

Personalized Learning

Task Force Report

Tennessee Department of Education | November 2016

Introduction

Through the strategic plan *Tennessee Succeeds* and under the direction of Commissioner McQueen, Tennessee has set ambitious academic goals for students, aiming to change the long-term outcomes for students in postsecondary and career readiness and success. The strategic plan maintains an emphasis on rigorous standards, aligned assessments, and strong accountability. In conjunction with these areas of emphasis, the state identified five priority areas: early foundations and literacy, high school and bridge to postsecondary, all means all, educator support, and district empowerment. In putting these emphases and priority areas to practice, Tennessee is pursuing a diverse approach to personalized learning, recognizing that students empowered to drive their own learning improve their outcomes. The state believes with these areas of focus, Tennessee will meet its three overarching goals: (1) Tennessee will rank in the top half of states on NAEP by 2019; (2) the average ACT composite score will be a 21 by 2020; and (3) the majority of high school graduates from the class of 2020 will earn a postsecondary certificate, diploma, or degree.¹

Focused on empowering districts, the state launched a Personalized Learning Task Force to explore personalized learning strategies and to direct the state's support efforts. The task force focused on four key cohesive strategies—blended learning, predictive analytics, micro-credentials, and competency-based education—and provided direction for state pilot initiatives in each. This report captures summaries of key topics and the feedback provided by the task force.

Personalized Learning Task Force

Purpose

The Personalized Learning Task Force was launched in December 2015 to explore local and national strategies, inform Tennessee pilot initiatives, and provide recommendations on the overall direction for the state to support personalized learning. The task force convened stakeholders from schools, districts, non-profit partners, institutions of higher education, and divisions within the department of education to provide diverse perspectives on the current landscape and future opportunities for personalized learning in Tennessee. The task force learned about existing efforts and provided constructive feedback on four key initiatives aligned to *Tennessee Succeeds*, each with a proposed pilot: blended learning, predictive analytics, micro-credentials, and competency-based education. Building on

¹ The *Tennessee Succeeds* strategic plan is available on the department's website [here](#).

presentations from researchers and practitioners, the group also discussed opportunities to expand the reach and to deepen the impact of successful personalized learning strategies.

Through discussions and feedback, the task force was ultimately charged with two primary goals:

1. Develop a state definition of personalized learning
2. Develop recommendations for the state’s direction to support personalized learning

By engaging key stakeholders and focusing on district-led strategies, the department aims to ensure that its support captures the needs of Tennessee educators, creates a cohesive strategy across initiatives, and utilizes and expands on existing resources and successful strategies. The task force’s feedback is captured in this report, including summaries of each session, pilot initiatives, and overall recommendations.

Members

Recognizing the wide variety of stakeholders necessary to facilitate an effective shift to personalized learning, the task force represented diverse experiences and perspectives. Members contributed to robust discussions and ensured that strategies leveraged and connected resources from across the educational landscape in Tennessee. A full list of members is included below:²

Tennessee Personalized Learning Task Force Members	
Member	Title/Organization
Sam Brooks	Personal Learning Coordinator, Putnam County Schools
Kim Clemmons	Instructional Technology Supervisor, Wilson County Schools
Brenda Dean	2020 Project Promise, Hamblen County Board of Education
John Fischer	Senior Program Officer, Bill & Melinda Gates Foundation
Chad Fletcher	Principal, Westwood Middle School, Manchester City Schools
Keilani Goggins	Director, Tennessee State Teacher Fellows Program, Hope Street Group
Alfred Hall	Director, West Tennessee STEM Hub, University of Memphis
Wes Hall	Director, Tennessee STEM Innovation Network
Gary Lilly	Director of Schools, Bristol City Schools
Beverly Miller	Assistant Director of Schools/Chief Technology Officer, Greeneville City Schools
Rachael Milligan	Managing Director, Ayers Institute for Teacher Learning & Innovation
Nina Morel	Dean, College of Professional Studies, Lipscomb University
Hope Nordstrom	Director of M.Ed/Ed.S. Programs, Lipscomb University
Theresa Nixon	Director of Instructional Technology, Knox County Schools
Sally Pardue	Director, Millard Oakley STEM Center, Tennessee Tech University

² Brief biographies of task force members are available in the Appendix.

Kecia Ray	Executive Director, Center for Digital Education
John Ross	Technical Assistance Specialist, Appalachia Regional Comprehensive Center
Robert Sharpe	Assistant Superintendent, Hamilton County Department of Education
Chris Smallen	Chief Technology Officer, Lenoir City Schools
David Timbs	Supervisor of Instructional Technology, Johnson City Schools
James Witty	Executive Principal, MNPS Virtual School, Metro Nashville Public Schools
Joe Wood	State Coordinator, Battelle for Kids
Tennessee Department of Education Participants	
Kathleen Airhart	Deputy Commissioner, Chief Operations Officer
Vicki Kirk	Deputy Commissioner, Chief Academic Officer
Danielle Mezera	Assistant Commissioner, College, Career and Technical Education
Cliff Lloyd	Chief Information Officer
Robbie Mitchell	Executive Director, Academic Strategy & Operations
Adriana Harrington	Project Manager, Office of Student Readiness and Early Postsecondary
Amy Owen	Director, Academic Strategy
Don Boyd	Centers of Regional Excellence (CORE)
Sam Percy	Executive Director, Operational Strategy

The task force was facilitated by Dr. Kathleen Airhart, deputy commissioner and chief operations officer, and supported by various divisions within the department.

Structure

The task force met in Nashville for five sessions between December 2015 and September 2016, each hosted by various task force members' organizations. The first session was dedicated to introductions and overviews, and the four remaining sessions each targeted one of the key initiative areas. The agendas were structured to provide context and specific strategies, overviews of potential pilot initiatives, and an opportunity for the department to gather feedback on these opportunities.

- *Context Setting:* Presentations on the existing landscape and strategies in Tennessee and nationally were provided by partner organizations, researchers, districts, and schools.
- *Pilot Initiatives:* The department provided overviews of pilot programs to identify the goals, scope, scaling strategy, and the projected sustainability planning and challenges of each.
- *Feedback:* The task force was hosted as open conversations throughout the presentations, with constructive feedback and considerations stemming from discussions, questions, and structured reflection opportunities to inform department activities.

The topics covered are provided below:

Session	Presentations
Overview of Personalized Learning	<ul style="list-style-type: none"> • Beginning to Define Personalized Learning in Tennessee • National Conversation around Personalized Learning • Personalized Learning in Practice: Greeneville City Schools • Existing Landscape of Stakeholder Feedback from Tennessee
STEM & Blended Learning	<ul style="list-style-type: none"> • State STEM Strategy • Connecting Resources & Strategies: The Tennessee STEM Innovation Network (TSIN) & Innovation Hubs • Blended Learning Tools • <i>Pilot: Algebra I/Integrated Math I Blended Learning</i>
Education Technology & Predictive Analytics	<ul style="list-style-type: none"> • Educator Dashboards in Tennessee • Tools from the Field: Data Analytics • Overview of Predictive Analytics • Data Security & Student Privacy • <i>Pilot: Predictive Analytics</i>
Micro-Credentialing	<ul style="list-style-type: none"> • Setting the Context: Elements of Micro-Credentials • Review of the National Context • Partnership Panel: Evolving Professional Development • <i>Pilot: Micro-Credentials in Tennessee</i>
Competency-Based Education	<ul style="list-style-type: none"> • Overview of Competency-Based Education • Competency-Based Education in Practice: STEM School Chattanooga • Site Visit Reflections: Vermont • <i>Pilot: Competency-Based Education School Sites</i>

The sections below provide a brief summary of the presentations, pilot initiatives, and feedback for each session. Reflections from the task force evolved throughout the course of the sessions and are embedded in both the summaries and feedback points in each section below.

Session 1: Overview of Personalized Learning

The task force’s opening session focused on two main objectives—providing context on personalized learning and surfacing existing feedback from educators. Building on the unique strategies employed by the organizations represented on the task force, the first topic highlighted working definitions of personalized learning, the national conversation around the topic, and a member district that is currently pioneering significant personalized strategies. The second topic shifted to survey and focus group results to provide an analysis of district and educator perceptions on technology and personalized learning. Overall, task force members recognized vast opportunities within personalized learning, as well as the need to link those opportunities into state specific cohesive strategies to tailor the learning experience and build Tennessee educator investment.

What is Personalized Learning & What Does It Look Like?

Exploring definitions and strategies of personalized learning highlighted a central focus on student-centered learning while also exposing how varied and numerous the approaches may be. The U.S. Department of Education defines personalized learning as follows:

“Personalized Learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) all may vary based on learning needs. In addition, learning activities are meaningful and relevant to learners, driven by their interests, and often self-initiated.”³

A successful personalized learning model relies on the seamless integration of individualization, differentiation, and student interests.⁴ While each of these elements is often used independently, building a cohesive strategy involving all three creates a learning experience in which each step of the learning cycle is tailored to the student. For educators and systems to achieve this encompassing goal, often many strategies and tools must be employed simultaneously, and structures must be in place to support educators in leveraging these resources efficiently.

³ Office of Educational Technology. (2016, October 10). *Future Ready Learning: Reimagining the Role of Technology in Education*. Retrieved from U.S. Department of Education [here](#).

⁴ Culatta, R. (2016, October 19). *Personalizing Learning*. Retrieved from Office of Educational Technology, U.S. Department of Education: www2.ed.gov/documents/teaching/summerseminars/culatta-personalizing-learning.pptx

The spectrum of strategies used to promote personalized learning proves as diverse as the educators and systems implementing them. Task force members shared the unique activities used in Tennessee districts and organizations, ranging from digital conversion initiatives to integrating online and blended learning opportunities to rethinking professional development. Across all these examples, the strategies emphasized a focus on educator support and development as much as the technology or tools available to the classroom. Nationally, common personalized learning initiatives mirror and expand on the Tennessee examples to include blended learning, predictive analytics, micro-credentials, and competency-based education. While some schools, districts, and states have emerged as pioneers in these areas, much of the implementation of this work is still in its exploratory phase, being honed through experience and best practice sharing.

Despite being an evolving and relatively new educational concept, personalized learning in action has demonstrated successful outcomes. In a study conducted by the RAND Corporation, a set of 23 schools implementing personalized learning for at least two years experienced improved student achievement outcomes.⁵ The elementary and middle schools improved from 14 percentile points below the national average to 4.5 points above it in mathematics and moved from an average of 13 percentile points below the national average to meeting the national average in reading. Furthermore, the study found that initially lower-achieving students demonstrated stronger relative growth than their peers under these models. Other studies have also signaled achievement gains and improvements in student engagement under these models. Personalized learning, at its foundation, and these outcomes resonate with educators as great teaching that provides students with pathways to success.

Ultimately, defining personalized learning and its strategies is still an open-ended opportunity. Common themes emerge from state and national conversations, including driving toward student-centered learning experiences, leveraging technology and flexibility in how students learn and demonstrate mastery, and emphasizing the real world applicability of student learning and interests. The diversity of implementation, however, may make it difficult for educators to know where to begin. Building on these common themes while tailoring strategies to unique contexts, goals, and resources will prove an essential process for the development of successful personalized learning models in Tennessee.

⁵ RAND Corporation. (2014). *Early Progress: Interim Research on Personalized Learning*. Seattle: The Bill and Melinda Gates Foundation.

District & Educator Initial Feedback

Many Tennessee educators and districts have the building blocks for a successful personalized learning strategy, but they also need support in linking those elements to be successful. Through two studies—the Appalachia Regional Comprehensive Center’s (ARCC) policy review and focus groups and the department’s district survey—Tennesseans provided initial insights into the current awareness, implementation, and support needs for personalized learning. The ARCC studies highlighted a high demand for certain types of tools (e.g., virtual learning opportunities) but also a need for more training on how to leverage these tools into comprehensive strategies. Educators flagged concerns on needing professional development to successfully utilize new devices and resources, as well as how to better use existing tools.⁶ At the district level, the survey surfaced similar challenges. For example, more than 75 percent of districts reported providing support for digital instructional tools in the form of infrastructure and professional development; however, while access to these resources is high, districts also reported challenges in seamlessly integrating them into instruction and learning opportunities for students. Additionally, districts expressed concern about the major hurdle of developing an efficient process for vetting new and expanding digital content and tools.⁷ Overall, educators and districts possess many of the tools and interests to shift to personalized learning but would benefit from having access to comprehensive strategies and supports from the state to achieve the goal of integrating these resources.

Feedback & Key Points

- With the diversity of strategies, defining personalized learning may limit educators, schools, and districts in their exploration and implementation. Instead, describing key traits of personalized learning offers more opportunity for grassroots determinations.
- Educators largely support the idea of personalized learning, but the range of options makes it difficult for districts to determine where to start. Building on existing strategies and linking with statewide pilots provides a foundation for interested stakeholders.
- Personalized learning cannot simply mean technology; it requires a holistic strategy and support structure for both students and educators.
- Many districts are not starting from scratch, but support is needed in developing integrated strategies that draw on existing resources cohesively.

⁶ Ross, J. (2016, March 11). Personalized Learning in Tennessee: Findings from a Policy Review and Focus Group Interviews. *Personalized Learning Task Force Meeting*. Nashville, Tennessee: Appalachia Regional Comprehensive Center.

⁷ Owen, A. (2016, March 11). District Landscape Survey: Personalized Learning. *Personalized Learning Task Force Meeting*. Nashville, Tennessee: Tennessee Department of Education.

- Personalized learning is not one set strategy, but rather an opportunity to pull multiple strategies together to cohesively impact a student's learning trajectory.

Session 2: STEM & Blended Learning

Since Tennessee's Race to the Top grant, the state and districts have invested heavily in innovative strategies in science, technology, engineering, and mathematics (STEM) education and in creating meaningful links to careers and real-world applications. Embedded in many of these strategies is a focus on student interests being brought into the learning experience, a foundational element of personalized learning. This session explored the state's STEM strategy, resources, and opportunities, including existing blended learning tools and the state's first pilot for a blended learning model.

State STEM Strategy

Under the direction of the STEM Leadership Council, the department has developed a STEM Strategic Plan to address the full integration of STEM education in K-12 learning. The plan targets four priority areas to drive the integrative work of state math and science standards with broader STEM-related focuses. These four priority areas are curriculum and instruction, student achievement, educator professional development, and community and postsecondary partnerships. By aligning state math and science standards with STEM practices, the state aims to increase student achievement in STEM learning, expand student access to effective STEM educators, and build broad-based community awareness for STEM professions. Collectively, these priority areas and underlying strategies focus on closing the academic and economic STEM gaps that currently exist in Tennessee.

Inherent in the state's plan is a central focus on connecting instruction to future opportunities, in large part by leveraging partnerships to broaden student exposure to STEM fields. By offering students a view of future potential applicability, STEM education becomes more meaningful and engaging in the classroom. These practices foster personalized learning by deepening the learning experience with links to student interest and promoting real-world application.

Networking Successful Strategies

In exploring the landscape of STEM in Tennessee, one of the state's key partners and support structures is the Tennessee STEM Innovation Network (TSIN). Launched under Race to the Top, the TSIN seeks to promote and expand the teaching and learning of STEM across the state by leveraging a network of regional innovation hubs, platform schools of exemplar models, and professional development and tools for STEM educators and leaders. The seven regional hubs are partnerships

among institutions of higher education, local school districts, and business partners to develop cohesive supports and opportunities for STEM education. By offering districts access to the collective resources of the partnerships in their area, the hubs are able to provide schools and districts with unique supports as they develop and implement tailored STEM strategies. The TSIN also leverages platform schools as incubators to surface innovative and effective strategies from the classroom level to share with broader audiences through educator and leader workshops and conferences. Connecting educators and businesses across the state, the TSIN and hubs have provided professional development to over 4,000 educators and represent over 200 business partners. Tennessee's access to this network allows for the dissemination of successful strategies and resources to educators across the state.

Blended Learning Tools

By integrating both classroom and online learning, blended learning models create the opportunity to provide tailored instruction at multiple levels, shifting the time, place, and pace of learning to fit student needs. As with personalized learning strategies, multiple models and systems exist for implementing blended learning. While many schools and districts have launched unique initiatives, educators across Tennessee have free access to online resources to use in blended learning settings. For example, the LearningBlade system provides a supplemental middle school STEM curriculum that engages students in online activities to solve real world STEM challenges, drawing on skills from all core content areas.⁸ EverFi also provides free statewide access to multiple courses in critical life skills, including financial literacy modules aligned to state standards.⁹ With these resources, educators may integrate high-quality content that meets students where they are, offering enhancement, remediation, or alternative core instruction as needed. Blended learning maximizes educators' abilities to differentiate instruction and to allow students to drive and tailor their own learning.

Pilot Initiative: Algebra I/Integrated Math I Blended Learning

Overview

Launched for the 2016–17 school year, the Algebra I/Integrated Math I blended learning pilot marks the department's first pilot initiative toward personalized learning. The guiding principle of this effort builds on evidence that technology can support teachers in delivering tailored instruction by helping them leverage data and quickly diagnose student needs. Moreover, recognizing that all students learn and think differently, blended learning provides an avenue to support personalization by combining technology with strong human teaching strategies. The goals for the pilot are to assess whether or not a blended learning environment

- 1) helps move students towards proficiency in Algebra I and Integrated Math I;

⁸ More information on the LearningBlade product is available on the company's website [here](#).

⁹ More information on EverFi's offerings in Tennessee is available on the company's website [here](#).

- 2) supports teacher instructional practices; and
- 3) increases student buy-in and ownership of their learning process.

Scope of Activities

Through an initial cohort of 50 teachers, approximately 5,000 students will learn Algebra I or Integrated Math I in a blended learning environment during the 2016–17 school year. Participation spans Tennessee, with 37 high schools and middle schools across 21 districts represented. Experience was not a factor in selection, as nearly two-thirds of the cohort are implementing blended learning for the first time. To assist in the transition, teachers received access to and training on how to use the following:

- Canvas, a learning management system that supports learning, collaboration, assessments, grading, messaging, and analytics;
- Tennessee-aligned Algebra I/Integrated Math I content provided by NROC, a community-guided non-profit focused on college and career readiness; and
- ongoing professional development provided by BetterLesson, an organization specializing in content-specific blended learning support.

Additionally, the department will provide ongoing support to teachers and administrators through webinars and regular virtual office hours.

Scaling and Sustainability

Throughout its first year, the department will evaluate the pilot for effectiveness of practice and potential for scale. Applying a mixed-methods approach consisting of data collection, observation, and tracking teacher and student improvement in select areas will allow the state to assess whether or not a blended learning environment meets the goals stated above. This evaluation will also surface successful implementation strategies to guide how the department encourages additional schools to adopt the model in the future.

For the 2017–18 school year, the department will recruit a second cohort of 50 teachers, scaling the pilot to 100 participants and increasing the number of students served to approximately 10,000 annually. The summer 2017 training will introduce the new cohort to pilot resources and blended learning strategies, while also supporting the original cohort towards engaging more deeply in blended learning.

Challenges Going Forward

As the pilot expands, the department is prioritizing building district capacity to support blended learning. First, the state must engage with administrators at pilot schools to ensure that they can make informed decisions regarding their technology infrastructure and professional development strategy. Second, a new model for providing initial training must be adopted. The state will consider a “train the trainer” model for cohorts attending their second summer professional development in future years to leverage existing experience. Finally, the state and districts will face a financial hurdle in funding full scale implementation and access with over 70,000 students taking Algebra I/Integrated Math I annually.

Feedback & Key Points

- Tennessee already possesses a strong network and multiple strategies to support STEM and blended learning models; however, many districts and educators are unaware of those offerings. The state must leverage networks to improve communication of existing resources and to promote successful strategies.
- Given existing resources, STEM courses offer an easier starting point for blended learning initiatives.
- Blended learning models should not be relegated to remediation or enhancement. If the tools cover the content effectively, they could be used in any setting.

Session 3: Education Technology & Predictive Analytics

Personalized learning strategies often leverage technology to increase the efficiency of the learning cycle. Innovative solutions have the potential to provide for data-driven teams to capitalize on using efficient analytics of existing data. A shift toward prediction and prescription utilizing machine-generated suggestions to improve students' learning trajectories is possible through predictive analytics. Current initiatives to embed this capacity into classrooms focus on making educators' interactions with data more streamlined and tailored to their instructional and management needs. Looking ahead, Tennessee is exploring how to convert predictive analytics and machine-learning technologies that help big businesses improve their functions to the education sector, using data to determine successful instructional strategies and content. To implement successful personalized learning models, educators must know their students' needs and be able to identify the right combination of instruction and paths to meet those needs. Educational technology can provide the tools to help educators understand those learning pathways more efficiently and effectively.

Improving Access and Efficiency of Data

Educators often face the challenges of data being stored in multiple systems and in cumbersome formats, requiring significant time and effort to collect and analyze basic data points on their students. To alleviate some of these issues, Tennessee launched ImpactTN (data dashboards) to provide educators with simplified access to student data and analytics. ImpactTN, tailored to meet the needs of teachers, leaders, and district staff, synthesizes data from multiple sources, including local student information systems and state assessment files, to give educators a clear, single view. Data points, which are updated daily, include grades, attendance, assessments, contact information, discipline,

special designations, and transcripts among others. The data is surfaced through analytic tools which allow educators to quickly see trends for individual students and classes. These views provide educators with information to regularly inform instruction and to promote data-driven conversations. As with all data systems, ImpactTN relies on a data-driven culture in the classroom and school. The dashboards aim to address the initial hurdles of improving the use of data by targeting access and ease of use.

Predictive Analytics & Machine-Learning

Most current educational technology-driven systems focus on existing data, but new attention is being given to predictive analytics as a tool to identify student trajectories and to propose intervention points. Predictive analytics use historical data trends to develop insights into learning patterns and streamline data-informed decisions. The models rely on having robust and regularly updated data on student profiles, performance, and instructional strategies. By pulling this data into statistical algorithms, predictive analytics identify what factors contribute most significantly to student outcomes, based on known information. Armed with these conclusions, educators can better target intervention strategies to meet student needs.

Understanding patterns and trajectories is also an essential tool for the business sector, used by companies to improve their bottom lines. An additional layer on top of predictive analytics is the science of machine-learning. Machine-learning uses ongoing data inputs to fine-tune predictions and recommendations. While great educators naturally do this refinement over time, having an automated system built on more robust data offers educators an advanced starting point in making differentiated instructional decisions.

While these technologies are used regularly across the business sector to automate many operational decisions and to inform larger scale strategies, they have not yet been successfully utilized broadly in education. Tennessee is interested in using these same concepts and solutions to benefit personalization for educators and students.

<i>Pilot Initiative: Predictive Analytics</i>
<p>Overview</p> <p>Unlike the other pilot initiatives, the predictive analytics project is a technology development effort that seeks to leverage existing data, improved analytics, and digital content in innovative ways to personalize learning and improve academic outcomes. Incorporating the predictive analytics and machine-learning capacity learned from the business sector, this project aims to provide “personalized content channels” that provide recommendations to educators for specific strategies and content to both support educators and reflect student needs and interests.</p>

Framing the Technology

Breaking down the instructional process offers insights into how predictive analytics may be used to improve efficiency. The Algebra I/Integrated Math I blended learning pilot provides a good example of the steps required to effectively personalize instruction through the use of targeted digital content. The basic steps include the following:

- Through a combination of feedback mechanisms and data over time, broad areas of need are identified. In this case, Algebra I/Integrated Math I surfaced as an essential need area to ensure stronger academic success.
- Once the area of need is identified, digital content that closely aligns to Tennessee standards is located and tagged with appropriate criteria to allow the content to be searched and matched to student needs. In addition to identifying content, an assessment screener is developed that helps an educator identify the concepts and learning objectives for which each student requires additional support.
- Finally, from the results of the screener, the educator can search for content that matches the needs of each student and assign the supplemental content to the student through a learning management system (LMS).

The Algebra I pilot has been incredibly beneficial in embracing the role of digital content, advancing the adoption and understanding of the use of learning management systems to support instruction delivery, and in recognizing the value of delivering personalized support for each student. The experience also signals the considerable effort required of educators to build a supplemental learning program by hand. It takes time to collect enough feedback to identify areas of overall need, and the locating and tagging suitable digital content is labor intensive. The administration and the manual review of screener results requires significant time and effort, and searching for and assigning digital materials can be overwhelming with so many options. Furthermore, the need exists to duplicate the process each time a new cycle of instruction and reflection is initiated.

Predictive analytics, powered by advanced concepts such as machine-learning, have now reached a level of sophistication where it is possible to automate this process. This project aims to leverage advanced analytics algorithms prepared by some of the leading data scientists in the country to provide early insights into students; these insights are continuously being refined and improved. These insights have the potential to understand learning gaps for each student and to identify the best content to support individual learning styles and preferences. This technology solution will be able to review student information in real-time and suggest content for each student that both meets the student's competency needs and aligns with each student's preferred learning modality. By applying advanced machine-learning concepts, these recommendations for the match of content to student needs will be constantly reviewed over time, improving accuracy as more information becomes available.

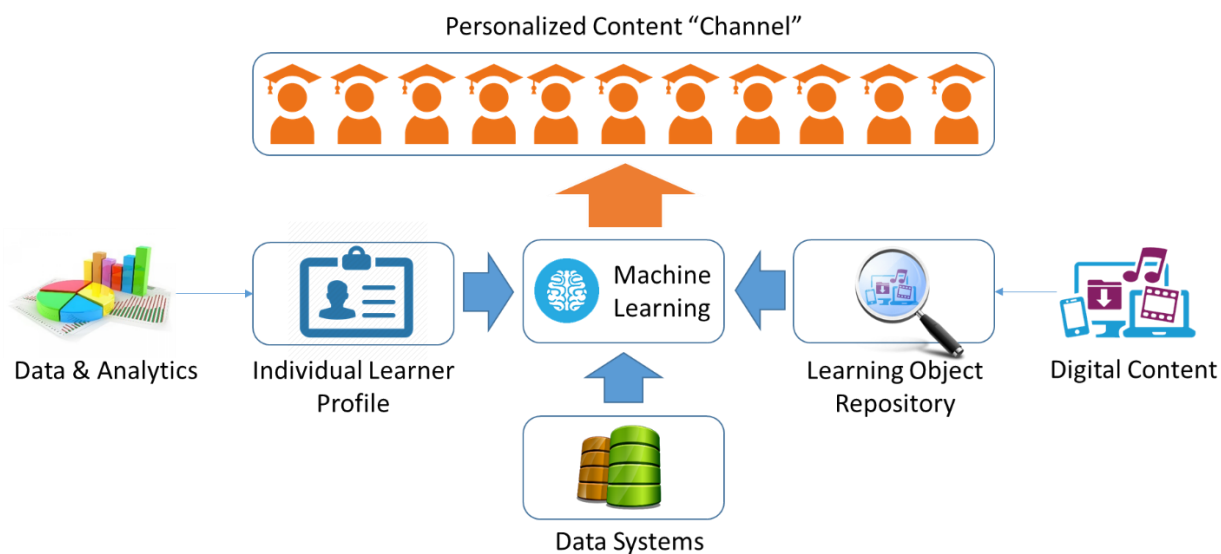
Content

Ultimately, the quality and appropriateness of the digital content assigned and the educator delivery will determine the success. While dozens of repositories of high quality digital content exist nationally, the challenge for educators is searching for that content across many sources and matching it to relevant state standards. The predictive analytics system solves this through a concept called a “search broker.” A search broker has the ability to search across all repositories from a single interface. Advanced crowd sourcing algorithms progressively align this content to state standards, as educators tag sources for given learning objectives. This process builds on an effort by the U.S. Department of Education called #GoOpen that promotes open source content for educators, aligned to state standards. Predictive analytics systems can inform use of existing digital content to personalize learning to meet the needs of their students.

Impact

The predictive analytics solution, while a complex technology, provides an automated process to develop instructional recommendations. The system matches individual student needs with the optimal learning opportunities. Those opportunities are surfaced as recommendations through a personal learning channel to the teacher. The teacher, however, remains ultimately responsible to approve content and facilitate instruction. The system continues to improve its recommendations over time as it learns of demonstrated successes in improving student outcomes.

The following illustration depicts the conceptual model described in this document:



Feedback & Key Points

- Educators are interested in strategies that save time and effort, but education technology has two major pre-requisites to meet that goal:
 - Educators must possess the skills or the support to obtain them to leverage technology.
 - Technology solutions must be integrated with one another so as not to feel like an additional system to learn to use.
- Identifying high-quality digital content is a significant challenge for educators and leaders. Districts similarly lack efficient processes to support the vetting of content as well.
- The best data systems and dashboards still require a strong, data-driven culture to exist in the classroom, school, and district. Educators need ongoing professional development in this area as access to data and analytics improves.
- State and local systems must maintain a central focus on data security and privacy. Stakeholders want data-informed instructional decisions, but they also want to know their information is protected.

Session 4: Micro-Credentials

As with any strong instructional strategy, personalized learning applies as much to the professional development of educators as it does to the academics of students. Micro-credentials, online modules designed to develop and to assess specific skills, offer educators the ability to pursue their own learning based on their needs and interests while emphasizing evidence of improved outcomes. After exploring the need and opportunity for micro-credentials to redesign professional learning, this session collected insights from a panel of partner organizations on redesign efforts and mapped out Tennessee's plan for leveraging micro-credentials to create a personalized professional learning system to inform additional pathways for licensure advancement and renewal.

The Need and the Opportunity

While the importance of professional learning and continuous improvement are widely acknowledged, the current landscape of professional development reflects a disconnect between what districts and teachers believe should be emphasized in professional development. A survey of teachers and district leaders shows that the three areas of professional development most emphasized by districts—lesson observation, coaching, and professional learning communities—garner reviews ranging from neutral to

outright dissatisfaction.¹⁰ This mirrors findings in other surveys, which show that teachers are generally more satisfied with informal professional development opportunities than in-service activities. In Tennessee, 72 percent of educators reported that using their own professional judgment in considering strategies to grow and improve was very important, and 55 percent noted that collaboration with other educators was essential to successful growth.¹¹ Despite these findings, professional development is often prescribed without connecting to educator needs and disconnected from the peer learning.

Micro-credentials offer an opportunity to help bridge this disconnect. Micro-credentials are a way for educators to demonstrate professional competencies and provide evidence of outcomes from professional learning. Educators have control over how the learning occurs and can choose topics that are most relevant to them at the time. The strengths of micro-credentials lie in the flexibility, voice and choice, and relevance that they offer educators. These strengths encourage educators to drive toward competency of skills, leveraging additional resources, and peer experience to achieve those goals.

Efforts to Transform Professional Development

To inform the shift to micro-credentials, the state looked to partner organizations to highlight their experiences in incorporating this new model and other redesign efforts to improve professional development. Partner organizations including districts, higher education institutions, and national organizations contributed to a panel discussion that surfaced core themes of effective professional development. A few key themes from the conversation include:

- *Educator Voice:* Across organizations and initiatives, the panel consistently emphasized the importance of providing educators more voice and agency in developing their own professional learning. Educators will be empowered to lead their own learning when they can select relevant topics and pursue them in flexible settings.
- *Coherency:* Often, professional development is a generic presentation assigned on a rotating schedule throughout the year. For educators to be invested, professional learning must be coherent in two significant areas. First, the learning experience must be linked to the educator's areas for improvement or interests, making explicit a clear purpose to the learning. Second, the

¹⁰ Berry, B. (2016, July 28). Micro-Credentials: Setting the Context. *Personalized Learning Task Force Meeting*. Nashville, Tennessee: Center for Teaching Quality.

¹¹ Airhart, K. (2016, July 28). The Tennessee Plan: Creating a personalized Professional Learning Pathway with Micro-Credentials. *Personalized Learning Task Force Meeting*. Nashville, Tennessee: Tennessee Department of Education.

professional development must translate into actionable steps in the classroom and be supported through implementation and refinement.

- *Assessment:* Professional development must be followed by an objective, robust review of practice. Educators expect instruction to lead to improvements for their students, and when it does not, additional support is provided. Educator professional learning must operate in the same way with clear expectations of mastery and ongoing support to improve as needed.

As micro-credentials address these and other issues, a new model of professional learning also requires a culture shift. Micro-credentials more closely align to coaching models than to the current, one-size-fits-all approach to professional development, and they rely on partnerships between educators putting skills to practice and administrators supporting them in doing so. Achieving this goal moves the prevailing dynamic around professional development away from required credits and toward meaningful skill development.

Pilot Initiative: Micro-Credentials

Overview

The state's strategic plan, *Tennessee Succeeds*, identifies educator support as one of five priority areas to help the state reach its major education goals by 2020. The plan, in specifically aiming to support "the preparation and development of an exceptional educator workforce," sets the stage for the exploration of micro-credentials as a form of personalized professional learning. The department of education is conducting the Tennessee micro-credential pilot to gather feedback and explore avenues to more personalized learning for educators across the state.

The goal of the pilot is to directly impact up to 100 teachers, sixty of whom will meet face-to-face and serve as a focus group. An additional forty teachers will participate virtually by earning micro-credentials independently and providing feedback on the experience. Among teachers in the focus group, approximately 30 (with four to nine years of teaching experience) will act as mentor teachers to 30 beginning teachers (with one to three years of teaching experience). Teachers in the pilot will earn up to three micro-credentials from a curated set focused around the TEAM rubric indicators of questioning, thinking, and problem solving. These areas were chosen after statewide evaluation data identified them among the most common areas needing refinement and growth for teachers along the TEAM rubric.

The pilot seeks to capture teacher perceptions around micro-credentials as a form of personalized learning, including details around the general quality, rigor, and relevance of the credentials. It also aims to collect teacher input on the process required to earn the micro-credential. This input will address questions about isolation and collaboration, helpfulness of associated resources, and cost benefit analysis regarding time required to earn the credential. The department will use findings from the pilot to help inform a possible pathway

to license renewal and advancement by allowing micro-credentials to count toward professional development points in subsequent years.

The pilot will run from October 2016 to June 2017, in partnership with three organizations, the Center for Teaching Quality, Digital Promise, and Bloomboard. These partners will provide the platform, initial content and scoring, and support for the pilot. The focus group will gather in Nashville three times during the year to connect and reflect, provide feedback, gain support, share insights, and express concerns as they work to earn three of 15 possible micro-credentials.

Scope of the Pilot

The department sought recommendations for the pilot from education leaders throughout the state. From those recommendations, 30 educators with four to nine years teaching experience were chosen to represent schools and districts from each of the eight CORE regions. These teachers have shown characteristics of leadership, willingness to learn, and working well with members of their school communities. Invited teachers were asked to choose a beginning teacher with one to three years teaching experience to partner with throughout the pilot. Together, these 60 teachers will comprise our focus group for the pilot. Each member will work to earn three micro-credentials while providing valuable feedback that will inform the department's decision-making process regarding micro-credentials and personalized learning.

Scaling

During year two of the pilot, the department plans to reach up to 5,000 educators with micro-credentials and to develop policies to use micro-credentials as a tool for licensure advancement. As with the first year, BloomBoard will continue to provide the platform through which teachers will access and engage with the micro-credentials. In year three, the state hopes to expand the pilot more broadly as a resource to all educators and to develop micro-credentials around Tennessee content standards and other state specific needs.

Sustainability

Sustaining a program for micro-credentials will require a solid plan around two major elements: (1) a system for assessing evidence and (2) a way to monetarily maintain the technological platform. A potential solution to develop a system for assessing evidence is to provide professional development points for each micro-credential that a qualified teacher reviews and assesses of peers, in addition to any professional development points that teacher might earn for completing the course. The question of monetary support required to sustain the digital platform may be answered by a system which allows each district to determine how to contribute for each micro-credential earned. The department will utilize the information gained during year one and two of the pilot to inform decision-making for subsequent years.

Feedback & Key Points

- Micro-credentials offer an alternative to traditional professional development that can better scaffold and target educator learning.
- Districts should network with one another in developing identification strategies to best link educator needs with the right micro-credential offerings.
- The state and districts should partner with institutions of higher education and educator preparation programs to develop high-quality micro-credential content and assessments of evidence.
- The paradigm shift in professional development requires thoughtful, strategic communication with teachers and leaders to ensure investment and strong implementation.

Session 5: Competency-Based Education

Personalized learning recognizes that students excel when they are empowered to take ownership of their learning, integrating their own interests and progressing at the right pace. Competency-based education creates these pathways for students by focusing on demonstrating mastery through application and allowing students to advance through curricula and grades as mastery is achieved. With options in the scale of implementation, these models open flexibilities in classrooms and policies for students to drive how they engage with their learning experience. This session provided an overview of competency-based education and highlighted both local and national exemplars in implementation strategies.

Competency-Based Education 101

Robust competency-based education models may incorporate a wide variety of strategies, including those detailed above, with the ultimate goal that students progress as they demonstrate mastery, regardless of the time or situation in which the content or skills were learned. The leading working definition focuses on five key elements:¹²

- Students advance upon demonstrated mastery.
- Competencies include explicit, measurable, transferable learning objectives that empower students.
- Assessment is meaningful and a positive learning experience for students.
- Students receive timely, differentiated support based on their individual learning needs.

¹² Patrick, S., & Sturgis, C. (2015). Maximizing Competency Education and Blended Learning: Insights from Experts. *CompetencyWorks Issue Brief*, 14.

- Learning outcomes emphasize competencies that include application and creation of knowledge, along with the development of skills and dispositions.

Whether implemented within a classroom or across a system, these elements personalize learning by offering more flexible structures for students, focused primarily on outcomes rather than a defined path to those outcomes.

At the classroom level, competency-based education expands the landscape of instructional strategies and assessments to student-driven interests. If a student can select the content in which they learn competencies, then the instructional context shifts from being solely teacher-led to meaningful and individualized topics for students. While the end goal of mastering a skill or knowledge has not changed, the way in which a student works toward that goal has changed drastically, improving student engagement. The focus is on the student mastering the competency, not a prescriptive path to doing so. In measuring student learning, competency-based education similarly broadens opportunities from basic multiple-choice assessments to applications of learning, seamlessly capturing knowledge and skills. Through project-based learning, performance assessments, debates, or other activities, students integrate the content they have learned to achieve a goal, mirroring real world application and ensuring a deeper understanding of the competency. By creating a stronger link between the learning and assessment processes, competency-based education provides student more transparency in understanding their progress and paths toward improvement.

At full implementation, schools and districts leverage policies to remove barriers to student progression. By shifting away from seat-time requirements, a new progression structure is developed that allows students to move through courses and grades at their own pace. Grading and credits also evolve to be solely based on mastery. Systems must consider what additional opportunities should be provided to students completing coursework quickly, such as work-based learning or early pursuit of postsecondary classes. Ultimately, students in these districts may earn competency-based diplomas that represent the same level of rigor and learning as traditional degrees, but further emphasize the successful application of learning.

Competency-Based Education in Action

To illustrate successful strategies and to emphasize the wide range of strategies, a local Tennessee high school and schools across Vermont provided exemplars of competency-based education in practice to the task force.

STEM School Chattanooga, a platform school with TSIN, is a state leader in integrating STEM across curricula and leveraging innovative teaching strategies to empower students.¹³ All students and teachers participate in project-based learning, both in specific courses and across content areas. As students work through projects, they have clear rubrics of what their work should demonstrate to achieve mastery, but they also have the flexibility in their pathways to address the project driving questions. For example, when students are given driving questions like how to prevent viruses from spreading, they may interpret this to mean a cold or they may interpret it as something less obvious like computer malware. The grading model demands quality work rather than compliant work, requiring students meet minimum standards in order for work to be assessed. It also provides for iterative opportunities to demonstrate mastery, with grades not being finalized at the end of a unit, but rather at the completion of the year. For students, this transparency offers a clear understanding of achievement without overly dictating the path to getting there. Educators at STEM School encourage students to own their learning, comfortably shifting into facilitator roles as students delve into content and skills and begin to demonstrate their understandings. The result of this student agency and flexible educator support is a school environment in which students exude confidence in their learning, engage with material in innovative ways, and demonstrate learning through methods relevant to their interests.

As a national leader in competency-based education, Vermont removed the traditional credits system and adopted flexible and personalized pathways, requiring students to progress and graduate based on mastery of skills and knowledge. At the state level, Vermont set the competencies expected for graduation and performance indicators to map out the trajectory. To measure student learning along their tailored paths, the state published guidelines for task models and scoring criteria, emphasizing transferable skills that link the classroom to real world application. With these expectations and supports, Vermont districts and schools possess the autonomy for determining the best models for their students.

A group of task force members traveled to Vermont to observe schools with different competency-based education models in place. Schools opted to launch models in alignment with their own

¹³ More information on STEM School Chattanooga is available on the school's website [here](#).

resources and priorities, with some beginning with school-within-school strategies and others immediately flipping to full-scale implementation. The group noted that while one school maintained a similar environment to a traditional school setting with the notable difference of the progression, another school felt like a completely different context as students took full ownership of their learning paths and educators served as facilitators. Some schools continued to use traditional resources and instructional materials while others integrated significant amounts of digital content. Regardless of the practice, the group's reflections on the impact on student learning highlighted the significant dynamic shift for students in competency-based education. Students were empowered to be involved in their learning, having a substantial say in developing their personalized learning paths. They were encouraged to follow their own interests, with the standards being tied to that path rather than setting in stone the single path students must take. To support these models, the group identified the importance of school and district leadership being invested and comfortable with these new dynamics in the classroom, and allowing the flexibility and time required for educators and students to master them. While Vermont is years into implementation, the models at each school continue to evolve to meet individual student needs through flexibility and student ownership of learning.

Pilot Initiative: Competency-Based Education

Overview

In order to fully take advantage of changes in progression, the state recognizes that competency-based education systems must be built on a strong foundation of classroom instruction. These classroom- and school-level proof points may then be used to inform local and state policy decisions, in addition to expanding the strategies and experiences used to drive new implementations. To develop this body of evidence and experience, Tennessee is launching a pilot of competency-based education school sites across the state to embed high-quality classroom strategies and surface specific policy needs to fully leverage the opportunities of these models.

Beginning in the spring of 2017, the pilot will invite school teams of educators and leaders to participate in an intensive summer training on competency-based education and then provide ongoing support throughout the school year as educators convert existing teaching units into competency-based instruction and assessments. School teams may consist of educators within the same or across content areas based on the school strategy, providing different views of implementation. The professional development series will provide an overview of competency-based education and exposure to existing strategy options, and then pivot to a workshop for educators to begin to redesign an initial unit into the new model. Educators will be supported by divisions from the department and external facilitators with expertise in instructional strategies and quality performance assessments. By the start of the 2017–18 school year, participating school teams will be prepared to implement their first competency-based units, refining their practice and further developing additional units throughout the school year with the support of regular check-ins, onsite observations, and peer-to-peer feedback.

The state has three primary goals for this pilot:

1. Develop educator and school leader knowledge and skills to implement competency-based education in the classroom
2. Develop state knowledge and capacity to provide the supports necessary for strong implementation, including professional development, technology, systems, and policies
3. Establish Tennessee proof points and lessons learned to drive state and local initiatives and policies

Ultimately, by surfacing successful practices from pilot participants, the state aims to expand the reach and benefits of competency-based education models in Tennessee.

Scope of the Pilot

In the first year of the pilot, roughly 15 school teams will be selected (each consisting of two to four educators) for an estimated total of 50 participants. With an initial focus on high school tested subjects, an estimated 5,000 students will participate in competency-based education units in the 2017-18 school year. The summer training will focus on developing a single unit for implementation in the fall, and through ongoing support during the fall, educators will complete additional units to put into place during the spring semester. Heading into the second year of the pilot, this initial cohort will implement multiple competency-based units in each of their classes.

Scaling

To learn the process of expanding these practices, the pilot will scale within the existing school sites (and potentially across schools) in the second year of the pilot. A second cohort of educators will be selected to participate in the same summer training series offered the prior year, and the educators from the first cohort will collaborate with new teachers in the workshop to redesign units. The scaling may occur vertically to include additional grades or horizontally to encompass additional content areas in alignment with the school strategies. The second cohort will follow the same pattern for unit development as the first cohort, resulting in substantial school teams implementing competency-based units and assessments throughout the second year.

Sustainability

The state aims to address sustainability by building local capacity to provide ongoing training and by creating robust resources for educators to pursue competency-based education models. Pulling from the two cohorts of pilot participants, the state will provide a mini-training at the end of the second year to a select group of educators, focused on developing coaching skills in competency-based unit design. These coaches would be charged with providing training to additional teachers at their school sites and locally and may be leveraged more broadly by other interested districts. Additionally, the state will use the lessons learned from the experience of the pilot group to design training materials, potentially to include micro-credentials, which would empower educators and leaders elsewhere to build their own skills and capacity. These training resources and the units prepared by the pilot educators will be made available to all educators in the state to implement, building on the experiences of their peers.

Challenges

The major implementation challenge is the diversity of strategies schools and districts may opt to employ in pursuing competency-based education. By designing the pilot to be driven from the classroom and local level, the state expects to surface common areas of need across the pilot sites. The state will look to provide robust supports to meet these needs as more schools and districts participate in these initiatives.

Feedback & Key Points

- The opportunities of competency-based education inherently personalize the learning path for students, empowering them in their daily classroom learning and their progression through the K-12 system.
- Developing high-quality performance assessments aligned to competencies will be a major challenge. Students, educators, leaders, and other stakeholders will need clear professional development and communication about this dynamic shift.
- Successfully implementing competency-based education will require flexibility, time, and the leadership support to fail and to improve over time.

Connecting the Work & Recommendations for Tennessee

The Personalized Learning Task Force's exploration and feedback on the existing landscape and opportunities to personalize learning through innovative initiatives provided valuable direction to inform Tennessee's strategy. The *Tennessee Succeeds* strategic plan, complemented and captured through the *Every Student Succeeds Act* state plan, and the release of updated standards and assessments provides unique timing for educators, schools, districts, and the state to rethink how education becomes a student-driven endeavor. Essential to a successful personalized learning model is the understanding that strategies, including the four key areas described above, complement one another and enhance the learning experience for students. By leveraging a cohesive plan of multiple strategies, students' likelihood of success increases as educators better grasp student interests and have access to more resources to link those interests to classroom.

In alignment with the goal of empowering districts, the state recognizes that successful personalized learning models will only take root when the initiative is led by local educators and leaders. The successes highlighted during the task force sessions and the proposed pilots have a central focus in common—educators, schools, and districts must possess the tools and supports needed for strong

implementation. Through the pilot initiatives, the state hopes to learn alongside districts and to provide them with the supports necessary to be innovative and strategic in exploring personalized learning. Tennessee will build on the experiences and strategies of local efforts to encourage districts to initiate and to expand personalized learning with the ultimate goal of improving outcomes for Tennessee students.

The following recommendations encourage Tennessee to pursue personalized learning:

1. The department should set descriptors of personalized learning rather than a finite definition to allow districts flexibility. Incorporating elements of the definition included in this report, successful personalized learning models would:
 - focus on learner-driven and student-centered practices;
 - use multiple and innovative instructional strategies and measures of learning;
 - incorporate collaboration (students to teachers and peer-to-peer);
 - offer flexibility in pace and place; and
 - leverage technology to improve the efficiency of the learning cycle.
2. The department should pursue a blended learning pilot or pilots to surface the needs of educators in integrating blended-learning tools into the classroom and to provide additional supports to tailor student learning experiences.
3. The department should explore the development of predictive analytic technology in education, creating systems and tools to demonstrate the feasibility and scalability of innovative solutions.
4. The state should develop and launch a micro-credentials system to a pilot set of participants to develop insights into the value of a new model of professional learning and potential impact for broader professional development redesign efforts and licensure requirements.
5. The department should facilitate the development of competency-based education pilot sites to explore the development process, support needs, and policy implications at the local and state levels.

Concluding Thoughts

Commissioner McQueen, Deputy Commissioner Airhart, and participating staff from the department are grateful to the members of the Personalized Learning Task Force and the numerous presenters for offering their time and expertise to help shape the direction of personalized learning in Tennessee. As the state seeks to continuously improve its supports to educators and leaders, the feedback of stakeholders continues to provide invaluable insights into how strategies unfold at the local level. Capturing many of those insights, this report and the broader lessons surfaced through the task force will influence the state's path forward which will continue to prioritize the empowerment of districts to inform and to own these key efforts in personalized learning.

Personalized Learning Task Force: Member Biographies



Sam Brooks

Personal Learning Coordinator, Putnam County Schools

Sam Brooks has been very honored to work for the Putnam County VITAL (Virtual Instruction to Accentuate Learning) program for the past seven years. Brooks' first assignment was onsite facilitator for online learning at Upperman High School. He then moved into a leadership role as personal learning coordinator for Putnam County Schools. The VITAL program in Putnam County has grown to include credit advancement/credit recovery, dual enrollment, IVC (live) distance learning, K-12 blended learning, as well as providing professional development for the 21 schools within his district. VITAL implemented a district homeschool (VITAL HomeConnect), as well as an early college dual enrollment program (VITAL Collegiate High School) beginning in the fall of 2014. VITAL has hosted over 50 site visits the past three years from districts interested in the operation of our personal learning program.



Kim Clemmons

Instructional Technology Supervisor, Wilson County School System

As the instructional technology supervisor for Wilson County Schools, Kim Clemmons is a leader in innovative change. She has served locally and nationally with key thought leaders in: TETC, USDLA, ASCD, Learning Forward, VSS and ISTE. Prior to becoming a district administrator, Kim was a classroom teacher who worked with the Tennessee Department of Education to develop the 21st Century Classroom teacher training curriculum. She is responsible for the successful implementation of a state approved virtual school using synchronous, asynchronous, blended and online learning environments to broaden student learning opportunities. Her creative and forward thinking approach has assisted Wilson County Schools with implementing one-to-one initiatives using chrome management for personalized student learning environments. Ms. Clemmons and her team are responsible for the very successful instructional technology professional development program in Wilson County.



Brenda Dean

Assistant Professor, Carson Newman University 2020 Project Promise, Hamblen County Schools

Dr. Brenda Dean is part of the faculty of Carson Newman University in the department of education's graduate program and is assisting Hamblen County Schools in its digital transformation. Her professional experience includes work as a Biology and Chemistry teacher, a building level administrator, and an assistant director of schools for curriculum and instruction for Hamblen County Schools. Dr. Dean is a master trainer for SREB on Using Root Cause Analysis to Reduce Student Failure.



Chad Fletcher

Principal, Westwood Middle School, Manchester City Schools

Chad J. Fletcher is the principal of Westwood Middle School in the Manchester City School System. Chad earned his BA, M.Ed., and Ed.S. Degrees from MTSU and began his career as a classroom teacher at Hunters Lane and Antioch High Schools in the Metro-Nashville/Davidson County Schools. Since 2001, he has served as a school administrator in Murfreesboro City, Knox County, and now Manchester City Schools. Chad was twice named Murfreesboro Education Association's distinguished administrator, was a finalist on multiple occasions for favorite principal in the Daily News Journal's Ruthie Awards, and has led Westwood's digital learning initiative for the past three years.



Gary Lilly

Director of Schools, Bristol City Schools

Gary Lilly began his career with Bristol Tennessee City Schools in 1994 as a teacher. He has held a variety of roles with the system, including parent involvement coordinator, curriculum specialist, technology coordinator, principal, and attendance and transportation director. For the past seven years, he has served as the district's director of schools. During his tenure as director, the district has implemented a one-to-one digital conversion in grades four through 12. The district has also been recognized as one of six #GoOpen Ambassador Districts by the United States Department of Education for their work with open educational resources. As a result of these and other initiatives, Dr. Lilly was recently named as one of the Top 30 Technologists, Transformers, and Trailblazers by the Center for Digital Education, a recognition he appreciates but attributes to the hard work of the teachers and administrators within the district.



Beverly W. Miller

Assistant Director of Schools / Chief Technology Officer, Greeneville City Schools

After spending the first ten years of her career working in IT for MECO Corporation (an international manufacturing firm), Miller joined the Greeneville City School District as the first technology coordinator in October 1995. She recognized in her early days working in public education that her skillset was unique and could be best utilized when combined with that of a highly-qualified, skilled, certified educator. Miller established a strategy to align herself with those who had chosen a teaching career, learn as much from them as was possible, and then combine her talents and skills with theirs to impact education in a positive manner. Having just recently completed her 20th year with Greeneville City Schools, Miller notes that she is more passionate than ever that, while technology is never the entire solution or the complete answer, it most certainly is nearly always a critical piece of the puzzle. She firmly believes that, when used correctly and when placed into the hands of a great teacher, instructional technology can transform the teaching and learning process. After serving as the chief technology officer until 2012, Miller was promoted to assistant director of schools for administration. She continues to serve in both roles and enjoy her work immensely. Miller holds a Master of Business Administration (MBA) degree from Tusculum College. She has also been the recipient of the TETA CTO of the Year Award as well as the ISTE Making Happen Award.



Theresa Nixon

Director of Instructional Technology, Knox County Schools

Theresa Nixon began her career as a Biology & Chemistry teacher at West High School in Knoxville. She taught there for fifteen years. Nixon then served the Knox County Schools district in the science department as an instructional coach, specialist, and supervisor. Currently, as the director of educational technology and library services, she has the opportunity to work with all educators in Knox County to imagine the possibilities that can impact teaching and learning, create those opportunities, and share the celebrations and challenges to provide every student the opportunity to excel. Nixon has served as a professional development school teaching professor with the University of Tennessee, Knoxville. She has also served the Tennessee Department of Education as a representative to the Next Generation Science Standards State Leadership Council, the Common Core Leadership Council, and the Personalized Learning Advisory Council. Nixon has a bachelor's degree from the University of the South, Sewanee, a master's degree from the University of Tennessee, Knoxville, and certification as an Urban Specialist and National Board Professional.



Robert Sharpe

Assistant Superintendent, Hamilton County Department of Education

Dr. Robert Sharpe is the assistant superintendent of education and leadership support for the Hamilton County Department of Education, a school district with over 43,000 students. Dr. Sharpe began his career in public education as a para-professional. After earning a master's degree in special education, he began his teaching career in DeKalb County, Georgia. In addition to his experience as a classroom teacher, Dr. Sharpe has served as an assistant principal, principal, and director of middle schools. In his current role, Dr. Sharpe leads a district level team responsible for the supervision of school administrators in the district's 78 schools while also facilitating the planning and implementation of all district instructional programs and initiatives.



Chris Smallen

Chief Technology Officer, Lenoir City Schools

Dr. Chris Smallen is currently the chief technology officer and director of federal programs for the Lenoir City School System. Throughout his career he has served as a classroom teacher, technology coach and an assistant principal. He also serves as an adjunct professor for the College of Interdisciplinary Studies at Tennessee Tech University and the College of Education at King University.



David Timbs

Supervisor of Instructional Technology, Johnson City Schools

Prior to joining Johnson City Schools in July, 2015, Dr. Timbs served as the executive director of instructional leadership support for the Tennessee Department of Education. He has also served as the assistant superintendent for teaching and learning for Sullivan County Schools, as well as in teaching and administrative roles in Johnson County. Dr. Timbs has served the First Tennessee Regional as a regional value-added specialist, has chaired the First

Tennessee Supervisors' Study Council, and has served as a peer leadership coach for high school educators across the First Tennessee region. Dr. Timbs earned his B.A. in English from King College. He received his M.Ed. in Secondary Education from Milligan College and his Ed. D. in Educational Leadership and Policy Analysis from East Tennessee State University. He was selected as the "Tennessee Supervisor of the Year" in 2008, has served as an adjunct instructor at both East Tennessee State University and Milligan College, and co-authored a portion of a book on data analysis published by Corwin Press in 2009.



James Witty

Executive Principal, MNPS Virtual School

Dr. James Witty has a vast experience in nontraditional education working with students, teachers, and families as a teacher, district administrator, and state coordinator. Dr. Witty previously served as the vice president of the National Alternative Education Association (NAEA) and as vice president of the Tennessee Alternative Education Association (TAEA). As executive principal of MNPS Virtual School, Dr. Witty is noted for adopting and implementing the continuous improvement model aimed at increasing student achievement amidst exponential growth. The school is credited with numerous innovations and achievements such as: adopting new board policies for virtual learning, establishing a foundation for virtual teaching and learning, creating extensive teacher and student support mechanisms, opening the *Thomas W. Hatfield Student Success Center*, launching *The Virtual Academy of Business & Marketing*, establishing the virtual Summer Success Program, and earning the AdvancED accreditation. Witty earned his Bachelor of Science degree and a Master of Business Education degree from Middle Tennessee State University. He also holds a Doctor of Education degree in Learning and Leadership from the University of Tennessee and a Doctor of Jurisprudence degree from Nashville School of Law. In addition to authoring publications, Witty serves as an adjunct professor at Carson-Newman University, and will begin developing courses for Trevecca Nazarene University's new Instructional Design program this spring.



Alfred Hall

Director, West Tennessee STEM Hub, University of Memphis

Dr. Alfred Hall is an assistant professor of science education at The University of Memphis, where he also serves as director of the West Tennessee STEM Hub. Prior to this position, Dr. Hall served as chief of staff for the former Memphis City Schools system in Memphis, TN from 2008 - 2011. He has also served in other roles in the district, including chief academic officer, associate superintendent of curriculum and instruction, and director of mathematics and science. Beginning his career as a high school biology and physics teacher, Dr. Hall has also served as an Instructor of Biology, a program director for an undergraduate STEM program at Delta State University in Cleveland, MS, and an education specialist for the Eisenhower Mathematics and Science Consortium at AEL which provides technical assistance to SEAs. He was selected to serve as the project director of the Delta Rural Systemic Initiatives funded by the National Science Foundation in 1999, and he directed the Memphis Urban Systemic Program in 2001, providing leadership and support to educators in Memphis City Schools. He has served on the Integrated STEM Education committee with the National Research Council and National Academy of Engineering, as well as a member of the National Science Advisory Board for Macmillian/McGraw Hill Publishing Company and the National Taskforce for Recruiting, Retaining, and Supporting Teachers of Mathematics for

the National Council of Teachers of Mathematics. Dr. Hall received his Ph.D. in Science Education from George Mason University in Fairfax, VA.



Nina Jones Morel

Dean of the College of Professional Studies, Lipscomb University

Nina Jones Morel, Ed.D., is associate professor of education and dean of the College of Professional Studies at Lipscomb University, where she is leading a unique competency based program that behaviorally assesses student transferrable and durable competencies and then develops personalized learning plans, combined with cognitive and performance coaching, to help students succeed in academics, the workplace, and life. Before coming to Lipscomb, Morel served on the faculty of Tennessee State University and Middle Tennessee State University. Morel has held previous positions as a Tennessee state legislature lobbyist and Title 3 school improvement consultant. She has taught at the middle, high school, and university levels. She has been a school district administrator for federal programs, English Language Learning (ELL) and district-wide coaching for one of the largest school districts in Tennessee, where she co-led a team to create and implement an instructional coaching program. In addition to authoring publications, Morel was the 2005 winner of the Milken Foundation National Educator Award for excellent. Morel holds a B.A. from Lipscomb University and a M.Ed. and Ed.D. in Administration and Supervision from Tennessee State University, where she researched implementation of technology initiatives and teacher professional learning in K-12 settings.



Hope Nordstrom

Assistant Professor of Education, Lipscomb University

Dr. Hope Nordstrom is the director of advanced M.Ed./Ed.S. programs and assistant professor of education at Lipscomb University in Nashville. She is the lead faculty for the Technology Integration M.Ed./Ed.S. program and organizer of Lipscomb's Ignite: Technology UNconference. Before joining the College of Education faculty, Dr. Nordstrom taught middle school for ten years. Dr. Nordstrom has her bachelor's and master's degrees from Tennessee Technological University and her Ed.D. from Trevecca Nazarene University. She has earned an Advanced Online Teaching Certificate from the Online Learning Consortium (OLC). Dr. Nordstrom's primary research and teaching interests are effective technology integration strategies, online learning, visual literacy, and visible thinking.



Sally Pardue

Director, Oakley STEM Center, Tennessee Tech University

Dr. Sally J. Pardue is a tenured associate professor of Mechanical Engineering at Tennessee Technological University, and director of the TTU Oakley STEM Center, a member organization of the Tennessee STEM Innovation Network via the Upper Cumberland Rural STEM Initiative Hub Project. Her engineering research has focused on nondestructive evaluation and structural characterization using random vibrations for machinery diagnostics, bridge diagnostics, and composite materials. Her educational research includes integrated STEM project-based learning, longitudinal progression and transfer of learning, and research training. Pardue is a member of the Society of Women Engineers, American Society of Engineering Educators, American Society of Mechanical Engineers, and American Educational Research Association.



John Fischer

Senior Program Officer, Bill & Melinda Gates Foundation

John joined the Bill and Melinda Gates Foundation in May 2015 as senior program officer on the U.S. policy, advocacy and communications team. His work is focused on personalized learning and high quality assessments at the national level as well as the Foundation's College Ready strategies in Florida and Tennessee. Prior to moving to Washington DC, John held positions in the state education agency in Vermont and higher education in New Hampshire.

As deputy secretary at the Vermont Agency of Education, John led the state school improvement and innovation and transformation strategies. He led the state's personalized/proficiency based learning initiatives, college/career readiness, standards & assessment and CTE initiatives. He designed the priority pathways project for the state's comprehensive economic development strategies plan. As the Vermont federal liaison, John advocated for rigorous high school and CTE programming and worked with the House Subcommittee on early childhood, elementary, and secondary education and the Senate HELP committee on the Perkins and ESEA reauthorization efforts over the past few years.



Keilani Goggins

Director, Tennessee State Teacher Program, Hope Street Group

Keilani Goggins has many years of experience working closely with multiple stakeholders to launch and actively manage large-scale projects. As director of youth at the YWCA of Nashville and Middle Tennessee, she spearheaded the launch of Girls Incorporated in the Middle Tennessee area. She was also assistant director at Vanderbilt University's Center for Student Professional Development, where she coached closely with student teachers. As current director of the Tennessee State Teacher Program with Hope Street Group, Keilani collaborates with 26 teacher leaders across the state to engage their

peers and gather input on various education topics. The program, in its second year, launched its first data collection in Fall 2015 surrounding the topics of professional learning and teacher leadership and Response to Instruction and Intervention in Spring 2016. Born and raised in Tennessee, Keilani is a product of Tennessee's public schools. She is committed to empowering teachers, building partnerships, and strengthening public education in the state. Keilani is a graduate of the University of Tennessee, Knoxville, and received her graduate degree from Tennessee State University.



Wes Hall

Director, Tennessee STEM Innovation Network

Wes Hall serves as the director of the Tennessee STEM Innovation Network (TSIN), overseeing operations for Battelle Memorial Institute and working to connect stakeholders across the Volunteer State. TSIN is committed to promoting and expanding the teaching and learning of science, technology, engineering, and mathematics in public schools across the state. Prior to joining Battelle, he managed the Tennessee Higher Education Commission's

STEM Race to the Top initiatives, focusing on replication of the UTeach teacher preparation model and the administration of STEM professional development grants delivered by the state's higher education faculty to in-service K-12 teachers. Wes previously worked in Knox County government and earned his Bachelor's degree and Master's in Public Administration from the University of

Tennessee, Knoxville. Wes currently serves on the state's STEM Leadership Council, the advisory board for Tennessee Scholars, and the University of Tennessee's Young Alumni Council.



Rachael Milligan

Managing Director, Ayers Institute

Rachael Milligan joined the Ayers Institute for Teacher Learning and Innovation in 2013 and became managing director in 2015. Her responsibilities at the Ayers Institute range from coaching teachers and school leadership teams, to organizing training events that bring K-12 and higher education faculty together, to collaborating with educator teams to create online resources and courses for use in teacher and leader preparatory and professional learning programs. Prior to joining the Ayers Institute, Rachael served as an assistant principal in Williamson County. She taught history, geography, and government courses at the middle and high school levels for nine years. Rachael has been director of 21st Century Community Learning Centers and a house parent at the Tennessee Children's Home. She has her administrative endorsement from Trevecca Nazarene University, her M.Ed. from Peabody College of Vanderbilt University, and her B.A. from Harding University. Rachael is currently pursuing her doctorate in Learning Organizations and Strategic Change as a candidate in Lipscomb University's Ed.D. program.



Kecia Ray

Executive Director, Center for Digital Education

Kecia Ray is the executive director of the Center for Digital Education and is on the graduate faculty of the Johns Hopkins University and Bethel University. She previously work at Metropolitan Nashville Public Schools, where she served as the district's first executive director of learning technology. She has conducted research in the area of technology integration across the United States, Canada, and South Africa and is the author of three books and several papers focused on designing instruction and distance technologies.



John Ross

Technical Advisor, Appalachia Regional Comprehensive Center

John Ross has spent much of the past 15 years helping educators understand how technology integration enhances school improvement efforts. Formerly the director of the Institute for the Advancement of Emerging Technologies in Education and the director of technology for the Appalachia Regional Comprehensive Center (ARCC), he works as an educational consultant. He spearheaded the launch of regional online professional development environment in 2004 and has since designed and delivered online professional development to many thousands of educators in multiple states. His best-selling book, *Online Professional Development: Design, Deliver, Succeed!* (Corwin) was selected as book-of-the-month for Learning Forward in 2011, and he continues to publish on related topics, including his chapter "Online Courses" in the third edition of the popular *Powerful Designs for Professional Learning*. The high school online astronomy course he developed for *Virtual Virginia* with his colleague Anita Deck was selected as one of the "Best of 2014 High School Courses" by iTunes U. He created and taught an online graduate class based on the textbook he co-authored with Dr. Katherine Cennamo from Virginia Tech and Dr. Peg Ertmer from Purdue, *Technology Integration for Meaningful Classroom Use: A Standards-Based Approach* (Cengage), which addresses the National Educational Technology

Standards for Teachers by ISTE. Over the past three years, he has served as evaluator for numerous projects, such as the Virginia Department of Education's e-Learning Backpack Initiative and Kids' Tech University at Virginia Tech. Dr. Ross holds a Ph.D. in curriculum and instruction and instructional technology from Virginia Tech, and was a classroom teacher for 10 years.



Kathleen Airhart

Deputy Commissioner, Chief Operating Officer, Tennessee Department of Education

Dr. Kathleen Airhart was appointed as deputy commissioner for the Tennessee Department of Education in January 2012. Previously she has served in roles for the Putnam County School System including teacher, special education supervisor, and director of schools. She holds a Doctorate from Tennessee State University in curriculum and instruction and a Bachelors, Masters, and Ed.D. from Tennessee Tech University. She was named Superintendent of the Year by the Tennessee Organization of School Superintendents for 2011-12. During the course of her career, Dr. Airhart has actively engaged and led education reform efforts to improve PK-12 educational results for all children in Tennessee.