooms and sometimes to share with other teachers.

Materials from these categories can be mixed-and-matched in practice. For example, a teacher might supplement a purchased commercial curriculum with OER content, incorporate OER into teacher-created materials, or create their own curriculum to address their students' needs by blending materials from all three categories.

Advantages of Digital Content

Digital Content covers a wide array of formats that can range from static PDF copies of textbooks to interactive tutors that use artificial intelligence to optimize each student's learning to multimedia simulations that allow students to explore complex phenomena in game-like ways.

When selecting content, consider how your school or district can leverage the opportunities that going digital will enable, such as the following:

- *Multi-modal instruction:* Digital content can allow students to interact with content in a variety of ways, providing sound, video, graphics, and animations that can lead to more engaging, varied, and personalized learning opportunities than those available with printed resources.
- *Interactive instruction:* Digital content can provide mechanisms for students to engage in many types of interactive activities, such as online tutoring systems, simulations, interactive math tools, and educational games in which the technology responds to students' actions.
- *Personalized instruction:* By selecting specific resources and pathways, instructional content can be customized to meet the individual instructional needs of each student. "Intelligent" systems can also collect ongoing data about students' work to automatically provide appropriate levels of challenge and to provide students and teachers with information to inform decisions about teaching and learning.
- *Universal Design for Learning (UDL):* UDL approaches are designed to provide all individuals with equal opportunities to learn. The [UDL principles](#) call for a curriculum that can present content in different ways, enable students to express what they know in a variety of ways, and stimulate students' interests and motivations for learning. Flexible digital resources make it possible to implement the UDL principles effectively.
- *Up-to-date:* Digital content can be updated frequently to address new knowledge and revised standards, and to engage students in current issues during learning activities and projects.
- *Modularity:* Content no longer needs to be a "course package" like a traditional textbook. Different content sources can be selected to teach different topics based on quality, pedagogical approach, and fit to students' needs and interests.

Considerations for Selecting and Evaluating Digital Content

When selecting content, districts and schools should always proceed with careful planning, and begin with several key questions:

- What is our vision for teaching and learning in our district? What are the key needs and practices that we want digital content to address?
- What content, addressing what standards, do we need?
- What are the advantages of the new digital content? What does it add over available print and other digital content?
- Are we looking for core curriculum content or content that supplements the curriculum already in use?
- How does new content fit into our overall digital content strategy?
- What content will be phased out to make room for new content?

In addition to careful planning before purchases, districts should continuously evaluate digital content for effectiveness and use, and replace content that is not impacting student learning. Specifically, districts should identify and collect data to assist with evaluation of the following:

- **Teacher Use:** Are teachers using the digital content? Are they satisfied with the quality of the content? Are they able to implement the content into their instruction? Do they have proper training to use the digital content effectively?
- **Student Perceptions:** Do students find the content useful, interesting, and valuable? Is the content package meeting the learning needs of each student?
- **Implementation:** If the content includes recommended pedagogical approaches, are those approaches being implemented with fidelity? Are there any barriers that are preventing implementation with fidelity?
- **Outcomes:** Is the content package meeting outcomes that were identified when selected?

Commercial, OER, and Teacher Created Content

A key decision is when to use commercial content, OER, and teacher created content, or a mix of these types.

Commercial digital resources are generally aligned to standards and undergo review to ensure content accuracy and quality of alignment. Additionally, some commercial products wrap their content within applications that provide additional functionality and data reporting, which may be desirable. However, careful review of commercial resources is also required to ensure the quality of the content, effective use of the technology, alignment with current standards, and fit to the approach of the district, school, and teachers. Cost considerations favor the other types of content when quality materials are available or can be created locally.

OER content provides educators with the most flexibility, choice, and diversity in content. OER generally allows educators to mix-and-match content from multiple sources and, in many cases, to adapt content to local needs. While there is not a cost to purchase OER, significant initial work is often required to curate, vet, and assemble freely available content into a usable curriculum. While OER content has gained widespread use at the college level, it is at an earlier stage of adoption in K-12. However, the K-12 content marketplace has been shifting towards OER for the past several years, with federal agencies and major foundations funding the development of new OER materials, so more high-quality OER materials can be expected to become available in the next few years.

Teacher created materials are often prepared by individual teachers and by teams of lead teachers recruited by their districts to participate in curriculum development efforts during the summer. Often, these teachers select, organize, and adapt OER resources, as well as develop their own. This approach provides resources well adapted to the local context and students, and the process often provides valuable professional learning opportunities for the teachers involved. However, as with all curriculum materials, quality of content, flexibility of the resources, coherence of the curriculum, and other factors need to be considered when these materials are implemented school-wide or district-wide.

Commercial Content Considerations

This section describes some considerations that apply to commercial digital content only.

Licensing and Total Cost of Ownership

Perpetual Licenses versus Annual Subscription Licenses. A perpetual license is a one-time cost or installment plan, which once paid grants the owner a license to use the software or product indefinitely without additional fees. In contrast, annual licenses involve an ongoing annual cost.

A purchase on a perpetual license may include a yearly fee for updates, but the district can continue to use the product even if they do not pay for the updates. Subscription licenses, by contrast, usually include updates for as long as the purchaser continues to subscribe.

Because districts pay yearly for annual licenses, the cost per year is usually significantly less than the one-time costs associated with a perpetual license. Annual licenses are also advantageous because the cost becomes a known line item in the yearly budget versus perpetual licenses that may require costly upgrades or new purchases at irregular intervals. Additionally, annual licenses give the district an opportunity to continually evaluate the effectiveness and use of a product, and make decisions to phase out products that are ineffective or not used sufficiently.

Licensing Units. Some digital content products are licensed on a per enrolled-student basis, meaning the total cost is a set fee times the number of students in a school or district. Others products are licensed by the number of concurrent users, teachers, classrooms, or schools. Different approaches can have significant implications for overall costs, so need to be carefully considered.

Managed Services versus Self-Hosted Services. Some web-based digital content is available as a managed service, where the vendor hosts the content (typically known as a “cloud-based system”), installs updates when needed, provides technical support, and ensures that servers and network infrastructure are operational and secure so that the content is consistently available. Other content is self-hosted, meaning that the school or district must provide a server and provide the technical services and support required by users. The overall cost of a managed service is generally less than the cost of a server plus staff time to maintain, support, and secure the server. Additionally, if a software package is available for students’ home use, monitoring services and outage response plans need to be in place for evenings, weekends, and holidays. For these reasons, while a managed service usually comes with additional fees, the total cost of ownership (materials, equipment, time, and support) and the burden on district IT infrastructure is usually significantly lower.

Professional Learning Services. The cost of professional learning required to prepare teachers to effectively use new types of digital content can be significant and requires careful consideration prior to any purchasing decisions. Many digital content vendors also provide professional learning

services and product training at additional cost. Districts may opt not to pay for these services in an effort to reduce the purchase cost. However, if a content package includes a research-based implementation model, outcomes are significantly reduced if the program is not implemented with fidelity (as recommended by the vendor to achieve the best results). Districts should evaluate the need for professional learning to support effective use of content, and carefully evaluate the quality of vendor-provided professional learning programs. For example, some vendors programs focus more on introducing the technology functions rather than the effective use of the digital content with students.

Staffing and Facility Needs. It is important to consider the staffing and facility needs when considering digital content. For example, ensuring the best results with intelligent tutoring systems may require that students engage with the software for 30 minutes three times a week. In order to accommodate this, a computer lab and a computer lab facilitator may be needed. These needs should be identified and factored in to the cost. In addition, technical time required to set up, deploy, and maintain the software should be considered. The most reliable approach to determining these types of costs is to contact schools or districts that have experience using the product and can share what they have learned about the requirements for successful use.

The RFP Process

It is often required, and generally recommended, to issue a Request for Information (RFI), Request for Quote (RFQ), or Request for Proposal (RFP) prior to large-scale purchases of new digital content. An RFI asks vendors to supply districts with information about what products they offer, how they work, and how a school can use them. An RFQ asks a vendor to submit a price and service quote for a specific product or service. An RFP asks a vendor to propose both the products and services they will provide, along with the costs of providing them.

The district should issue a document (specifications document) indicating district requirements for the content to be purchased, and the information needed from each vendor. While a vendor may not be able to deliver 100%, ask for everything you want and review the proposals to determine the extent to which each submitted product meets your needs. You should include as much information as possible in your specifications document to help the vendors propose the best solutions for your district. A few recommended items to include:

- School/district size, location, demographics, student performance
- Subject areas or topics you are looking to purchase content for
- Use cases (who will be using the content, and for what purpose - remediation, daily classroom use, credit recovery, etc.)
- Instructional focus (the vision for teaching and learning)
- Technical environment (devices, LMS, WiFi coverage, bandwidth)
- Preferences on licensing models, managed services, or professional learning programs
- Any contract terms that vendors will need to abide by (see “Contract Terms”)

- Implementation timeline
- Information about other district initiatives that may intersect with the use of this content
- Requirements to inter-operate with other systems, such as a Student Information System.

However, you should also ask vendors for very specific information, and you should review it carefully. This will include:

- If the product includes protocols for implementation, (e.g. usage setting, time of use, etc.), the vendor should be able to provide the research base where this implementation has been deemed effective
- Terms of use and data privacy policy and procedures (see *Privacy and Data Security* on page 13)
- Process the vendor uses to align content to standards
- Process and timeline vendors will use to re-align content to standards if standards change
- Process vendor uses to verify the accuracy, integrity, and neutrality of content
- Alignment with the UDL framework and approach to supporting students with learning differences or special needs.
- Process of vetting, including, and notifying customers of changes in content material
- Uptime statistics for cloud-based products and incident response procedures
- Student Information System (SIS) and Learning Management System (LMS) integrations (see *Privacy and Data Security* on page 13)

Additionally, get references from other districts, preferably in-state, that are users of a product. Speak with those districts about how they have used the product and their evaluation of its effectiveness and quality. Also, find out what the other districts paid - it may give you additional bargaining clout. If multiple districts are up for license renewal at the same time, making a single purchase on behalf of multiple districts may result in net savings for all involved. If another district or agency has completed a bidding process for identical services in the past year, General Statute 143-29(g) permits you to utilize the same contract terms and forgo a bid process, provided that the vendor is agreeable to providing the same terms and the same (or better) pricing.

Also, you should expect vendors to be able to provide you with a demo instance of their product that will enable a small number of users to fully evaluate it. This should include sample data when that is relevant to the product evaluation. Ideally, a vendor would set up an instance for you to use the product with a small number of students for a few weeks.

North Carolina's Division of Information Technology maintains a library of RFI, RFQ, and RFP templates available at <http://it.nc.gov/it-procurement-forms-and-templates>. Districts can use and modify these to meet their financial and legal policies.

Considerations for Open Education Resources and Teacher Created Materials

Open Education Resources provide content freely available on the Internet. Produced by organizations, schools, universities, and individual educators, this content is created and made available for educators around the world to use. Like commercial resources, they tend to vary in grain size, from individual lessons and learning objects to comprehensive curricula. Generally, however, OER tends to skew more towards supplemental materials and specific resources addressing individual skills, though there are a few course packages that are available through sites such as [NROC](#), [CK-12](#) and [OpenStax](#). As noted above, larger, higher-quality OER content for K-12 education are likely to become available in the next few years.

Evaluating and Curating OER

There are hundreds of thousands of Open Education Resources available on the Internet, freely available for use in your school or district. Many individuals and organizations are involved in creating OER, and as a result, quality may vary. In many districts, individual teachers are curating open education resources, often on their own time. This can be highly inefficient, as many teachers may be evaluating the same resources. However, district efforts to build OER repositories and to align OER to course pacing guides is complex and time consuming, and therefore, expensive. More effective tools to support these processes are likely to become available; for example, Amazon has announced a beta version of one that will be freely available to educators.

A rubric for curating OER content can help guide the process and ensure consistency. The [Achieve OER Rubric¹](#) is the most commonly used rubric for evaluating OER. Achieve also makes the [EQuIP rubric²](#) available to evaluate teacher instructional units. The NC Department of Public Instruction has also created a summary of the [Achieve OER Rubric³](#) that can be used to evaluate resources quickly. The Achieve rubric covers many of the elements recommended in an RFP for purchased content, but is tailored for Open Educational Resources. While UDL principles are referenced in the Achieve rubrics, adherence to the UDL framework should also be verified to ensure that content is accessible to all learners.

Some vendors and organizations, including the OER Commons, also sell pre-curated databases of OER, or databases of OER aligned to standards. This can be a cost-effective alternative to curating resources within the district, though many teachers report that they find the process of curating curriculum materials valuable to their instructional practice.

¹ <http://www.achieve.org/publications/achieve-oer-rubrics>

² <http://www.achieve.org/our-initiatives/equip/rubrics-and-feedback-forms>

³ <http://www.ncpublicschools.org/homebase/content/rubric/>

Copyright and Licensing

Commercial content is almost always licensed under a full copyright, meaning that educators cannot reproduce, modify, or remix content outside of the scope of the license agreement. Typically, for paper content, the copyright would prohibit a teacher from making photocopies or using non-original versions of any works except for the worksheet masters specifically designated. In a digital world, copyright and licensing restrictions for purchased content would prohibit teachers and students from using a program if they are not licensed to do so. Teachers can make use of many documents in the classroom under “fair use” principles, but there are significant restrictions on what the law allows them to do. Typically, a teacher is not allowed to copy or distribute educational content where a copy is not purchased for each student.

Copyright is issued automatically to any new creative work and copyright rules are extremely complicated. Works created before the early 1930s are usually in the “Public Domain,” meaning they can be used without any restriction, and some authors of later works have voluntarily forfeited their copyrights to allow their work to be in the Public Domain.

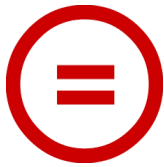
As open source software became increasingly common, the leaders of open source collaboratives realized that neither traditional copyright protections nor releasing to the Public Domain would be conducive to building and encouraging future build-outs of open source software. To solve this problem, a new type of license was created to allow software to be made freely available as long as derivative works and modifications to the software were also made freely available. Effectively, copyright holders voluntarily released some of their rights in order for the open source community to thrive, but left other restrictions in place.

Creative Commons has become the de facto standard for releasing sharable content on the Internet. Most OER are licensed using Creative Commons licensing. It is the license used for Wikipedia and can be found as options on many websites including Flickr, YouTube, and Soundcloud. The goal of Creative Commons is to allow users to adapt, remix, reuse, and improve the content they find online and to promote the transference of knowledge and creativity. Every Creative Commons license allows content to be copied, distributed, and publicly displayed. It also allows the medium to be changed (e.g. video to transcript) and allows for public performances and webcasts. Additionally, all Creative Commons licenses are applicable worldwide, perpetual, non-revocable, and nonexclusive.

Creative Commons allows content authors to easily specify which rights they will release and which rights they will reserve. These rights fall into four categories under Creative Commons licensing:



By Attribution (BY): “You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.”



No Derivatives (ND): “If you remix, transform, or build upon the material, you may not distribute the modified material.”

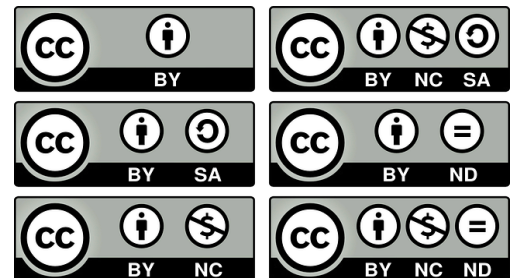


Share Alike (SA): “If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.”



Non Commercial (NC): “You may not use the material for commercial purposes.”

This “mix-and-match” strategy allows content authors to decide how restrictive a license may be. A Creative Commons license with no restrictions is effectively in the Public Domain. A Creative Commons license with the “By Attribution,” “No Derivatives,” and “No Commercial Use” (CC-BY-NC-ND) license is nearly as restrictive as a traditional



When a work is licensed under Creative Commons, the image of the license used should be present on the work. For web-based content, the image should be linked to the CC license. License images can be generated with metadata and proper links at www.creativecommons.org/choose.

Ownership of Teacher Created Materials

Increasingly, teachers are creating their own instructional materials for use in their classrooms. There are important legal issues about ownership of these material, which districts should address in their contracts, policies, and/or information sessions with teachers and other employees. For example, if a district employee uses work time or equipment to create curriculum materials, the district and/or state may be able to claim ownership. But if a district employee creates curriculum materials on their own time and equipment, they are likely to claim ownership unless the district has a specific policy in their employment contracts that states otherwise. This becomes more complex when employees collaborate to create materials and when they are shared across districts.⁴

⁴ Read “Clarifying Ownership of Teacher-Created Digital Content Empowers Educators to Personalize Education, Address Individual Student Needs” from SETDA for more information: http://www.setda.org/wp-content/uploads/2014/03/SETDA_WPTeacher-Created.final_.5.29.pdf

Districts are strongly encouraged to enact policies clarifying ownership of teacher created materials. Confusion around teacher ownership of the materials they create can be a barrier to teacher collaboration and to encouraging teachers to share instructional materials, both within and across districts. Some options for consideration are as follows:

- Educators are the authors and retain full ownership of the instructional materials they create. They have the right to decide on the license used, and are responsible for making sure it aligns with Copyright or Creative Commons licensing restrictions.
- Educators maintain authorship and ownership of the instructional materials they create and may decide on the license used. However, as an employee of the district, educators grant the school district and employees within the district a perpetual license to use, remix, and adapt the instructional content.
- The district assumes ownership of all materials created by a teacher or other employee of the district. The district will then decide on the license to be used. The employees of the district, including the teacher who created the material, are granted a right to use, remix, and adapt the instructional content for the term of their employment with the district.
- The district requires all materials to be licensed as an OER under a Creative Commons License, with original ownership by the teacher or the district. A license with the By Attribution, Non-Commercial, and Share Alike restrictions (CC-BY-SA-NC) would ensure that an educator's work cannot be sold by a third party and that educators receive credit for their work.

If teachers are to share instructional materials, a system for sharing should be in place.

Schoolnet, Instructure's Canvas Commons, and several other products provide a mechanism for teachers to submit instructional materials. Schoolnet for example, requires teachers to submit lessons for administrative review before they may be shared publicly. This ensures a level of quality of resources in the database, but can introduce time-delay and administrative workload. Teachers also may be reluctant to submit materials in the future if a lesson is rejected from submission to the database. Conversely, Instructure's Canvas Commons is open, meaning any teacher may submit instructional material, and it is available to everyone automatically. Teachers have the ability to rate and comment on materials. As a result, the database tends to be crowded, with a lot of materials that may not be high quality. Additionally, teachers do not typically rate and comment on materials without an incentive to do so (mostly due to a lack of time).

Teachers typically prefer to have access to a repository of instructional materials that they can adapt to their own uses, rather than pre-packaged lessons that may not be reflective of the needs of their students. Portals to share materials tend to not be widely used due to the time required to submit materials and the time required to find existing materials. These are factors districts should consider when investigating potential solutions. As a rule of thumb, finding lessons in a portal should be faster, more consistent, and should yield a better result than a plain web search.

Key OER Sources and the #goOpen Initiative

#goOpen is an initiative of the US Department of Education's Office of Educational Technology. The goal is to encourage vendors and content providers, teachers, states, and districts to make content more freely available.

There are many providers of Open Educational Resources. Some examples of OER providers are:

- [CK-12](#): A provider of Open Education textbooks. Educators using the CK-12 platform can pull chapters from one book or several, sequence them as they choose, and edit the content of the chapters to customize for their classrooms.
- [OpenStax](#): A collection of freely available textbooks in PDF and iBook format, focusing on Advanced Placement (AP) and college courses.
- [Khan Academy](#): A provider of video-based tutorials, primarily in mathematics. Khan Academy also offers a free math skills tutoring program with analytics and a teacher dashboard.
- [OER Commons](#): A curated database of standards-aligned Open Educational Resources.
- [Gooru Learning](#): A tool which allows teachers to select from a list of curated Open Educational Resources, and assemble playlists and courses of Open Resources for students.
- [Hippo Campus](#): A repository providing content from the National Repository of Online Resources (NROC) Consortium, a project of the Monterey Institute for Technology and Education. NROC provides video playlists and links to supplemental resources across the Internet.
- [Curriki](#): Curriki is a resource for educators to openly share standards-aligned resources and curate both teacher-created resources and OER into playlists aligned to content standards.
- [Engage New York](#): As a part of their transition to Common Core, the state of New York assembled teachers to create a curriculum map with lesson plans and materials for Language Arts and Mathematics. The resulting product was made available as OER.

Technical Considerations

Devices and Network Infrastructure

The selection of content and other tools for student learning should be the primary driver for selecting the devices students will use in classrooms. However, once devices are selected, future content should be evaluated for compatibility with student devices. If students will be using their personally-owned devices as well (at home or in a BYOD environment), schools should establish a general set of “minimum standards and capabilities” for these devices, and instructional content and web tools should be evaluated against those standards. While there will be situations where instructional content will be able to take advantage of features of specific devices (e.g. accelerometers or cameras on iPads), districts should make an effort to select content that will function on multiple types of devices, so that devices can be updated based on instructional goals.

Network bandwidth can also be a barrier to using digital content. In general, school districts should have enough bandwidth and wireless capacity so that network performance isn’t impacted by student use of digital content and tools, including streaming audio and video files.

Privacy and Data Security

In the past few years, significant attention has been paid to privacy and data security. The rise in companies using data to create “profiles” of users, as well as several widely-publicized data breaches, have made the public aware of data security issues. Many parents are especially concerned with how data about their children is collected and used. Additionally, federal and state laws place restrictions on the collection and use of Personally Identifiable Information (PII). PII is defined as any information that alone or combined with other information can be used to uniquely identify a person, such as names and social security numbers. Both OER and commercial services can collect student data, so it is important to know in advance what is being collected and factor student privacy into your selection criteria.

Laws Governing Student PII. There are several Federal and State laws governing the use of student PII:

- **Family Educational Rights and Privacy Act (FERPA):** FERPA applies to all schools that receive federal funding. FERPA provides parents with the right to inspect student records maintained by the school and to request corrections to a student record. Once a student turns 18, rights transfer from the parent to the student. Under FERPA, a school district using educational software may provide data to a content vendor as long as the vendor also abides by the privacy requirements of FERPA.

- **Children’s Online Privacy and Protection Act of 1998 (COPPA):** COPPA is administered by the FTC and is directed at websites that are likely to collect personal information (e.g. Facebook, Google). COPPA requires parental acknowledgement and consent for any child under the age of 13 to sign up for web-based services. COPPA also defines certain requirements for privacy policies and required steps for operators to protect children. Under COPPA, a school can act on behalf of the parent to register students for online services.
- **Protection of Pupil Rights Amendment (PPRA):** The PPRA also applies to schools that receive federal funds. It identifies eight protected areas, including religious practices, political affiliation, and others that are prohibited from being required in surveys or in other data collection efforts.
- **NC Privacy and Security of Student Educational Records (SL2014-50) and the Student Online Protection Act (SL2016-11):** In North Carolina, SL2014-50 places additional restrictions on data collection in addition to PPRA (adds biometrics, voting history, and other information), and requires that all contractors and content providers comply with FERPA, have data security procedures in place, and provide parental notice and opt-out opportunities. SL2016-11 limits the ability of vendors to sell students’ personal information, engage in targeted advertising, or use student data for purposes not related to K-12 schooling. It also requires vendors to delete a student’s information within 45 days at the request of a local school board.

Best Practices and Contract Terms. Moving student data between systems is a potential data security failure point for many districts. When loading student information, make sure to follow these best practices:

- Use APIs whenever possible. The Power School API allows for secure real-time roster data exchange between the Power School SIS and other products. APIs are almost always the most secure way to transfer data and to control access. This is the preferred method, and districts should encourage vendors to use it. Many LMS products (e.g. Canvas and Schoology) already include this ability. Power School does charge vendors for the ability to connect to the Power School API.
- Never send student data via email attachments or services such as Google Drive. Even a password-protected ZIP file can be easily accessed. Vendors needing data in flat-files (CSV) should use secure FTP spaces (FTP over SSH) and private key authentication or a password that is changed regularly. Secure FTP spaces should be restricted by IP address to reduce the risk of attacks and files should be encrypted at rest.
- Never provide a vendor with Power School credentials or share any user credentials with a vendor.
- Remember the principle of “least possible privilege” or “need to know” - a vendor or user in your SIS should never have access to any information or functionality that is not essential for them to complete their job or contract obligations.

You should also examine product Terms of Service, Privacy Policies, and Contracts to ensure that the contract specifies the following:

- The data that is being provided by the school district or collected by the application, and how it is used.
- Data will never be used for marketing purposes.
- Data confidentiality and compliance with FERPA.
- All data will be stored in data centers located in the United States, and all data will be encrypted in transit between servers and over the Internet. Also that data will remain in the United States, and will not be accessed or shared with vendors or employees outside the country.
- All data handling procedures and that the district or the state may verify compliance at any time.
- Processes for monitoring and notification in the event of a data breach.
- The district will be the owner of all data produced by the application, and that a vendor should return all data to the district and destroy any copies upon request or upon termination of the contract.
- All subcontractors and agents of the vendor are subject to the terms of the contract.

LMS Integration and Authentication

A Learning Management System (LMS) can be the key unifying component of any digital learning initiative. Learning Management Systems facilitate communication and exchange of instructional materials between teachers and students. A Learning Object Repository (LOR) facilitates sharing of instructional materials between teachers. Before evaluating content, it will help to answer the following questions:

- What Learning Management System (LMS) are the teachers using to deliver materials to students?
- Do you currently manage digital content in a Learning Object Repository (LOR) that is separate from the LMS? (eg. Pearson Equella, MIT DSpace, etc.)
- If not using a LOR, does your LMS have a LOR? (eg. Instructure's Canvas Commons)

North Carolina's Home Base Solutions - Canvas and Pearson Equella. Additionally, you should be familiar with DPI's Home Base product suite which provides a couple of tools that it will be helpful to be familiar with when considering formats and interoperability.

The Instructure Canvas LMS is a robust platform for handling a variety of digital content. The Canvas Commons provides an interface for educators to share resources; however, that is not currently a place for procured content. Additionally, Canvas supports the IMS Global Learning Tools Interoperability standard (LTI v1.1) with support for outcomes.

Equella is an industrial strength LOR. North Carolina's instance of Equella is called the NCLOR. It has capabilities to support digital asset management, content review workflows and approvals, notifications, object versioning, and even creation of digital resources. If a district is already using Equella, it may be worth exploring adding procured content to the LOR; however, in the context of procurement, it does not make sense to consider Equella if not already using it, as onboarding commitments are high, and many of the functions Equella would serve can be found within most modern LMS systems. Canvas also features the Canvas Commons, which is a much smaller-scale implementation of a LOR that allows teachers to share content.

Integration with the LMS. When implementing instructional content, it is recommended to select content that can integrate directly into the LMS using a protocol called Learning Tools Interoperability (LTI). LTI is a set of standards maintained by the IMS Global Consortium. Connecting to content via LTI embeds the content directly into the LMS, so students never have to leave the LMS to access their content. Effectively, this provides students with "one-stop shopping" to all of their instructional content, regardless of the source. LTI also facilitates single-sign-on, where login data is passed from the LMS to the content tool automatically. The content tool can also pass grading and assessment data back to the LMS for storage in the gradebook.

The IMS Common Cartridge standard is an extension of LTI that allows vendors to package multiple LTI links, along with web links, LMS content, and metadata into a single package that can be imported into an LMS.

Most major LMS products support both LTI and IMS Common Cartridge. In Instructure's Canvas, a set of pre-set applications can be found in the course App Center. While Canvas features an app center built-in, most major LMS systems support LTI integration. Instructure maintains a directory of some LTI-compliant applications and integration instructions for all major LMS systems, located at eduappcenter.com. The IMS Global Consortium also maintains a list at <https://www.imsglobal.org/cc/statuschart.cfm>.

Authentication. If a product does not support the LTI protocol, or if a district chooses not to use it, it is recommended that districts use single-sign-on (SSO) via LDAP or SAML across as many platforms as possible. This is a good alternative to LTI, because even if students and teachers have to log in to multiple systems, they will only have one username and password to use across applications. Some districts choose to implement their own directory services, but the NC Ed Cloud IAM service provides a Central Directory Local Replica (CDLR) that districts can set up to provide authentication to any number of services using the NC Ed Cloud username and password.

Academic Benchmarks

Academic Benchmarks is a company which provides data integration and platform services for digital content platforms. Each Common Core standard and NC State Standard is assigned a Globally Unique Identifier (GUID). Vendors that utilize services from Academic Benchmarks can include the GUID when aligning to state standards. As a result, multiple systems can be integrated and users can search multiple databases against standards simultaneously. All NC Home Base products utilize academic benchmarks and content in the LOR and Schoolnet, and are aligned using Academic Benchmarks GUIDs.

About the North Carolina Digital Learning Plan

On behalf of the State Board of Education and Department of Public Instruction, the Friday Institute for Educational Innovation at North Carolina State University has developed the North Carolina Digital Learning Plan to accelerate North Carolina's progress, working in collaboration with policymakers, education leaders, practitioners, business leaders, and other partners across the State.

The goal of the Digital Learning Plan is to build upon the existing foundation to develop a coherent long-term strategy that sets directions and priorities, supports innovation, and provides resources to enable the State's educators and students to benefit fully from digital-age teaching and learning. The Plan provides recommendations for State actions that will guide and support K-12 schools in their transitions to digital-age education. This document summarizes the rationale and major recommendations of the Plan.

Visit ncdlplan.fi.ncsu.edu to view the full plan and learn more.