



The Florida Senate

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Committee on Education Pre-K - 12

SCHOOL DISTRICT INFORMATION TECHNOLOGY PROCUREMENT

Issue Description

In an effort to promote a more cohesive and cost-efficient plan for IT at the state and district level and to encourage effective decision making and procurement practices, the 2010 Legislature enacted legislation to encourage local school districts to develop Learning Management Systems (LMS).¹ A LMS provides electronic access to curriculum, individualized instruction, robust resources, ongoing assessments, professional development, and student achievement data in a secure environment. LMS access is available to students, teachers, parents, and administrators on an anytime, anywhere basis using a variety of technology tools. To generate more effective and cost efficient LMS at the state and district level, IT framework standards must be established so that LMS systems are easy to access, interoperable, and designed to enhance teaching and learning.

Background

IT Procurement Framework

Current law and State Board of Education rule provide guidelines for the purchase of information technology (IT) at the school district level,² and the rule additionally requires school districts to establish purchasing policies. Contrary to more stringent statutory provisions which require competitive bidding at the state level for most large scale purchases,³ the rule allows for district school boards to forego the competitive bidding process when acquiring information technology-related equipment, hardware, software, firmware, programs, systems, networks, infrastructure, media, and other related material.⁴

Funding Sources to Support Instructional Technology

State Funding

Before FY 2006, funding for IT was appropriated to school districts through the Public School Technology categorical.⁵ Unlike other categorically funded programs, IT funds could be expended based upon the individual needs of the school districts and without adherence or alignment to state adopted curriculum standards, accompanying assessments, and associated professional development needs. Beginning with FY 2006-2007, IT funding for school districts was merged into the Florida Education Finance Program (FEFP),⁶ providing substantial flexibility to districts in expending the funds for IT.⁷ A survey of school districts regarding their IT procurement practices revealed that almost all of the districts relied on contracts negotiated by the state's Division

¹ ch. 2010-154, L.O.F.

² Section 282.0041(16), F.S., defines information technology and s. 1008.385, F.S., provides a framework for the development of district management information services.

³ Section 287.057, F.S., establishes competitive solicitation procedures for state agencies for commodities and contractual services and s. 287.017, F.S., provides purchasing categories with threshold amounts.

⁴ State Board of Education rule 6A-1.012(14), F.A.C. The Office of the Auditor General indicated by telephonic communication that this provision was included to allow for expeditious purchases in a constantly changing technology market.

⁵ 1998-99, \$80.1 million; 1999-2000, \$63.4 million; 2000-01, \$62.4 million; 2001-02, \$34.3 million; 2002-03, \$62.4 million; 2003-04, \$49.9 million; 2004-05, \$49.9 million; and 2005-06, \$49.9 million.

⁶ The merger was made in part based on a Department of Education survey of districts, which reported using the majority of IT categorical funding for personnel.

⁷ Districts have multiple funding sources from which they can support IT. See, for example, page 10 of the Pinellas County Schools Technology Plan, available at: http://techplan.pcsb.org/Pinellas_County_Schools_Technology_Plan_2009.pdf.

of Purchasing (Department of Management Services), or purchased through another school district's contract/purchasing agreement.⁸ While these practices may simplify the procurement of IT and result in cost savings to the districts, procurement efficiencies do not necessarily ensure educationally sound purchasing policies or strategic planning and long term IT infrastructure to promote the enhancement of teaching and learning.

Federal Funding

The Florida Department of Education (DOE) is responsible for the oversight of IT funding provided through Title II-D federal funds, which are made available on both a formula and competitive basis.⁹ The 2010 Title II-D/Enhancing Education Through Technology (EETT) Grant Program funds total more than \$27 million and will support Next Generation Sunshine State Standards in instructional activities, teacher professional development, collaborative teaching and learning opportunities, and online assessments. Following extensive reviews,¹⁰ the 2010 EETT funds were competitively awarded to all but seven school districts.¹¹

Instructional Technology Trends – A Systems Approach¹²

A growing number of Florida school districts are making substantial investments in customized LMS¹³ and tailoring their systems to meet the individual needs of their education community.¹⁴ An ideal LMS provides technology-enabled, constantly available teaching and learning experiences for students, educators, parents, researchers, and policy makers in a secure environment. A LMS design should be developed specifically with the end-user foremost in mind and that integrates technology designed and matched directly to how teachers work and plan rather than expecting educators to make adjustments and adapt to the technology.¹⁵ A dynamic LMS supports:

1. Rich and effective curriculum resources that can be accessed anytime or anywhere using a variety of electronic devices;¹⁶
2. Ease and equity of access¹⁷ to instructional resources that are aligned to adopted content standards and include tools for collaboration and communication across all parts of the curriculum;

⁸ Forty-six school districts, the Northeast Florida Education Consortium (NEFEC) which comprises thirteen school districts, P.K. Yonge Lab School, and the Florida School for the Deaf and Blind (FSDB) responded to a Senate Education Committee Survey. The survey is on file with the committee.

⁹ Federal Title II-D funds have historically been available on both a formula and competitive basis. However, the DOE indicates that a Title II (Part D) entitlement application will not be issued for the 2010-11 program year. See <http://info.fldoe.org/docushare/dsweb/Get/Document-5802/dps-2010-115.pdf>.

¹⁰ DPS 2010-115, available at: <http://info.fldoe.org/docushare/dsweb/Get/Document-5802/dps-2010-115.pdf>. See also http://www.fldoe.org/bii/Instruct_Tech/EETT/Part2/pdf/ApprovedReviewProcessOverview.pdf.

¹¹ Calhoun and A.D. Henderson DRS submitted a proposal but were unsuccessful. Hardee, Indian River, Jefferson, FSDB, and FAMU DRS did not submit a proposal.

¹² The systems approach to problem solving emerged as scientists and philosophers identified common themes in the approach to managing and organizing complex systems. Four major concepts underlie the systems approach:

- **Specialization:** A system is divided into smaller components allowing more specialized concentration on each component.
- **Grouping:** To avoid generating greater complexity with increasing specialization, it becomes necessary to group related disciplines or sub-disciplines.
- **Coordination:** As the components and subcomponents of a system are grouped, it is necessary to coordinate the interactions among groups.
- **Emergent properties:** Dividing a system into subsystems (groups of component parts within the system) requires understanding that the system as a whole is greater than the sum of its parts.

See http://www.ifets.info/journals/8_3/10.pdf, page 106.

¹³ LMS are also referred to as course management systems, learning content management systems, and instructional improvement systems.

¹⁴ A survey disseminated by the Florida Association of District School Superintendents (FADSS) in June of 2010 revealed that eight school districts (Broward, Clay, Dade, Duval, Monroe, Palm Beach, Pinellas, and St. Lucie) operate comprehensive LMS.

¹⁵ See *Software & Information Industry Association (SIIA) Trends Report for Education Technology*, Longden and Jay, Educational Systems, Inc., June 2010, available at: www.siiia.net.

¹⁶ Electronic devices range from shared computers in a school or library, laptops, hand-held and smartphones.

3. Ongoing electronic formative and summative assessments with immediate feedback to teachers, students, and parents to effectively guide subsequent instruction;¹⁸
4. Student achievement data systems that provide instructional assistance and drive educationally sound curriculum decisions by teachers, parents, and administrators; and
5. Instructional and technology-related professional development for teachers and administrators. This includes professional development to support the teacher's use of new technologies, as well as instructional enrichment strategies.

Meetings Held to Address IT Procurement Practices

In an effort to promote the use of emerging educational technologies and to advocate a more streamlined process for procurement of school district technology, state, school district, and private technology representatives met in 2009 to discuss LMS-related developments; difficulties encountered in accessing essential curriculum, instruction, assessment and professional development resources; and disjointed educational platforms that are unable to link seamlessly. Key findings generated from these meetings included:

- Several school districts have made a substantial investment of human and financial resources to develop and deploy advanced LMS and hope to expand these systems with assurances of interoperability to other LMS;
- A perception on the part of school districts that access to key state-level curriculum, instruction, assessment and data-related information was unavailable in easily accessible formats; and
- A concern that the state lacks a clear, cohesive, strategic technology plan that would include applicable standards to support districts in making strategic, cost efficient decisions in the development or refinement of their LMS and ensure that local systems are interoperable with systems at the state, national, or proprietary level.

These findings were incorporated into legislation that encouraged school districts to provide electronic access to digitally rich content and instruction via learning management systems.¹⁹

An additional issue for discussion in the meetings centered on the necessity of a collaboratively developed technology plan that would provide the architectural framework by which all educational technology purchasing decisions would be made. The key components of such a framework include:

- *Ease of access* and dedication to the end user. For educational IT purposes, this would assure a single sign-on²⁰ for authenticated users to an extensive array of curriculum, instructional, assessment, and professional development resources;
- *Interoperability* so that instructional components developed in one system can seamlessly connect for use in other systems. This would entail, for example, a school district's ability to upload a platform such as FCAT Explorer directly onto the district's LMS. It also includes data interoperability, which refers to technical standards that define how district LMS can share or use data from multiple vendors;
- *Durability* of operating systems to accommodate enhancements in technology without costly redesign. A school district with a durable, operational LMS could easily adapt its LMS as newer technologies become available; and
- *Reusability* to incorporate instructional components into multiple applications and contexts. For example, a database of Next Generation Sunshine State or Common Core Standards would drive multiple applications in curriculum, instruction, assessment, and professional development.

¹⁷ An authenticated single sign-on by the end user best promotes maximum access to resources.

¹⁸ The best classroom practices come from assessment and evaluation. Therefore, the degree to which a LMS can integrate assessment functions with lesson and activity functions is a benchmark for how well a LMS environment is likely to perform. See *SIIA Trends Report for Education Technology*, June 2010, page 20, available at: www.siaa.net.

¹⁹ ch. 2010-154, L.O.F., codified in s. 1006.281, F.S.

²⁰ Single sign-on is a session or user authentication process that permits a user to enter one name and password in order to access multiple applications. The process authenticates the user for all applications for which they have been given rights to and eliminates further prompts when they switch applications during a particular session. See http://searchsecurity.techtarget.com/sDefinition/0,,sid14_gci340859,00.html.

Findings and/or Conclusions

Students expect and rely on technology to support all facets of their lives. Accordingly, public schools must embrace existing and future technologies in order to provide powerful learning experiences that engage students and prepare them for continuous advances in technology. The software publishing industry acknowledges that much of the technology available is confusing even to those who actually develop the tools. Features that are described in IT marketing materials often focus more on the technology than the art of teaching and may even be at odds with best classroom practice.²¹ Consequently, educators and end users may not have a clear understanding of the tools available or the implications of how they might be combined and integrated to differentiate offerings.²² For that reason, most of public education does not recognize how appropriate technologies can enhance and integrate curriculum, instruction, assessment and professional development, and too often acquires disparate technology gadgets instead of making calculated purchasing decisions that support effective technology systems. Fortunately, IT experts and software publishers now propose, as a starting point, technology integration that is matched directly to specifications developed by educators, based on how they plan and instruct, rather than asking teachers and administrators to plan instruction that is matched to currently available technology offerings.²³ In order for the decisions to be made based upon learning and classroom practices and not the technology, IT selection should be the final step in the instructional planning process.²⁴

Public schools are at a point to engage in a much bolder transformation of education powered by technology. The U.S. Secretary of Education, Arne Duncan, describes this point in time as a revolutionary opportunity for change, driven by the continuing push of emerging technology and the pull of the critical national need to radically improve our education system.²⁵ However, enticing technology and the urgent need to improve teaching and learning must be addressed within the context of sound fiscal policies and practices so that tax dollars are invested rather than simply expended. To attain this goal, a framework that describes the required minimum IT infrastructure must be agreed upon and then deployed. The needs and required functionality must drive the IT. Therefore, minimum IT infrastructure is contingent upon a clear understanding of the needs of educators and students. This requires a coordinated effort by educators at every academic level and recognized technology experts who are committed to the enhancement of teaching and learning.²⁶

Although several school districts continue to expand their use of technology to enhance teaching and learning, Florida as a whole appears to be without a collaboratively developed technology plan that clearly describes how technology will be used to improve teaching and learning and that identifies statewide policy directives to which state and local IT investments can be aligned. While s. 1006.281, F.S., encourages school districts to provide access to an electronic teaching and learning management system that includes key functional components, the identification and establishment of technical standards, authentication and security protocols, and procurement policies would ensure that district systems support and comply with the interoperability and ease of access requirements.

The DOE have indicated that they will engage districts and work collaboratively on the upgrade and redesign of the DOE longitudinal data system so that operating systems are compatible and districts are able to access and transfer information seamlessly. Representative staff of several school districts have expressed a desire to collaborate in the development of DOE data and learning management systems so that local district systems will

²¹ *SIIA Trends Report for Education Technology*, June, 2010, available at: www.siia.net.

²² *Id.*

²³ *Grounded Tech Integration*, J. Harris and M. Hofer, Leading and Learning with Technology, September 2009, available at: <http://eric.ed.gov/PDFS/EJ859576.pdf>.

²⁴ *SIIA Trends Report for Education Technology*, June 2010, available at: www.siia.net.

²⁵ *Transforming American Education: Learning Powered by Technology*, *National Educational Technology Plan 2010, Executive Summary*, Office of Educational Technology, U.S. Department of Education, available at: <http://www.ed.gov/sites/default/files/NETP-2010-exec-summary.pdf>.

²⁶ Historically, many LMS emerged from university research labs and play an increasingly important role in informing the conversation between instructional practice, educational research, curriculum development, and LMS design and implementation. See *SIIA Trends Report for Education Technology*, June, 2010, p. 27, available at: www.siia.net.

not be compromised and to assure district access to critical student and teacher information.²⁷ The DOE has in the past expressed concerns with regard to access to certain student information and other resources; however, state, local, and proprietary systems can in fact be created or adjusted to allow for single sign-on access in a secure manner, similar to the banking industry's use of the universal ATM system.²⁸ The system authenticates the ATM card, identifies the user, and allows access to all pertinent information while at the same time protecting the privacy of the bank and other clients. Learning systems research experts and IT developers caution, however, that an educational LMS is much more complex. Security and levels of access will be different depending on the end-user and the LMS must provide for exchange and transfer of information relative to, at minimum, students, teachers, curriculum, instruction, assessment, and professional development. The challenge will be the collaborative development of a framework for architectural technology standards, agreed upon by schools, districts, appropriate state agencies, and research institutions with expertise in LMS development, to resolve the critical issues of:

- Access, by whom and to what levels of information. This is also referred to as identity management;
- Data transfer and interoperability; and
- Security²⁹

In addition to the goal of enhanced teaching and learning and responsiveness to the end-user, such a framework may promote a more intelligent investment of IT funding, irrespective of the source of funds. A carefully planned and developed framework of standards would facilitate access to a vast array of robust resources via multiple technology devices and applications such as those in the growing smartphone market. Without a state technology plan in place to provide a framework for technology standards, public schools may be over-investing in carefully marketed and available technologies without anticipating less costly technologies that may be available in the near and distant future. Furthermore, once an agreed-upon framework of standards is developed, schools, districts, and the state should be in a more commanding position to request and expect that multiple software applications and disparate technology systems can communicate seamlessly and exchange data and content.³⁰

Studies to address gaps in educational technology planning, procurement, and investment suggest that educators look to other enterprises that have developed and used technologies to improve outcomes and enhance productivity.³¹ For example, several publications cite Advanced Distributed Learning (ADL),³² an initiative established in 1997 which develops and implements learning technologies intended for use by the U.S. Department of Defense and the federal government. A Shareable Content Object Model (SCORM), developed by ADL, is a learning content portability standard designed to address accessibility, interoperability, durability, and reusability of learning content, and is delivered to learners in SCORM-compliant LMS. SCORM, considered a de facto global standard for transporting learning content, has been widely adopted in a variety of learning contexts and environments beyond the Department of Defense and the federal government.³³ Although a number of PK-12

²⁷ An invitation to participate was distributed by the Deputy Chancellor for Curriculum and Instruction to the Florida Organization of Instructional Leaders (FOIL).

²⁸ Meeting with executive staff of Microsoft Corporation and Microsoft.net and Telephonic correspondence with Chief Executive Officer with the Center for Educational Leadership and Technology (CELT). See <http://www.celtcorp.com/TeacherStudentDataLink.aspx>.

²⁹ Access, data transfer, and security are referenced as issues essential to execution of a robust LMS and each of these issues are directly related to the standards of ease of access, interoperability, durability, and reusability described earlier in this report.

³⁰ Technology framework standards resolve issues related to data interoperability and content portability in heterogeneous systems (school districts, state agencies, and research institutions) that use software applications from multiple vendors. These standards may enhance ease of use for end-users, create long-term cost savings for tax payers, and the establishment of systems that have the ability to transform teaching and learning.

³¹ *Executive Summary, National Education Technology Plan, U.S. Department of Education*, available at: <http://www.ed.gov/technology/netp-2010/executive-summary>.

³² www.adlnet.org

³³ See *SIIA Trends Report for Education Technology*, June, 2010, p. 25, available at: www.sii.net. Learning Systems Institute research staff at Florida State University have suggested that the expanse of functions with which educational systems operate will require a more comprehensive approach to support the breadth of enterprise functions within the teaching and learning community and all accompanying counterparts.

organizations actively use SCORM, its use appears to be limited to situations in which all of the elements of a system, software and content, are from the same developer. Attempts at using SCORM with heterogeneous PK-12 systems consisting of applications and content from multiple vendors have generally not been successful.³⁴ Regardless of the learning context or environment, the standards of accessibility, interoperability, durability, and reusability must be maintained as the operational framework.

Based on two successive surveys of school districts,³⁵ 43 districts report purchasing and using some components of a LMS.³⁶ However, only seven districts currently deploy a fully operational electronic LMS that encompasses the functionalities of secure user-friendly, single sign-on access to curriculum, instructional resources, assessment, and professional development for teachers, students, parents, and administrators. School districts deploying these model LMS platforms remain committed to the ease of access for all end-users to a growing availability of resources and to the customization of these resources to meet the individual needs of students, parents, and teachers. At a minimum, state leadership should consider engaging the expertise of these districts so that the state and school districts can more efficiently and cost-effectively implement a model LMS system that enhances teaching and learning.

America's 2008 Digital Schools Report³⁷ describes features needed for a LMS to be viable, as articulated by students, teachers, and district technology directors. School districts, regardless of the extent of LMS development, have been specific in their request of IT components needed to transform teaching and learning toward a 21st century model. LMS features articulated by students, teachers, and district technology directors in the report include the following:

- Formative assessment and remediation;
- Teacher collaboration;
- Storage and delivery of assessments;
- Integration of curriculum and assessment in one system;
- Traditional courses supplemented with online instruction;
- Rich, high-quality content from a variety of sources;
- File exchange and homework submission;
- Online learning courses;
- Discussion forums;
- Assignments that are customizable to meet student needs;
- Complete integration with the Student Information Systems;
- Tagged, scalable content that aligns to curriculum standards;³⁸ and
- Support for integrated streaming video.

Interestingly, every requested feature included in the report is virtually identical to elements conveyed to committee staff by educators in Florida's school districts.³⁹

³⁴ Several educational publishers and software developers (Microsoft, McGraw-Hill, Pearson Education, eCollege, Blackboard/Angel, and the Open University) are currently collaborating on standards to enable the development and sharing of source tools and cross platform support/interoperability and portability. See www.imslobal.org/commoncartridge.html.

³⁵ An initial survey was disseminated by the Florida Association of District School Superintendents (FADSS) in 2009. A follow-up survey was conducted in June of 2010 to update information.

³⁶ A LMS has been defined by school district and university research LMS developers as a platform of dynamic applications rather than a defined set of educational tools and features. While many school districts currently use proprietary and open source applications such as Blackboard (<http://www.blackboard.com/>), Moodle (<http://moodle.org/>), and Angel (<http://www.angellearning.com/>), these are considered components of and not a comprehensive LMS.

³⁷ http://www.schooldata.com/pdfs/ADS08_intro.pdf

³⁸ HTML, which stands for HyperText Markup Language, is the predominant markup language for web pages. It is written in the form of HTML elements consisting of "tags" surrounded by angle brackets within the web page content.

³⁹ Elements requested or desired by local school districts were gathered from e-mail correspondence with committee staff and information collected at regional LMS needs assessment meeting conducted by CELT. E-mail correspondence on file with the committee.

Race to the Top (RTTT) Award and the DOE Statewide Longitudinal Data System Grant

In late August of this year, Florida was awarded \$700 million in its Race to the Top Round 2 Proposal, which includes support for district Learning Management Systems.⁴⁰ In addition, DOE was awarded a \$10 million grant in May of 2010 to upgrade its Statewide Longitudinal Data System.⁴¹ The grant will be used to support technology system upgrades, provide more timely feedback to teachers for instructional improvement purposes, and to enhance the accuracy, accessibility, and evaluation of programs.⁴² Grant funds will also be used to augment district technology initiatives, specifically LMS, as outlined in the Race to the Top Application.⁴³ Both awards, if treated as a combined effort, present an invaluable opportunity for the state. If approached as a comprehensive enterprise, the DOE could develop, with meaningful input from school districts, a framework of technology standards that promotes ease of access, interoperability, durability, and reusability among school districts, DOE, other state agencies, and research institution technology systems.⁴⁴ Other states, notably Kentucky and California, have experienced substantial success, as a result of collaboration with local schools and districts, in developing and adopting state technology plans.⁴⁵ As a result of Kentucky's plan, their state purchasing power has been maximized by leveraging the weight of the entire state to procure based on architectural standards.⁴⁶ The Gartner Group, an information technology research and advisory company,⁴⁷ estimates that Kentucky has saved millions in tax dollars due to a long range technology plan that includes cost efficiencies in shared services, reduction in rework of technology, shorter implementation timeframes, and conveyance of clear standards to technology providers.⁴⁸ The adoption of technology standards under which LMS operate would maximize taxpayer dollars by ensuring the highest level of interoperability, minimizing the retraining required when staff move between schools or districts, and maximizing the statewide purchasing power through the use of a product standard.⁴⁹

The Need for Standards and the Potential for Cohesion

It is essential that federal RTTT and ARRA Longitudinal Data funds awarded to Florida be invested wisely, based on collaboratively developed and sound technology standards. Florida is recognized for having developed some of the strongest mathematics and science curriculum standards in the nation. The standards were developed as the result of collaborative work between international experts, university research practitioners, and classroom teachers from their respective fields. Protocols used in that endeavor could serve the state well in designing an architectural framework of IT standards that will advance teaching and learning for years to come. Many LMS developed for use in other fields emerged from university research labs. In the event that a state plan for IT standards to support LMS is developed, involving these experts will play an increasingly important role in informing the conversation between instructional practice, educational research, curriculum development, and LMS design and implementation.⁵⁰

⁴⁰ LMS are referred to as Instructional Improvement Systems (IIS) within the RTTT application. See section (C)(3): Using data to improve instruction, page 117 of the RTTT Proposal, on file with the committee. The proposal includes plans by the DOE to engage the expertise of school districts who have developed a model LMS in assisting other school districts as they progress.

⁴¹ Funds were awarded through the American Recovery and Reinvestment Act of 2009 (ARRA). All four of the ARRA education assurances have implications for increased interest and implementation of LMS, particularly to the LMS feature related to improving the collection and use of data. See <http://www2.ed.gov/policy/gen/leg/recovery/presentation/arra.pdf> <http://nces.ed.gov/programs/slds/state.asp?stateabbr=FL>.

⁴² <http://nces.ed.gov/programs/slds/state.asp?stateabbr=FL>.

⁴³ Communication with DOE staff on July 9 and August 11, 2010.

⁴⁴ The 2009 OPPAGA Report (Report 09-31) states that information technology projects should also have a project steering committee to help guide the project planning process, monitor project activities, and enhance communication with end users.

⁴⁵ See the Kentucky Education Technology System (KETS), available at:

<http://www.education.ky.gov/kde/administrative+resources/technology/master+plan/>. See also California's Learning Resource Network (CLRN), available at: <http://www.clrn.org/home/>.

⁴⁶ <http://www.education.ky.gov/kde/administrative+resources/technology/master+plan/>, pages 11, 23, and 112.

⁴⁷ <http://www.gartner.com/technology/about.jsp>

⁴⁸ See the *SIIA Trends Report for Education Technology*, June, 2010, available at: www.siiacom.com.

⁴⁹ See the Kentucky Education Technology System (KETS), available at:

<http://www.education.ky.gov/kde/administrative+resources/technology/master+plan/>, page 112.

⁵⁰ The Learning Systems Institute at Florida State University has recently been awarded a \$2.5 million grant to continue applications work in the LMS arena.

Options and/or Recommendations

In order to more efficiently invest educational and instructional technology funds and to assure that such funds directly enhance the science of teaching and learning, the Legislature may wish to consider the following:

- Require state and district-level educational technology procurement policies to be aligned to electronic resources that support student achievement and the enhancement of teaching and learning;
- Require the DOE to appoint an educational technology leadership team to assist in the development of LMS framework standards, comprised of classroom educators and other appropriate end users, such as students, parents, and district technology directors; and
- Require the development of state IT framework standards for application to state and local learning management systems with the following functionalities: ease of access in a secure environment, including identity management; interoperability of diverse systems and appropriate transfer of data; durability and cost effectiveness of systems; and reusability to allow for the seamless transition of currently operational LMS.