

# NextEd

TRANSFORMING CONNECTICUT'S EDUCATION SYSTEM

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Continuous Improvement Plan from The Connecticut Association of Public School Superintendents

# The CAPSS Educational Transformation Project

## Project Partners

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DELL

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## The Core Group

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While acknowledging the support of the Project Partners and the work of The Core Group, the content of the report is the sole responsibility of the Connecticut Association of Public School Superintendents.

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# **MAKE IT PERSONAL**

**A Chapter in the  
Background Paper for the Report**

**NEXTED:  
Transforming Connecticut's Education System**

**Developed By  
Connecticut Association of Public School Superintendents  
(CAPSS)**



**November, 2011**



# **Transforming Public Education in Connecticut**

## **The Challenge of Creating a Learner-Centered School System**

### **Purpose**

Connecticut's public school superintendents believe that each child should come to school well fed, adequately clothed, and without fear. Every child should be inspired and challenged by a relevant and important curriculum that tackles real world problems. Every child should be taught by highly trained, professional educators in schools equipped with the technology necessary to enhance teaching and learning. Each child should graduate as a young adult, fully prepared to study at a high level, able to compete on the global stage, and committed to being a contributing member of our society.

Yet the current educational system is not working for all Connecticut students. It is not designed to meet the expectation of universal student success. A strong public school system is essential to maintaining our democratic heritage to create a climate of justice for all our citizens and contribute to the economic stability of our state. Our state must operate its schools understanding that the success of all of us is built on the success of each of us.

Tinkering with Connecticut's system of schooling will not help the state recapture its competitive advantage. The Connecticut Association of Public School Superintendents calls upon all of our citizens to enter into a spirited and thoughtful dialogue about what is required of a successful school in the 21<sup>st</sup> Century, what skills will be demanded of our graduates, and what accountability standards must be in place to make this educational transformation a reality.

With this call, it is necessary to revise our own vision of schooling and the social, economic, and political systems that support it. That cannot be done unless Connecticut decision-makers challenge the status quo, setting the cornerstone for a stronger, more equitable, and more vibrant Connecticut. The conversation will not be an easy one. But let us begin.

### **The Genesis of this Document**

This report is the product of research, soul-searching, and debate among Connecticut's public school leaders, and their philanthropic and social service partners. We are grateful to Project Partners and their representatives including the H.A. Vance Foundation, The Nellie Mae Education Foundation, The William Caspar Graustein Memorial Fund, and Dell whose contributions clarified our thinking and strengthened our message. The Educational Transformation Group examined Connecticut's current educational practices, policies, and student results.

Connecticut's educational, political, and social structures present a maze of challenges that cannot be fixed with one single strategy. The current system of public education must evolve in order to meet the dynamic needs of our children. Poverty, ethnicity, neighborhood instability, and individual disability cause inequities that imperil our economic and social fabric as a state.

As we drafted this report, we worked to define our core values, fundamental beliefs, and shared commitments as Connecticut's educational stewards. In our conversations, we shared moments of great pride and equally great despair. We saw notable achievement and insightful decision-making as well as evidence of failure and short-sighted thinking. Throughout our study, the Educational Transformation Group heard from internationally-noted experts. Some provided an ominous glimpse of the future, others advised restructuring of our economic and political supports, still others argued for dissolving most existing educational structures. Many of those ideas earned a place in shaping this report.

We present this vision of an educational transformation to the citizens of Connecticut in the hope that it will provoke statewide conversations about the nature of schooling and what we should expect of our pre-K-16 system. Examining our system of schooling will not be easy. Yet the people of Connecticut will never undertake a more important task.

## **The Core Principles Supporting the Transformation of our Schools**

- Our citizens deserve schools that are second to none.
- No child in Connecticut should be deprived of the opportunity to reach his/her potential due to circumstances of geography, financial inequity, quality of teachers or the school support system.
- Each child's advancement through school should be based upon the mastery of a clearly-defined and sequenced series of skills and a base of knowledge in all disciplines. Each child should have access to instructional technologies, thought-provoking academic activities, and extra-curricular programs that promote the development of a fully functioning adult capable of asking difficult questions and solving sophisticated problems.
- Each child in Connecticut should daily enter a school environment that is designed for and committed to meeting individual academic needs and interests, while also respecting individuality and ensuring personal safety.
- Each educator in Connecticut must be well-educated in a chosen field of study, highly trained in pedagogy, capable of adjusting instruction to meet the needs of every child, and subject to valid accountability standards.
- Those charged with the governance of education K-16, those elected in local communities, our state's legislators, and the executive branch must act with efficiency, harmony, and wisdom to make Connecticut's education second to none. There is no higher responsibility for our state's leaders than to provide a world-class school system.

Connecticut's citizens must challenge the status quo to bring about transformational changes in educational outcomes.

## **CORE BELIEFS STATEMENT**

- The Connecticut Association of Public School Superintendents (CAPSS) holds to the following core beliefs.
- Every child is precious. Each child, regardless of any racial, ethnic, economic, physical, mental or cognitive condition, can and must learn to the same high standard
- Each child has sufficient ability to learn to high standards.
- There must be a strong, vibrant, and flexible public education system in order to meet the goal of every child learning to the same high standard.
- The public education system, as it is designed and functioning today, is not designed to achieve the goal of every child learning to high standards.
- Transformative change in public education cannot take place in isolation from the public.
- The family structure is vital to the growth of every child. It must be reinforced and fostered on an equitable and consistent basis.
- The public education system must integrate services to children and raise community expectations both for the education system and for the other systems that offer services to children and their families.
- In order to achieve the result of every child learning to high standards, the system of public education must be transformed.
- Effective leadership is essential for building the capacity for transformative change resulting, in every child learning to high standards.

## Education Policy Direction

Policy making for education at federal and state levels are based on bureaucratic assumptions of hierarchy, centralized decision making, standardization, regulation, inspection. These characteristics are designed to limit unit and individual discretion, provide only one point or source of legitimacy, and depress creativity. The chief outcome of bureaucratic assumptions and thinking is stability, not change.

For local school administrators the model has produced ever increasing explicit formal legal and regulative constraints, less decision- making authority and flexibility, greater goal ambiguity and conflict about directions, more intensive external political influences, fewer incentive structures, and greater involvement of external authorities in the leadership of schools. Complicating the situation are the public organization constraints related to the lack of incentives for conserving resources and improving performance.

Virtually all the state and federal solutions of the “educational reform movement” have been bureaucratic: increase centralization, power and direction for the “top”; increase standardization through testing; increase regulations and mandates to limit school district and school discretion. None of this has resulted in any substantial improvement. The US is just as far behind or further behind the foreign competition as before the “reform movement” started. The agenda of expanding centralized controls, raising standards, top down change model, prescriptive policy, and incremental change has failed and will continue to fail.

Two major forces shaping organizations are the centralization of information due to technology and the decentralization of capability to the operational level. A balance of centralization and decentralization is needed to guide activity and encourage initiative and innovation. At government levels this means that activities should be directed more toward defining overall directions, providing capacity-building resources, and analyzing results using meaningful indicators. State Education Departments, for example, should be organized around “problems to be solved”, rather than regulative or narrow programmatic functions. Decentralized to the school district or school level should be responsibilities for the focus and content of the educational program, design of the instructional organization, determining staffing patterns, determination of expenditure priorities, and the development and evaluation of programs and priorities to address problems and priorities. The intent is to avoid separation of decision-making and implementation.

What is needed is the flexibility of operating units to invent, adapt and change to local conditions. If local schools are to be held accountable for outcomes they must have real authority for policymaking and implementing local decisions. Talking about holding schools accountable is useless until schools have the authority structures to be accountable.



# MAKE IT PERSONAL

## GOAL:

To meet the needs of today's learners, the state should provide a public education system that is student or learner centered and based on personal learning. The three core elements of a personalized learning system are:

1. It bases instruction, pacing and assessment plans on the learning needs of the student.
2. It makes learning styles of the students an important ingredient in the instructional plan.
3. It integrates the individual needs of the learner into the instructional and assessment programs.

## IMPORTANCE OF PERSONALIZED LEARNING

*Student learning must be at the heart of everything schools do.*

Since its introduction nearly fifteen years ago by the National Association of Secondary Schools Principals (NASSP), the Breaking Ranks Framework has

consistently held that each school, each principal, and each teacher must make learning personal for each student. Note the words "learning" and "personal". Student learning must be at the heart of everything schools do. Making instruction personal doesn't mean basing it exclusively on developmental factors or giving students a summer camp experience at the expense of academics. Instead, the Breaking Ranks Framework is a challenge to each school to understand each student and how he or she learns best, something that can only be accomplished by knowing each student well. Just as any parent with more than one child understands that one tactic may work for one child but not another, schools have begun to get away from the assembly line mentality. By making learning personal, a school can develop the right structures and tactics to challenge each student and engage him or her in learning. (Add reference)

*"Personalization" refers to instruction that is based on learning needs [i.e. individualized], tailored to learning preferences [i.e. differentiated], and adapted to the specific interests of different learners. In an environment that is fully personalized, the learning objectives and content as well as the methods and pace of instruction will vary.*

### Figure

#### Purposes and Indicators of Personalized Learning

##### Purposes

Increase student motivation  
Help students control their future  
Connect families to student learning  
Celebrate student achievement  
Connect each student with a caring adult  
Relate student work to standards  
Explore non-curricular options  
Support identity formation  
Initiate lifelong learning  
Increase self-awareness  
Emphasize applications of knowledge

Banish anonymity from school life  
Assess progress toward standards  
Connect academic and applied learning  
Encourage college aspirations  
Promote reflection and reevaluation  
Assess basic skills (speaking and writing)  
Explore career choices  
Demonstrate personal talents  
Extend range of academic choice  
Evaluate content acquisitions  
Recognize non-school achievements

##### Indicators

###### Personalized learning:

- Begins with individual interests so that each student becomes engaged in learning.
- Promotes the achievement of standards for all students.
- Insists that teachers get to know each student's strengths, weaknesses, and interests.
- Incorporates the Adults in the School model.
- Benefits from stronger professional and student relationships.
- Helps students learn to set goals and measure success for themselves against common standards.
- Recognizes that reaching all students depends on reaching each one.

Source: Adapted from DiMartino, J., Clarke, J., & Wolk, D. (2003). Personalized learning: Preparing high school students to create their futures. Lanham, MD: Scarecrow Press. Page 24.

## Focus on Learning

Student-Centered approaches to education focus on learning. Therefore, the pedagogy required in a student-centered approach will be based on the learning needs of students. The full range of learning experiences is used to provide learning opportunities and meet the needs and interests of all students.

With a focus on learning, as opposed to teaching, educators take on the roles of facilitators and advisors rather than just content experts. The system should seek the greatest, most powerful talent to support the success of its students, no matter where that expertise lies. The commitment and skills of a variety of adults - including community members, parents, and other professionals - as well as those of peers are utilized to expand educational opportunities for all students and to connect learning to students' culture and aspirations.

## Personalization Ubiquitous, Except in K-12 Education

In contrast to efforts to personalize products, services, and the user experience throughout our economy, society and daily lives – in part by leveraging continually evolving technologies – education has only scratched the surface of personalizing the learner experience. Such efforts in education continue to be the exception rather than the rule and often represent a "tweaking" of the traditional model rather than the necessary systemic redesign of how we educate our children. Students have come to expect personalization in other aspects of their lives such as through services like Facebook, Netflix, and iTunes. If Google and Amazon can utilize customer data and virtual communities to target each person's unique preferences and interests, then education can do so for each student. This effort will take the form of understanding each child's learning performance level, learning style, and learning preferences then adjusting instructional strategies and content to meet those needs.

*Students have come to expect personalization in other aspects of their lives.*



The following assumptions underpin the section on pedagogy in a student centered system:

- Today's industrial-age, assembly-line educational model—based on fixed time, place, curriculum and pace—is insufficient in today's society and knowledge-based economy. Our education system must be fundamentally reengineered from a mass production, teaching model to a student-centered, customized learning model to address both the diversity of students' backgrounds and needs as well as our higher expectations for all students.
- Educational equity is not simply about providing equal access and inputs, but about ensuring that a student's educational path, curriculum, instruction, and schedule is personalized to meet the student's unique needs, inside and outside of school. Educational equity meets children where they are and helps them achieve their potential by recognizing the child's learning style, needs, and interests as well as the social, emotional, and physical situation each child comes from.
- Personalized learning requires not only a shift in the design of schooling, but also a leveraging of modern technologies. Personalization cannot take place at scale without technology. Personalized learning is enabled by smart e-learning systems, which help dynamically track and manage the learning needs of all students. They also provide a platform to access the myriad learning resources, content, and opportunities needed to meet each student's needs everywhere at anytime.

The chart below illustrates some of the differences between the current education system and a personalized learning system.

Current System	Personalized Learning System
Mass Production	Individual Customization
Time Constant/Achievement Variable; Seat Time	Time Variable/Achievement Constant; Mastery/Competency Based (with concern for student readiness for learning new/advanced concepts)
Industrial Age, Assembly-Line, Common-Pace Instructional Model	Knowledge Age, Individualized, Variable-Pace Learning Model
End of Year/Course Assessment of Knowledge	Ongoing, Embedded, and Dynamic Assessment of Knowledge/Skills, Learning
Institution/Teacher Centered	Student-Centered
Fixed Place; School-Based	Anywhere and Everywhere; Mobile
Academics Addressed in Isolation	Learning Plan Recognizes and Integrates “Whole Child” range of social, emotional and physical needs
Fixed Time; September-June; 9 a.m. – 3 p.m.	Flexible Schedule; Anytime; 24/7/365; Extra Time as Needed
One-Size Fits all Instruction/Resources	Differentiated Instruction
Teach the Content; Sage on the Stage	Teach the Student; Guide at the Side; Collaborative Learning Communities
Comprehensive Teacher Role	Differentiated and Specialized Teacher Roles
Geographically Determined and Limited Instructional Sources (Teacher and Textbook)	Virtually Unlimited, Multiple Instructional Sources (Online Resources and Experts)
Limited/Common System Determined Curriculum-to-Life Path	Unique Student Voiced Curriculum-to-Life Path
Limited and Locked Student Report Card	Portable Electronic Student Portfolio Record
Printed, Static Text as Dominant Content Medium	Digital, Interactive Resources as Dominant Content Medium
Isolated Data and Learning Objects	Interoperable Data and Unbundled Learning Objects
Physical/Face-to-Face Learning	Online Learning Platform to Enable Blended Learning
Informal Learning Disconnected	Informal Learning Integrated

### **Six Essential Elements**

From among these and other attributes of a personalized learning system, the following are identified as the top six essential elements of personalized learning:

1. Flexible, Anytime/Everywhere Learning
2. Redefined Teacher Role and Expanded notion of “Teacher”
3. Project-Based/Authentic Learning Opportunities
4. Student Driven Learning Path
5. Mastery/Competency-Based Progression/Pace/Assessment
6. Strong Relationships

Inherent in these core components is the need for a change in the nature and use of assessments, as well as recognition of the critical role of technology and data (systems) to personalize learning at scale. Systemic redesign for personalized learning suggests the need for technology-based, online platforms to integrate the currently fragmented school “subjects”, manage the personalized portfolio of each student, and provide access anytime, from anywhere. Such a technology platform is inherently customizable, scalable, and flexible in a way not possible in the physical and analog world of most of our schools today.

## 1. Flexible, Anytime/Everywhere Learning

Flexible, anytime/everywhere learning includes learning beyond a traditional school day or building through online or blended learning, through hands-on opportunities in the community, and through instruction offered by a range of teachers, experts, or technologies. Adding a virtual educator to digital content creates various models of blended and online learning to personalize the education for each child. These models can better support students by offering learning opportunities 24/7/365 from anywhere so time can be the variable and learning can be the constant. They also provide access to resources not available in the school. Policies such as seat time or Carnegie units often restrict the implementation of models offering such flexible learning time and place for online or blended learning and experiences in the community.



High quality expanded learning time in schools is a core strategy as policymakers and educators recognize that the standard school calendar does not fit many students' needs. Most U.S. students attend school for an average of 6.5 hours a day, for 180 days a year. This is not nearly enough time for many students, particularly those who are English language learners and those who start the school year learning below their grade level.

Some schools serving large concentrations of low-income and minority students have dramatically improved student achievement by increasing instructional time in the form of a longer school day, week, or year for all students. Schools that expand learning time formally incorporate traditional out-of-school activities such as the arts and service opportunities into the official school calendar so all students, including those living in the highest poverty, have access to them.

Schools with expanded learning time allow community-based organizations such as arts and cultural institutions to take on more collaborative roles within the school than is typically the case in a conventional school calendar. It is not uncommon in schools with high quality expanded learning time for "outside" organizations to co-teach classes with regular classroom teachers and provide professional development for teachers, and mental and

physical health services to students. Schools with high quality expanded learning time bring important resources into the classroom and recognize that it's not just more, but also better, classroom learning time that is the key to student success. (Expanded Learning Time by the Numbers, Center for American Progress, 2010) Use of time is flexible to optimize student learning and provide time for educator planning and coordination.

## 2. Redefine Teacher Role and Expand "Teacher"

*"We model learning. I need to be the lead learner."* SARAH BROWN WESSLING, National Teacher of the Year, Personalized Learning Symposium, August 2010 Education leaders overwhelmingly agree that the role of the teacher dramatically changes with personalized learning, as it emphasizes a shift from a single teacher delivering knowledge to his classroom of students to teachers as facilitators of learning, often as a part of a team of teachers with differentiated roles. While the teacher-directed model has its place, the facilitator model is a significant departure from the way teachers have been trained to teach and have learned themselves as students. Included is an expanded view of the teacher to include not only school-based educators, but also other mentors in the community at-large who can support student learning. These mentors might include those from informal learning providers such as museums, boys/girls clubs, businesses, from social workers and health providers in the school, and from scientists and other experts perhaps available online.

*Personalized learning requires not only a shift in the design of schooling, but also a leveraging of modern technologies.*

Through further differentiation of the teacher's role, student-teacher ratios and instructional relationships can be varied to meet the diversity of student needs. Changing the role of the teacher requires ownership among teachers and other stakeholders, provision of job-embedded and sustainable professional development and training, and support in implementing the new approach or model of personalized learning Teacher contracts and other regulatory constraints may also need to be addressed to provide the flexibility in a teacher's role which will be needed to make this dramatic shift in instruction.

## 3. Project-Based and Authentic Learning Opportunities

Project-based and authentic learning opportunities can help increase the relevance of learning and improve students' ability to apply knowledge and use critical thinking skills. Education leaders view this as an

instructional shift necessary to incorporate meaningful content and 21st century skills and to meet the interests and learning styles of many students. Project-based and authentic learning opportunities can help increase student engagement and ongoing attention, increasing the likelihood of genuine learning.

#### **4. Student-Driven Learning Path**

***“We need to think about shifting from controlling what’s happening with students to coordinating it.”***  
KAREN PITTMAN, Co-Founder, President and CEO, The Forum for Youth Investment, Personalized Learning Symposium, August 2010.

Student-driven learning paths have been identified as synonymous with personalized learning. Such a model provides learning opportunities tailored to the expressed learning interests and abilities of the individual, taking into account whole child factors, scheduling needs, and goals of the students. Without neglecting work toward mastery of standards, each student’s path may vary not only in terms of when and where learning takes place, but also in terms of the modalities and instructional strategies used, the pace and place of learning, and the types of courses and topics studied. In theory, an unlimited number of models exist depending upon each student’s needs and interests; and the instructional program may contain online courses, project-based learning, tutoring or small group instruction, formal courses and community-based learning, and any combination of these and other elements.

*Student-driven learning paths  
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learning.*

Central to this concept is that learning be *student-driven*, meaning that the student has more explicit control over designing and determining the curriculum. Online or blended learning can provide access to courses not otherwise available, can give additional help or support, and can allow for learning at a time that works better for a student’s schedule. Differing learning goals and assessments for students should allow their mastery of standards to be expressed and demonstrated in various ways, especially when considering the pace of work and form of assessments.

#### **5. Mastery- or Competency-Based Progression/Pace**

***“Our solution is to create personalized learning in a systemic way - a standards-based or performance-based system for all students. The key is letting students move at their own pace...if you’re in algebra for a semester***

***and you can demonstrate proficiency after two weeks, you can move on. Likewise, if you need more time, you can take it.”*** WENDY BATTINO, Co-Founder and Executive Director, Re-Inventing Schools Coalition, RISC Personalized Learning Symposium, August 2010

#### **Expectations and Mind-Sets**

The reality is that we can talk about culture and high achievement, and we can conduct high quality professional development activities until we are blue in the face, but if teachers and other school leaders don’t really believe or expect that each and every student can achieve at high levels, our efforts are doomed to failure.

In Mindset, Dweck (2006) noted that what people believe about success drives their behavior. One group, “fixed mind-set,” believes that ability is something you either have or you don’t and that ability is the best indicator of success. Teachers of fixedmind-set worship talent and believe that no matter how hard one works, the level of achievement is limited by one’s innate ability.

Dweck and other researchers have learned that the opposite is true: in the real world: work and effort create ability. Dweck discovered that some people have a “growth mind-set.” They believe that success is the result of time, work, and deliberate practice. Her research has found that those with a growth mind-set were resilient learners who viewed problems as challenges and opportunities to learn. On the other hand, those with a fixed mind-set gave up easily and spent most of their time protecting their self-image. School leaders must do everything possible to help teachers acquire a growth mind-set. Once that is accomplished, successful learning in our schools will be unstoppable. (ref: Breaking Ranks)



Progress is primarily based on acquisition of competencies and content rather than on a student’s age, hours on task or credits. Mastery or competency-based progressions provide opportunities for students to work at their own pace and to reinforce a particular skill or standard until they have mastered the content. Students address standards at the time and in the manner that meets

their needs, rather than being assessed only after the entire group has covered a certain topic. For some students, this may accelerate the pace of learning based upon abilities, needs, and interests; while for others mastery may require additional learning time and alternative instructional formats until the student “gets” the material. As such, competency-based learning is really the authentic implementation of standards-based education. The former requires proficiency before advancement, while implementation of the latter in most systems tends to keep time constant and learning variable.



Of course, mastery-based progression can be inhibited by the strict confines of grade/age banding. While grouping frequently occurs within schools, it is almost always limited to within a grade level, especially in elementary and middle school. For example, middle schools may offer both “regular” and “advanced” 8th grade language arts, but students are still clearly labeled as 8th graders and are all expected to meet the same standards in basically the same timeframe and to be assessed on the standards during a year-end, high stakes test given on a certain day. Most districts and schools wishing to redesign their system to personalize learning move away from narrow grade/age level grouping policies as a key component.

The five core components of personalized learning lay the critical groundwork for providing opportunities to meet the needs, abilities, and preferences of all students. And while personalized learning is not about the technology itself, technology is a critical driver and conduit to transforming our current one-size-fits-all system.

## **6. Strong Relationships**

Schools should develop a personalized culture that fosters strong and respectful relationships among students and adults. Adults should understand students’ cultural and social contexts, know them well, and often work with students over many years in advisory capacities. Students should feel responsible for their own learning and be increasingly able to assess their own skills and needs. (Principles of Student-Centered Learning, The Nellie Mae Education Foundation, 2010)

We know that the single greatest factor affecting student learning is the quality of the teacher. The relationship teachers develop with their students serves as the foundation for learning, and the instruction and assessment practices utilized by teachers are keys to promoting the success of all students. To help students achieve high academic standards, teachers need to create supportive but rigorous learning environments and develop positive, influential relationships with students. One of the best predictors of student effort and engagement in school is the relationship they have with their teachers, particularly for students who struggle in school. At-risk students who stay in school and succeed typically cite meaningful relationships with adults who encouraged, nurtured, and even pushed them as key factors in their success. Research has documented that strong teacher pupil relationships and high teacher expectations have an impact three times as great for African American students and children in poverty as for Caucasian, middle-class students. Effective learning relationships feature high expectations for performance while providing the support students need to succeed. Research also shows that effective teachers can generate as much as six times the learning gains produced by less effective teachers.

***Progress is primarily based on acquisition of competencies and content rather than on a student’s age, hours on task or credits.***

Culture is central to learning. It plays a role not only in communicating and receiving information but also in shaping the thinking process of groups and individuals. A pedagogy that acknowledges, responds to, and celebrates fundamental cultures offers full, equitable access to education for students from all backgrounds and prepares students to live in a pluralistic society. Culturally responsive teaching is a pedagogy that recognizes the importance of including students’ cultural references in all aspects of learning. (CES Resources)

## **21<sup>st</sup> Century Pedagogy**

In their detailed study on how people learn, Bransford et al explain that ***“In the most general sense, the contemporary view of learning is that people construct new knowledge and understandings based on what they already know and believe.”*** In practice, this means that teachers must know their students well and build on existing knowledge and

abilities. More specifically, a range of teaching styles is required to ensure that each and every child receives the attention and support needed to acquire deeper levels of knowledge and understanding and to develop a broader array of skills. As teachers add to their repertoire of teaching techniques, they are better positioned to adopt different strategies to ensure that each student's personal learning needs can be met.

*The relationship teachers develop with their students serves as the foundation for learning, and the instruction and assessment practices utilized by teachers are keys to promoting the success of all students.*

As policymakers turn to instructional approaches that reflect a "constructivist" understanding of how students learn, it becomes increasingly clear that pedagogy for the 21<sup>st</sup> century will comprise four main interwoven parts:

- **The learner at the center:** This approach caters to multiple learning systems and reflects the learning needs of each individual. In the United Kingdom, for example, each child receives tailored and dedicated support for attaining performance goals with this model.
- **The teacher draws from a repertoire of strategies and skills:** Good teachers have always listened as well as lectured, but now this skill is more vital than ever. While traditional education systems fostered in students the obedience demanded of the manufacturing workforce, the transformed education system must ensure creative and collaborative skills. Knowledge is available at a click of a mouse, but learning to apply it requires a teacher who can instruct, facilitate, guide and support as needed.
- **Interdisciplinary and project-based work:** Project work in complex areas such as robotics or environmental change can help students learn how to draw on multiple disciplines and recognize the interdependence of various systems. Interdisciplinary and project-based teaching is also particularly conducive to working in teams; hence, it provides another example of the link between 21<sup>st</sup> century skills and the pedagogy used to develop them.
- **Authenticity:** Delivering learning that is authentic is another way to engage students by appealing to their existing passions and interests. It is equally important to integrate real-life experiences into lessons: students do not merely make an architectural drawing, they build a structure on the school lawn. This also provides the opportunity for learning that extends beyond the classroom into the community and wilderness, into the workplace, and into the virtual world.

## The Learners and Learning

Developments in learning research now make clear that:

### **Learning is an active, social process.**

Learners learn new knowledge, principles, and concepts for themselves through dialogue and interactions with others and through experimentation and risk-taking in safe environments. Indeed, learners can only develop meaningful knowledge through their interactions with each other, with teachers (if any), and with their learning environment.

### **Motivation is critical to effective learning**

Cognitive constructs of learning are incomplete if they disregard motivational and emotional aspects. Levels of motivation and positive or negative emotional states can be critical determinants of effective learning.

### **Learners bring different knowledge to a new learning challenge**

Learners are not empty vessels waiting to be filled with new ideas and facts, but have prior knowledge, no matter how inaccurate or narrow. Effective learning builds on this, engages with it and explains why prior knowledge may be wrong. It progressively moves towards new understanding, step-by-step. This is why formative assessment is crucial: it establishes what students know, helps them judge their understanding, and provides a basis for them to monitor their progress.



### **Learners start from different places and follow different routes to the same learning outcome**

There is no one right way to learn, no one-size-fits-all. Learners can try many different routes before they achieve their learning outcomes.

### **To be effective, knowledge should be discovered as an authentic, integrated whole**

The world in which the learner needs to operate does not appear in the form of clearly differentiated subjects, but as a complex of facts, problems, dimensions, and perceptions. As a consequence, knowledge should not be divided into different subjects or compartments, but discovered as an integrated whole. (*Learning Society, CISCO*)

## **Policy and System Enablers**

***“We had a system that said, 'You'll spend 180 days in the chair. Hopefully, you've progressed enough to progress to the next grade'...”***

VAN SCHOALES (Vail, 2010, p. 17)

Personalized learning requires a shift in the enterprise of schooling. Our education system is shaped by many stakeholders – state and federal regulators, district and school leaders, communities, teachers, and parents – who help to create many policies, traditions and cultural norms that may encourage, but too often hinder, the redesign of education to personalize learning. In many cases, these policies and practices were implemented well before the advent of online learning, digital content, and Web 2.0 resources. Personalized learning is not simply about replication of a few favored models and best practices, but about creating essential policy and systemic conditions for adoption of a range of practices and models that meet local needs and adhere to the tenets of personalized learning.



## **Five Policy and System Enablers**

The policy and system enablers for creating and sustaining personalized learning for all students include the following:

1. Redefine Use of Time (Carnegie Unit/Calendar)
2. Performance-Based, Time-Flexible State Assessment
3. Ensure Equity in Access to Technology Infrastructure
4. Funding Models that Incentivize School Completion
5. P-20 Continuum and Non-grade Band System

### **1. Redefine Use of Time (Carnegie Unit/Calendar)**

Redefining the use of time and eliminating the Carnegie Unit are critical enablers for personalized learning. Many personalized learning models reverse the traditional model that views time as the constant and achievement as the variable. Traditionally, our education system is

designed around seat time - the requirement that students may advance only with the required time spent physically in a school classroom for a particular Carnegie unit or course. These physical limitations of time and place can dramatically hinder the flexibility needed to encourage and enable personalized learning.

In contrast, a personalized learning model would support students in progressing on their own pace and schedule. Typically, if a student mastered Algebra I in one semester instead of two, seat time requirements may prevent them from receiving their required course credit, and most systems would not even give them the opportunity to demonstrate mastery until year's end. Reliance on seat time can similarly limit the ability of a student to take an online or blended learning course or participate in learning within the community with experts or apprenticeship-like experiences. Related policy issues are the fixed school schedule and calendar, which limit formal learning time based on an agrarian calendar, rather than providing flexibility for 24/7/365 learning. Seat time policies are often closely contrasted with performance-, mastery- or competency-based approaches to learning.

### Expanded learning time

There are never enough hours in the day—this familiar frustration applies to virtually all of life's undertakings. When it comes to educating our young people, this expression is beginning to seem particularly true. In addition, since all learners require different amounts of time to master standards, schools will need to find ways to create additional time for learning. The first task should be making maximum use of existing school day and instructional time. However, some students will require additional time to master standards.

The traditional school calendar has remained unchanged for over 30 years. It is no longer necessary to end school in June so that students can work on the farm and begin school in the fall after the harvest. The school calendar can be designed to meet the learning needs of students rather than the needs of an agricultural economy.

*Redefining the use of time and eliminating the Carnegie Unit are critical enablers for personalized learning.*

Just adding extra time won't help unless the time is spent in high-quality programs where students are actively engaged in learning. The decades of research from the 60s indicates that more time that children spend on task that is focused on learning, the more they will learn. So improving the quality of instruction is just as important as increasing the time for it.

There are many ways to expand learning time. Traditionally, schools look to before or after school programs, Saturday programs and summer programs. In addition, expanded learning times can be created through the use of technology to access learning opportunities outside the school day. If expanded learning time is to be used to assist student learning, the expanded learning time must be planned collaboratively with the school, teacher, parent and student and be of high quality.

*“The biggest barrier is the] Carnegie unit, seat time... We are basing our entire system on the number of minutes within four walls... Moving to a competency-based system, away from seat time is an essential condition to getting to personalized learning. The funding incentives and structures need to change...”*

SUSAN PATRICK, President and CEO, International Association for K-12 Online Learning (iNACOL) Personalized Learning Symposium, August 2010

## **2. Performance-Based, Time-Flexible State**

### **Assessment**

Educators have observed how much the timing and rigidity of current state assessments shape instruction and expectations. Rethinking state assessments to be performance-based and time-flexible is critical to personalized learning. We know that assessment plays a significant role in what is taught in our nation's districts and schools. “Teach to the test” and “if they don’t test it, we don’t teach it” are common reactions to the current system. Primary are state tests, which are most often delivered to all students in a grade on the same material at the same time. Education leaders believe that personalized learning requires a shift in this one-size-fits-all approach to assessments as follows:

- High-stakes state and other static assessments that occur at the same time for all students are unlikely to meet each student’s needs. In a system of personalized learning, each student will likely be at very different point in the curriculum on any given day, and thus a single testing date for all students may limit the ability of a student to progress more quickly if the content has been mastered
- High-stakes tests most often include only a limited test item format that may not account for students’ varied learning styles and abilities. Providing multiple, varied opportunities to demonstrate mastery better reflects student diversity and may more accurately measure achievement. Learning goals should go beyond content to include student communication, collaboration, creativity, critical thinking, and other skills that are often under-appreciated in our current accountability.

- Technology provides many opportunities to expand assessments to include more dynamic options, including embedded or formative assessments, especially with online or portfolio options. This may also allow for personalizing the type of assessment depending upon the standards, content, and the child. This may include performance-based assessments, observations, or applications of knowledge in a group. It will also require flexibility in timing relative to both the time of the year and the age of the student.

While some of these assessments exist in certain forms – and federal Race to the Top assessment grants address several of these possibilities and challenges - current policies and practices generally present a challenge to this more flexible assessment system.

## **3. Ensure Equity in Access to Technology**

### **Infrastructure**

While it may be possible to implement personalized learning without technology for a few students at a time or for a few lessons, education leaders overwhelmingly agree that it is almost impossible to bring the program to scale for all students without capitalizing on technology. This includes access to technology at school, home, and wherever learning takes place. It is vital to provide high-speed broadband, instructional applications, and related tools and resources. The flexibility and options central to personalized learning typically involve robust learning platforms, data systems, digital content, online/blended learning, and Web 2.0 resources.



Without reliable access to technology and broadband, teachers and students will undoubtedly miss the full potential of personalized learning. However, education policy still primarily budgets for technology as a supplemental expense rather than as a baseline teaching and learning platform. Other regulations often limit the flexibility to use funds to achieve certain program goals through technology. These challenges are often more pronounced in high-poverty and rural communities lacking in fiscal resources, geographic access, and economies of scale.

#### **4. Funding Models that Incentivize School Completion**

Federal, state, and local education funding is largely based upon student Average Daily Attendance (ADA), as measured by the number of students counted in their seats one or more times during the school year. This model precludes online and blended learning. Further, apportioning funding for online courses taken outside of the district or the state often has negative financial consequences for the district. These funding models may also create disincentives for a school or teacher to help advance a student faster than within a traditional setting, or to provide alternative, off-campus learning opportunities.

Many districts and states have not yet fully considered or adapted funding policies related to personalized learning, so they are left wondering about the financial consequences of a student graduating early, dual enrollment in college, and students receiving services outside of the school building. Current funding models may also not account for the differentiated roles of educators, including what, how, where, and when they teach.



Supporting flexibility in teaching practices to meet student needs must be matched by educator compensation policies. Long-held funding policies often discourage or prohibit districts and schools from offering such personalized learning opportunities. *“[In Ohio, we asked:] What are ways that students get high school credit and demonstrate mastery of learning other than seat time? . . . We still have a Carnegie unit, but . . . we have a credit flexibility plan now.”* DEBORAH DELISLE, Ohio Superintendent of Public Instruction Personalized Learning Symposium, August 2010

Funding models may also require a rethinking of resources. A personalized learning system enabled through a technology-based learning platform may be seen as more expensive than traditional models. But our current models may be inefficient by teaching to the

mean, failing to leverage technology, and keeping time and place fixed rather than leveraging anytime, everywhere learning opportunities. Further research and data are needed to document the budget impact of a personalized design and to provide budget models that allocate resources in a more cost-effective manner than traditional models.

***Performance- or level-based student grouping, rather than the traditional grade/age bands, is therefore a key policy component for authentic personalization of learning.***

#### **5. P-20 Continuum and Non-grade Band System**

Education leaders understand that the traditional grade band system is often institutionalized by culture and expectations through the age-old question of "What grade are you in?" Performance- or level-based student grouping, rather than the traditional grade/age bands, is therefore a key policy component for authentic personalization of learning. The fact that students are all born within a preset 12 month period does not, and should not, dictate their abilities or performance at a given time (or age). While often controversial, working toward a P-20 continuum rather than being hindered by age and grade-bands opens the doors for personalizing learning for all students by helping to shift the role of the teacher, addressing the individual child's needs, and focusing on performance and mastery.

#### **Five Instructional Elements that Support Personalized Learning**

In this report, the division of recommendations into chapters does not always allow the representation of the interaction of elements that work together. These five elements, listed below done well are essential to personalized learning:

1. Assessment
2. Data
3. Curriculum
4. Technology
5. Educator Support

They are characterized and describes in other chapters. However, the connection to personalized learning is highlighted in the next section.

#### **1. Assessment**

***To power personalized learning, assessments should encompass a broader range of measures beyond performance on academic tests.***

Assessment must take into account information on a student's learning style preferences, previously successful experiences, interests, and other factors in a learner's life. The practical expansion of assessments follows the discussion about the importance of more flexible policies. While several systems and tools are moving in this direction, few districts provide a comprehensive approach to using assessment to inform instruction on a daily or even hourly basis. Systems rarely allow for different forms of assessment depending on the content or the student's needs. Products such as portable electronic student portfolios, embedded formative assessments, and learning management systems support these efforts. New types of assessments that correlate to the personalized learning experiences will likely evolve and be required to maximize the efficiency of these systems and student learning.

## 2. Data

Personalized learning requires that teachers and students have real-time access to meaningful data to better facilitate each student's learning experience. Typically, in our one-size-fits-all model, the data referenced is almost solely academic test data. Personalized learning models expand this definition to include data on student learning style preferences, correlations between instructional approaches and achievement, student interests, and information on the whole child. Having this depth of data available on a regular basis and being able to translate the information via algorithms into recommendations for instruction require a robust, sophisticated platform and data system. In the School of One model, the algorithms, which capitalize on data and assessments daily, allow for the development of individual playlists for students.

*Personalized learning requires access to a universe of curriculum resources to meet the wide range of student learning styles, performance, and interests.*

Further instructional technology advances will ensure even more sophisticated learning platforms and data systems that not only more efficiently identify student needs, but also more effectively identify and deliver matching interventions from a repository of adaptive software, engaging digital content and instructor-delivered resources (online and face-to-face) not otherwise available through traditional means. The maturity of data interoperability and content portability standards will enable educators, students, and designers of software applications to assemble ever more unique, best of breed resources customized to each student.

## 3. Curriculum

Personalized learning requires access to a universe of curriculum resources to meet the wide range of student learning styles, performance, and interests. A personalized curriculum utilizes and draws upon different types and sources of information, providing teachers and students with choices. Access to multi-dimensional and multi-modal curriculum options ensures learning can be personalized by reading levels, interaction, and other preferences. The use of well-developed learning progressions helps address the potential tension between curriculum coherence and pliability, allowing customization and relevance to the student within the framework of learning standards. Modularized forms of content allow a mix and match of unbundled but aligned learning objects and resources. Personalization also expands curriculum to include learning apprenticeships in the community, cross-curricular opportunities, group or team learning, and problem-based experiences.

Teachers have supported the organization of content around essential questions in an environment that encourages instructors to let go of some control and reward student exploration.

Technology enables many key elements needed to support personalized learning from a curriculum perspective, including digital content, online learning platforms and instructional software. Large banks of content are more easily accessible anytime, anywhere if in digital format.

Interoperable content can be more easily tagged, organized, searched and accessed in a manner unique to each student's needs. Interactive, multimedia resources can engage students by learning preference and modality. Adaptive courseware can support individualized pacing, reading levels, and opportunities for review or extension depending on a student's needs. Learning algorithms can track progress, identify skill gaps, and suggest learning resources. Web 2.0 methods provide students with opportunities to engage with peers and create their own content. Digital content and curriculum exists in many forms today, including through subscriptions, software, and open education. Content delivery and pricing models, curriculum formats, and the learning platform are important areas of focus to realize the potential of personalized learning.



#### **4. Technology**

Technology underpins each of the areas referenced above and is critical to bringing personalized learning to scale. When considered systemically, technology allows for a shift from the current fragmented approach to curriculum, instruction, and assessment to a much more integrated platform that can be managed and accessed anytime, from anywhere. Technology based platforms are needed to gather and analyze assessment and other data and to deliver multiple types of instruction through digital content and online/blended learning. Modern learning technologies efficiently identify student skills, learning styles, and preferences in an on-going way and enable delivery of a wide range of matching curriculum and learning activities to meet each student's personalized needs.

Technology applications support personalization, including:

- multi-modal and universally designed digital content, adaptive software, and multimedia resources, including learning games and simulations, that address various learning styles and reading levels;
- computer-based and learning-embedded formative assessments that dynamically identify gaps in student learning to immediately impact instruction. related data systems for managing that information; and
- online learning and virtual learning communities that provide a range of opportunities otherwise not available, including platform for peer-to-peer learning and communication with community-based people and resources.

*Technology underpins each of the areas referenced above and is critical to bringing personalized learning to scale.*

A robust, comprehensive learning platform that incorporates learning algorithms, assessment, and curriculum and content in its many forms is essential. While technology in and of itself is not the silver bullet for personalized learning, it is a critical driver and conduit to transforming our current one-size, fit-all system. Policies that encourage equity in access to technology infrastructure are central to personalizing learning for all students.

Like models for personalization of learning, the technologies and resources will continue to evolve and grow. Ever more sophisticated tools and integrated systems are required to meet this bold approach to

learning. Allowing students to bring their own personal computing devices (e.g., laptop, cell phone, smart phone, etc.) also provides an opportunity to personalize learning and also to reallocate resources.



#### **5. Educator Support**

Education leaders identified the changing role of the teacher as critical to achieving the authentic, student-centered approach required for personalized learning. However, most teachers do not have experience or training in the facilitator or collaborator role, and are challenged to differentiate instruction. Teachers require and deserve support through on-going and sustainable professional development to acquire these skills and fully implement personalized learning. This includes a comprehensive set of tools and resources, easy access to data, curriculum and content resources, and technology to implement the lessons and resources.

Additionally, teachers, administrators, and other educators need professional development, models, and peer support for changing their role as educators and how they interact with students. A teacher who has always taught a single group of 28 third grade students each year is going to have a very different day when working with a group of students with a broader age-range. This will require not only new training, but also a new design for ongoing teacher collaboration, professional development and support. Online professional development, professional learning communities, instructional coaches, and collaborative planning time are several options for teachers striving to change their role for personalized learning for all students.

Cutting across these five tools of personalization is the concept of the “learning genome”. To deliver a personalized pedagogy, we need to develop a process for further understanding the underlying traits, needs and appropriate learning resources/processes of each student. Further R&D is needed to create data-rich, dynamic learning communities to power personalized learning.

Educators, researchers, and software developers must collaborate to carry out this R&D.

Implementing personalized learning requires a change in the business of schooling. Utilizing the tools and resources referenced above has many policy and operational ramifications and requirements. As districts and schools implement personalized learning models, careful planning is required to ensure that the tools and resources are in place and that educators are supported in their use.

learning and instruction are customized to the student's unique needs. Although it builds upon long-standing research and understanding of how students learn, personalized learning authentically implemented represents a true paradigm shift, not a series of tweaks to the system.

By its nature, personalized learning does not have a one-size-fits-all answer simply to be replicated. But key components described above are common in the various models and approaches.

It is important to recognize the challenges to transforming the inherently political K-12 public education system that currently exists. Jane Feinberg of the FrameWorks Institute shared her multi-year, multi-method research on messaging for education reform to ensure understanding, ownership and ultimately support among stakeholders, including parents and the community. She pointed out that people generally are nervous about transformation or a major overhaul to the system. Her research shows that focusing on future preparation is the most well received message related to education reform: "Our nation's success depends on our ability to prepare our population for the 21st century." (Feinberg, August 5, 2010, Symposium). Interestingly, Feinberg noted that the word personalized often suggests the responsibility is on the individual, rather than on the need for systemic redesign. Feinberg suggested that *customized* and *student-centered* may be more appropriate terms for conveying this vision and model.

Collectively, as stakeholders committed to improving learning and ensuring that each student receives a personalized education, leaders overwhelmingly agreed that developing a system of scalable personalized learning is critical for our education and our nation to address the

Personalized learning offers much promise to address our nation's educational challenges and goals – to ensure equity for all students, and to better engage each student to achieve at the higher levels expected for them to be college and career ready and successful in an increasingly complex society. It is important to continue the effort to shift from an institution/teacher-centered education system to one in which the student is at the center and

many achievement and economic challenges we face. To accomplish these goals, it will be necessary to:

- Expand research and development aimed at studying redesign for personalization models and practices, and share what works and the road map for getting there.

*"Our nation's success depends on our ability to prepare our population for the 21st century."  
(Feinberg)*

- Support public-private partnerships to advance key technologies, including common metadata and technical standards needed to enable the interoperability of various applications, data, and content resources to form a more seamless, integrated learning platform.
- Form a policy action network to identify and implement state and district policies that support personalized learning, including changes to seat time or Carnegie units.
- Develop a shared understanding of the vision, definitions, and effective communication of personalized learning to help inform education stakeholders.

The section above of the report draws heavily on the report of a Symposium sponsored by the Software & Information Industry Association, ASCD and the Council of Chief State School Officers cited below:

Software & Information Industry Association. (2010, November). Innovate to Educate: System [Re]Design for Personalized Learning; A Report from the 2010 Symposium. In collaboration with ASCD and the Council of Chief State School Officers. Washington, DC. Author: Mary Ann Wolf.

## Make it Personal

### Guiding Principles

- **Child-centered approaches to education are characterized by a focus on learning and are driven by the knowledge of developmental trajectories, skills, interests, goals and needs of children.**
- **The full range of learning experiences—at all times of the day, week and year—are harnessed to provide learning opportunities and meet the educational needs and interests of all children. Use of time is flexible.**
- **Schools provide a variety of standards-based, applied, Multidisciplinary learning opportunities for children inside and outside of school. These opportunities may include project-based learning, internships, experiential education, career technical education, peer learning and apprenticeships.**
- **An effective child-centered learning environment embraces rigor in the form of high standards and multiple, valid assessments of children’s mastery in regard to these expectations.**
- **Progress is primarily based on acquisition of competencies, rather than a children’s age, hours on task or credits. The current configuration of schools, where pace and progress typically occur in grade-level lockstep, and the focus is on teaching facts and procedures will not result in the depth and breadth of knowledge necessary for success.**
- **With a focus on learning, as opposed to teaching, Educators take on the roles of facilitators and Advisors in addition to content experts.**
- **Schools have a personalized culture that fosters Strong and respectful relationships amongst children and adults. Adults understand children’s cultural and social contexts, know them well and often work with children across multiple years in advisory capacities. Children feel responsible for their own learning and are increasingly able to assess their skills and learning needs.**
- **Technology can open up new avenues for child centered learning.**

Source: Nellie Mae Education Foundation, *Emerging Principles of Student Centered Learning*, 2010.

**Key Issue 1:** *A student’s progress is based on demonstrated competency, not seat time.*

**Recommendation 1:** Students should progress to more advanced work upon demonstration of learning by applying specific skills and content.

**Recommendation 2:** Children should advance through school and ultimately graduation based on their demonstration of essential knowledge, skills and dispositions, not on the time they have spent in classes.

**Recommendation 3:** School systems must offer children

various forms of support to advance at their own pace to meet established competencies.

**Recommendation 4:** Time should be the variable and learning the constant. It will take different amounts of time for different students to master the skills and content.

**Key Issue 2:** *Connecticut needs to offer children multiple routes through which children learn essential knowledge and dispositions.*

**Recommendation 5:** Students’ learning pathways should be determined by a combination of what a student needs to know and be able to do the student’s learning style and the student’s interests.

**Recommendation 6:** School systems should create multiple pathways that enable children to master essential content and skills. Therefore, school systems should be constructed and organized to offer diversity and choice in learning pathways.

**Recommendation 7:** Students should work on levels that are appropriately challenging.

**Recommendation 8:** The state, districts and others should develop and implement learning resources that use technology and embody design principles from the learning sciences.

**Recommendation 9:** The state, districts and others should develop and implement learning resources that exploit the flexibility and power of technology to reach all learners anytime, anywhere and with anyone.

**Recommendation 10:** Schools and systems should use advances in learning sciences and technology to enhance learning, and develop, adopt and evaluate new methodologies with the potential of inspiring and enabling all learners to excel.

**Recommendation 11:** School, district, and state policies and regulations should be conducive to technology-based teaching and learning initiatives. Structural barriers to implementation of technology-based learning should be eliminated.

**Recommendation 12:** Children must receive instruction in how technology can enhance the learning experience while also being wary of its potential threats. This means being responsible, not only at school but also at home and mastering lessons in digital footprints, illegal downloading and plagiarizing, and understanding what is okay to share and what should be kept private. In short, children should understand the components of being good digital citizens.

**Recommendation 13:** Acceptance of technology-based learning toward graduation or for CEUs must be based on assessments of the student’s or teacher’s learning of the defined outcomes. Control of inputs such as certification and minimum time (Carnegie units) and CEUs should be eliminated.

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## **OTHER CHAPTERS in the NEXTED Report**

**Complex Problems**

**Raise the Bar**

**Early Childhood**

**Make It Personal By Design**

**Boost Quality – Human Capital**

**Reform Leadership**

**Offer More Options and Choices**

**Retool Assessments and Accountability**

**Involve Students and Parents**

**Leverage Technology**

**Continue Transformation**

**The original report and the related Background Papers can be found and downloaded from the NEXTED web site.**

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