Mastery Learning in Action

This paper is the third in a series of papers that highlight the work of the Mastery Transcript Consortium®, its schools, and the combined effort to transform grading practices, transcripts, and the college admissions process so that the interests of students, high schools, and higher education are aligned. You can find the papers posted to date at the Mastery Transcript Consortium website at mastery.org (and more to come!).

→ Getting Our Signals Straight for Students: How the Mastery Transcript Consortium is Re-Aligning the Path from High School to College by K. Casey and C. Sturgis

→ The Journey Towards Mastery Learning: The Steps and Stages to Mastery Credits and the Mastery Transcript by S. Bell, K. Casey, and C. Sturgis

Introduction

Each year, more schools begin the journey to a personalized, mastery-based[1] system. They do so because the traditional education model needs updating to align with the research on learning. It needs updating to prepare students for today's rapidly changing world. Educators are redesigning schools to motivate and engage students; to help them build the mindsets and traits to be powerful learners; and to develop the full spectrum of knowledge and skills they need to take advantage of challenges and opportunities they will encounter throughout their lives.

In 2019, I visited five member schools of the Mastery Transcript Consortium® (MTC) to find out what mastery learning means to them and how they are implementing it. Some of the schools are long-standing breaking out of traditional models; some are brand new schools borne from the desire to shift the educational paradigm. Some are independent and some public. Some are in the early stages of implementation, while some are well-developed.

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1   There are different terms and concepts used to describe the model of education that can replace the traditional model. Some districts use the term personalized learning to indicate that students should have a sense of purpose and ownership over their education. This term often includes the idea that instruction should be differentiated by taking into consideration the individual student's progress in learning. Although some people use the term personalized learning to indicate the use of educational technology, that is not the case in this paper.

     Mastery-based learning, a related and often overlapping concept to personalized learning, is used to refer to a model of education that has developed based on the research on learning. It is designed to help all students be successful in attaining the knowledge and skills required for graduation by having students demonstrate that they have 'mastered' the learning targets. It is designed to motivate and engage students while also helping them develop the habits, mindsets, and skills they need to be self-directed learners (or have agency). States and districts use other terms to describe the model, including competency-based, proficiency-based, performance-based, and standards-based. You can find an introduction to the model in the first section of *Quality Principles for Competency-Based Education* by Chris Sturgis and Katherine Casey or in the Mastery Transcript Consortium *Journey to Mastery Learning*.

Some serve highly homogenous, relatively wealthy, educated communities, and one is diverse by design.

Schools use different terms to describe their learning models. For example, Champlain Valley Union High School (CVU) has developed standards-based learning, while Singapore American School (SAS) refers to personalizing learning. Schools are also developing mastery learning in different ways depending on whether they have already made the shift to using standards to align instruction, assessment, and grading. At Tilton School, the mastery approach aims to help students develop five essential skills—creative engagement, innovation and design thinking, and mindfulness—to enhance standards-based instruction, whereas at Northern Cass School District #97, mastery learning (referred to as personalized learning) is their core instructional approach. Regardless of whether mastery learning is an enhancement or an overarching model, all the schools are redesigning so that students are engaged and motivated, have opportunities to apply what they are learning, and discover their potential.

Each school had different starting points on the road to mastery learning. No two stories were alike. Despite this, they landed in remarkably similar places of what it means to personalize learning and design schools around mastery. Common features include:

→   approaching students holistically with attention to intellectual and emotional development;
→   empowering learners with the mindsets and skills to own their learning;
→   engaging and motivating students through projects, interests, and making connections to the real world;
→   employing instructional strategies that help each student reach and master learning targets; and,
→   increasing flexibility of the school to respond to students with timely and differentiated supports and opportunities.

This paper, drawing from the case studies that were prepared on each of the schools and organized by the five stage framework introduced in the paper T*he Journey Towards Mastery Learning*, will highlight examples of how the schools are designing their system of mastery learning. There is no one model of mastery learning, nor is there one roll-out strategy. Each school has designed and implemented in ways that make sense for them based on leadership, capacity, and opportunity. Each school continues to hone their model as they learn about what works for students.

A LOOK AT MASTERY-BASED SCHOOLS

The following five schools shared their approaches and insights about mastery learning in the fall of 2019. Case studies, in the form of short articles written about each school, can be found at the Mastery Transcript Consortium website at mastery.org.

PUBLIC SCHOOLS
→   Champlain Valley Union High School, Vermont
→   Northern Cass School District #97, North Dakota

PUBLIC CHARTER SCHOOL
→   Pathways High School, Wisconsin

INDEPENDENT SCHOOLS
→   Singapore American School, Singapore
→   Tilton School, New Hampshire

Purpose and Vision: Defining a Compelling Reason to Innovate

The journey toward mastery learning always starts with schools defining the reasons they need to change. It's known as defining the *Why*.[2] It's a far-reaching step in creating a vision that is shared by educators, students, parents, and the broader community. The underlying reasons sparking change vary. They also influence the design and implementation priorities.

At Tilton School, a residential, independent school serving 250 students in rural New Hampshire, ending the debilitating traditional grading practices was one impetus to introduce a mastery approach. The other reason was to fully prepare students for life beyond high school. They wanted a way for students to develop a wide range of skills necessary for adulthood, beyond the content taught in the academic courses. Thus, their vision for their mastery approach is for students to make real-world connections, develop essential skills, and showcase their strengths.

The founders of Pathways High School (PHS) were dismayed about how much talent is left untapped in traditional schools. The school launched three years ago with the mission To unleash all learners' potential. Now. The school philosophy is shaped around helping students expand interest, discover their potential, and construct a deep and driving sense of purpose.

OUR MISSION
To unleash all learners' potential.
Now.

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2   Sinek, Simon. (September 2009). How Great Leaders Inspire Action [Video file]. Retrieved from https://www.ted.com/talks/simon_sinek_how_great_leaders_inspire_action.

The journey toward mastery learning and personalization at Northern Cass School District #97 (Northern Cass) was launched when district leadership began to wonder about the lives of their students after graduation. Through interviews with employers and colleges about their graduates, they discovered that their students were respectful and good at school. But was that good enough? They wanted their students to stand out and contribute to the world around them. Thus began a stream of conversations within the district and the community about what they wanted their students to be, know, and do when they graduated from Northern Cass. The eventual result was Northern Cass's *Why*: a vision that students are empowered individuals who can shape their environment and that each learner can develop greatness, albeit in different ways.

NORTHERN CASS VISION AND COLLECTIVE COMMITMENTS

→　We believe every learner can change the world, therefore we must provide a world class education.

→　We are dedicated and passionate about relationships, teaching and learning, self-reflection, acknowledging greatness, and support of the Northern Cass community.

→　We are driven towards continuous improvement.

The Singapore American School (SAS) journey started with the question *What does it mean to be an exemplary school*? To find out, they sent teams to tour over 100 schools in Singapore, China, Finland, New Zealand, and the United States. The school visits made it clear to SAS that they wanted to do more than prepare students for college (99 percent of their students go on to higher education). They wanted to develop exceptional thinkers. An important lesson that emerged from the multi-year exploration was the permission for staff to think differently. The process of learning about other school models immediately began to change the culture of SAS; educators became more empowered and began to own the learning model.

VISION

A World Leader in Education, Cultivating Exceptional Thinkers, Prepared for the Future

Not only did SAS navigate the world, they also had to navigate the array of educational terminology. Personalized learning was one of the most confusing, with its many different meanings: interest-driven, student-centered, student agency, and educational technology. They realized that they had to create their own understanding. The SAS approach for personalizing learning is to offer students opportunities for deep intellectual exploration in areas of interest. From insights gained from school visits, they knew that personalizing learning required redesigning some aspects of their school, including: investing in stronger relationships; more flexibility in seating, resources, and instruction; and creating more relevant, authentic learning.

A frequent theme among these five schools is a vision that students will have influence and impact in shaping their own lives and the world around them. With this driving vision, schools are empowering students to have more than ownership over their education; they are preparing them to be able to advocate, organize, and navigate within a complex and ever-evolving world.

Schools took similar steps in defining their purpose:

→   Gathering feedback from stakeholders.
→   Visiting other schools.
→   Studying the research on learning.
→   Engaging community in creating a shared vision.

The most important thing is to keep the Why and the vision fresh. It's not just something posted in the front hall and on the website. It's a living document, message, conversation, and mantra from which all organizational decisions are made that have an impact on the learning outcomes of students.

Graduate Profile — Creating A Vision of Success for all Learners

In order to transform a district or school, educators need to know where they are going. A vision inspires and points the direction. Changing school operations requires something else. It requires a crystal clear expectation of the knowledge and skills, including the performance levels that students should develop. This second stage in the journey to mastery learning includes creating a vision of success for students. It starts with a graduate profile that describes what students will be able to know and do upon graduation. The graduate profile is then translated into a common learning framework that includes a progression of learning targets that guide learning, instruction, and assessment.

Believe that All Students Want to Be Successful

Every school I visited has a powerful vision statement for their students. Pathways High School operationalizes their vision statement by trusting that all their students want to be successful. It doesn't matter what behaviors students are demonstrating — absenteeism, tardiness, not turning in assignments, heads down on the table — the Pathways team assumes all their students want to be successful in their lives. They assume that everyone wants to be a winner. Who wouldn't want to be successful? Thus, when students exhibit behaviors that impede learning, teachers use these moments to know their students better and help them build their voice to deal with underlying issues. By trusting that their students want to be successful, the team at Pathways brings their vision statement — unleashing the full potential of all students — to life.

Pathways believes that students will be motivated by their own idea of success. In fact, Pathways is designed to help students create their own idea of success beyond what is defined by the school. Kim Taylor, director of Pathways High School, explained, "Success is going to be defined by each student. It's not just about getting a high GPA or how much money you earn. The next generation is pushing back on the idea that income means happiness. They have a different sense of purpose and ideas about what will bring them happiness. We are going to work with them so they have the critical skills to create the lives they want and to navigate whatever challenges they encounter." When students have a clear vision of what they want for the future — something more meaningful than getting into the best college — they have a sense of purpose, one of the essential ingredients of intrinsic motivation.

Believing that every student is going to be successful doesn't mean they are going to be exactly the same. Everyone has different aptitudes, interests, and motivation to excel. Pathways wants every student to shine in ways that interest them and are important to them. They shine by demonstrating what they can do, not by getting perfect grades.

Graduate Profile and Learning Framework

A World Leader in Education, Cultivating Exceptional Thinkers, Prepared for the Future—
Singapore American School Vision Statement

With a new vision statement in hand, Singapore American School realized they needed to clarify what it meant for students to become exceptional thinkers.. With the help of faculty, board members, parents, and students, SAS started by creating a graduate profile with seven desired student learning outcomes (DSLO):

→   Character
→   Collaboration
→   Communication
→   Content Knowledge
→   Creativity
→   Critical Thinking
→   Cultural Competence

The next step was to operationalize the seven DSLOs and academic standards. There's been some trial and error along the way, and SAS's thinking has evolved over the last two years. The first cut produced 70 different competencies that they had intended to replace standards. But it was too complex and unwieldy. After a visit to high schools in New Hampshire, they realized that a small set of overarching competencies, within which standards could fit, could create cohesion. At this point in time, they are working toward mapping the Common Core standards to the academic competencies and creating two competencies for each DSLO that define what they expect students to demonstrate before they graduate.

On the other side of the world from Singapore, surrounded by rolling hills and rich agricultural lands, Champlain Valley School District engaged their community in creating a mission statement that defines what they want high school graduates to be:

→   citizens who **LEARN** actively and collaboratively,
→   **THINK** creatively and critically,
→   **LIVE** responsibly and respectfully,
→   **CONTRIBUTE** positively to their community, and
→   **DEVELOP EXCELLENCE** in their individual interests.

While district leadership was setting the course for the future with this vision, the team at Champlain Valley Union High School (CVU) had been putting together piece by piece what they now refer to as standards-based learning. Part of that process was for teachers to

create learning targets and scales for each course. (The CVU approach to learning will be explained further in the next section.)

CVU is now trying to tie the pieces together between the graduate profile and the course-based learning targets. They have created fourteen academic graduation standards. A fifteenth graduation standard is the expectation that students have learned to learn and have the habits of learning that will help them be successful in college, careers, and life. The goal is to have learning targets be clearly linked to one of the graduation standards so that students can see how what they are learning now relates to the set of skills they are going to need after graduation. CVU is currently revising the graduation standards based on student data and teacher feedback, so they may look different in the future.

Champlain Valley Union High School Graduation Standards 2019-2020

Creative and Practical Problem Solving (Academic)

a Generate a variety of solutions, supported by evidence.

b Interpret information and derive meaning through the use of inference, empathy, metaphor, or imagination.

c Frame questions, make predictions, experiment with possibility, and design strategies

d Develop and use generalizations, models, or abstractions.

e Set goals, make informed decisions, and take constructive risks.

Clear and Effective Communication (Academic)

a Understand and use discipline-specific vocabulary.

b Demonstrate organized and purposeful communication.

c Adjust communication to suit the purpose, context, and audience.

d Demonstrate standard conventions of expression including oral, written, performed, and emerging technologies.

e Participate and collaborate effectively and respectfully to enhance the learning environment.

Informed and Integrative Thinking (Academic)

a Use evidence and reasoning to effectively support ideas or solutions.

b Identify main and supporting ideas, patterns, trends, clues and relationships in sources of information.

c Analyze, evaluate, and synthesize information and perspectives to build understanding.

d Evaluate the accuracy, bias, and usefulness of information.

Self Direction (Habits of Learning)

a Take initiative in, and responsibility for learning.

   Learning Targets:
   → CVUHabit: I attend class, and I have the materials and mindset to learn.
   → CVUHabit: I reflect on my actions, choices, and strategies and how they affect my learning.
   → CVUHabit: I communicate questions, ideas, stuck points or conflicts.

CVU is on the path toward creating a proficiency-based diploma. Their efforts are supported by the groundbreaking efforts in Vermont[3] to create a personalized, proficiency-based system. The traditional diploma is based on completing a number of classes. A proficiency-based diploma is based on demonstrating that you really learned. It's a profound change, as it requires districts and high schools to be much more responsive and flexible than ever before. It makes schools design with more intent around the experiences students will need in high school to develop the knowledge and skills set out in the graduate profile.

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3 In 2013, Vermont established two major policies, Act 77, the Flexible Pathways Initiative and Rule 2000: Education Quality Standards, that call for schools to offer personalized pathways within a proficiency-based model of education.

Learning Model: Clarifying How Learning and Teaching Will Change

Although some schools will begin by clarifying their beliefs about how students learn based on the research on learning, others develop a pedagogical philosophy along the way as they seek to align their instruction and assessment with the graduate profile and standards. Some schools may focus more on the cognitive aspects about how students learn, others on the social-emotional side. Some are emerging, and some are so well-developed that a book has been written documenting the approach. Every school has a philosophy of learning — a learning model — that starts with building a culture of trust, investing in relationships, and approaching students holistically.

Making an Impact

Although the staff at Pathways High talk about kids, not theory, it is clear that several theoretical principles are shaping school design:

→   Self-determination motivation theory that emphasizes autonomy, purpose, and mastery;

→   Adolescent development and identity formation that addresses the need to belong, express their voice, and explore questions such as *Who am I? Who do I want to be? What do I want my future life to be? and What do I need to do to get there?*; and

→   Research on learning, including engaging students as active learners, making connections, taking into consideration prior knowledge, and continuing the cycle of learning until students successfully reach the learning targets.

These philosophies are woven together into a pedagogical philosophy that emphasizes students building their voice (the mindsets and skills for self-advocacy to navigate new environments, challenges, and opportunities) and developing intrinsic motivation through high interest activities for students to build connections and a deep sense of purpose.
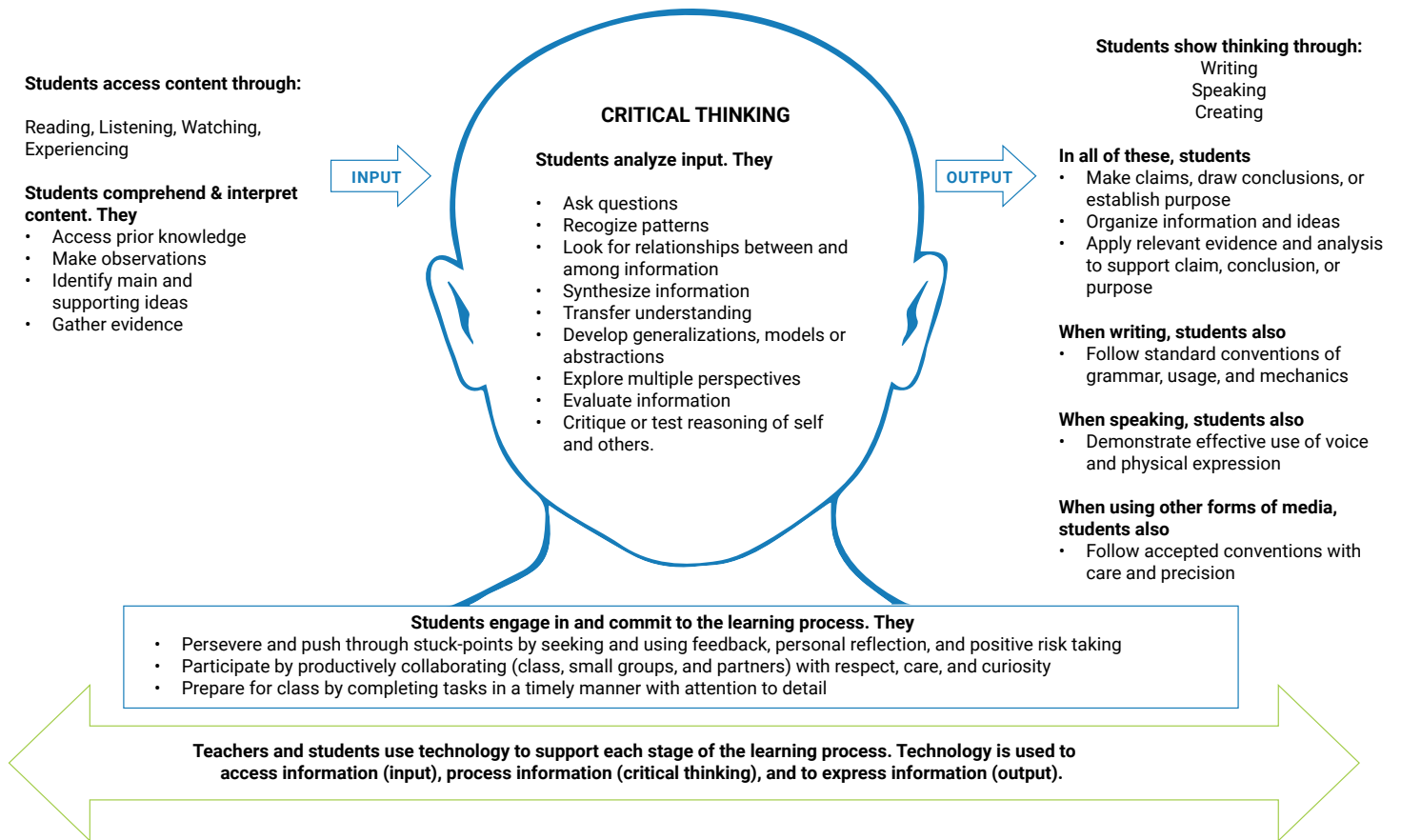
Having started from scratch (as compared to schools that must make a transition to mastery learning), Pathways has been very creative in how they have organized learning experiences. The primary components of the school design are:

→ *Impact experiences* that expand students' horizons and interests through real-world experiences;
→ *Seminars* with high interest themes and interdisciplinary curriculum;
→ *Cohorts* based on three phases that enable students to create community, build academic skills, and explore careers and colleges; and
→ *Empower* hour is for students to work on passion projects and develop the 'empower skills'—evidence, mindfulness, problem-solving, ownership, working together, exploring perspectives, and refinement.

Pathways High wants students to make an impact in their world, and they believe that impact experiences — experiences and relationships in the world beyond the school — are the best way to help students develop interests and purpose. Students make connections to the real world through impact experiences. They learn about the world around them. They see the relevance of what they are learning in school. They see up close what professional standards of excellence look like. They get glimpses of all kinds of jobs that they didn't know about before. They see what the daily life in a workplace is like. They meet adults who are interested in them and see their value. Every seminar has at least one impact experience; most will have more.

The Big Blue Head: A Framework for Critical Thinking

As CVU began to design their pedagogical approach, one of the first things they did was outline their understanding of the cognitive learning process. They call it the Big Blue Head, as the first graphic was printed on blue paper. You could also refer to it as the CVU Theory of Learning and Teaching.

Students access content through:

Reading, Listening, Watching, Experiencing

Students comprehend & interpret content. They
- Access prior knowledge
- Make observations
- Identify main and supporting ideas
- Gather evidence

INPUT

CRITICAL THINKING

Students analyze input. They

- Ask questions
- Recogize patterns
- Look for relationships between and among information
- Synthesize information
- Transfer understanding
- Develop generalizations, models or abstractions
- Explore multiple perspectives
- Evaluate information
- Critique or test reasoning of self and others.

OUTPUT

Students show thinking through:
Writing
Speaking
Creating

In all of these, students
- Make claims, draw conclusions, or establish purpose
- Organize information and ideas
- Apply relevant evidence and analysis to support claim, conclusion, or purpose

When writing, students also
- Follow standard conventions of grammar, usage, and mechanics

When speaking, students also
- Demonstrate effective use of voice and physical expression

When using other forms of media, students also
- Follow accepted conventions with care and precision

Students engage in and commit to the learning process. They
- Persevere and push through stuck-points by seeking and using feedback, personal reflection, and positive risk taking
- Participate by productively collaborating (class, small groups, and partners) with respect, care, and curiosity
- Prepare for class by completing tasks in a timely manner with attention to detail

Teachers and students use technology to support each stage of the learning process. Technology is used to access information (input), process information (critical thinking), and to express information (output).

The Big Blue Head summarizes the learning process. It's not just the memorization process, which many cognitive neuroscientists describe in terms of working memory and retrieval. It's the process of thinking critically.

At CVU, instruction starts with making the learning targets transparent because "the brain wants to know where it's going." Thus, teachers need to have a clear understanding of what they want students to learn. CVU turned to the structure called Know-Understand-Do (K-U-D), originally developed by Carol Ann Tomlinson, to shape curriculum. Teachers identify what students will Know, Understand, and be able to Do by the end of a period of learning. The expectations for what students are able to Do is the learning target. Learning targets have scales that describe a learning progression that shapes instruction, assessment, and feedback.

When CVU first started down the path of using K-U-D, every teacher was writing their own learning targets and scales. Some developed six learning targets for a semester, while others wrote forty. Over time, they've found that a general rule is to aim for 8-12 learning targets over the year for one class (or 4-6 in one semester). Teachers who were teaching common courses worked together to create the learning targets.

The K-U-D framework helps clarify that in order to apply content and skills, students are going to be involved with critical thinking. And critical thinking, just like any other skill, can be broken down into smaller pieces and modeled for students. Finally, standards-based learning requires teachers to think carefully about the learning target, their instruction, and how evidence of learning will be demonstrated. If students are going to learn how to approach a problem through critical thinking, shouldn't the instruction, assignments, and homework promote critical thinking as well?

How Do We Know What Students Have Learned?

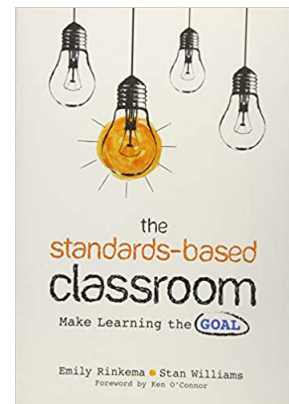Every mastery-based school is driven by a set of core questions such as:

→   **What** do we want students to learn?
→   What is the **most effective** way to maximize their learning?
→   How do we **know** when they have learned it?
→   What happens if they **haven't** learned it?
→   What happens if they **have** learned it?

These questions create a cycle of learning with time and resources allocated for students who didn't learn it the first time or right away. The work of mastery-based schools is to find the right balance of different types of strategies of assessing learning so that students receive timely, productive feedback; have opportunity for more instruction, practice, and revision; and determine where they are in their progress and adjust their student learning plans to ensure they are moving forward at a meaningful pace toward meeting the graduation standards.

The five schools were in different stages of developing an intentionally balanced system of assessments. All of them invested in formatively assessing students and providing timely feedback as part of the cycle of learning. Some were just starting to put together scales that indicate progress toward learning targets. Northern Cass is using Marzano Research Labs proficiency scales.

CVU has developed a clear assessment strategy. Teachers are learning how to create scales for the learning targets and developing common ones for courses taught by several teachers. This is creating the reliability needed to make a proficiency-based diploma effective, as it reduces the inconsistency that haunts today's diplomas, where students in some districts can graduate with sixth grade reading skills.

At CVU, summative assessments are also considered part of the cycle of learning, not an end point. They are a check-in to see what students have learned, how effective the

Please see *The Standards-Based Classroom: Make Learning the Goal* by Emily Rinkema and Stan Williams for an in-depth look at the CVU learning model.

instruction has been, and to make mid-course corrections for both. They help students take a look at their growth, allowing them to reflect on where they started and where they are at a given point in time. They can help students create their own goals for improving, and summative scores can always change throughout the year as new evidence of learning is demonstrated.

What's different from traditional school is that the ultimate goal is to have all students be successful on the summative assessment. Why would a school ever want students to be unsuccessful in their learning? Students can access the Learning Center any time during the day if they need extra help. Revision, re-dos, and retakes are all acceptable if a student doesn't succeed in demonstrating the learning target the first time around.

Emily Rinkema and Stan Williams, instructional coaches at CVU, agreed that the instruction and assessment strategies run the gamut right now. "We have teachers who have developed powerful instructional strategies for critical thinking that are aligned with the learning targets, but still use multiple choice tests as their primary method of summative assessment. Or there are mismatches where the assessments are beautifully aligned, but the instruction hasn't caught up. And then there are some who just love their content and want their students to love it too, and can't see how a focus on skills could actually improve content retention. However, it's safe to say that we are all moving toward brain-friendly practices and away from brain-hostile ones."

> Introducing a new model of teaching and learning requires humility. We are all learners. Mistakes are expected along the way to implementing a new learning model. The important thing is to be able to learn from those mistakes. As teachers become more intentional about aligning instruction with higher-order skills, they soon find themselves outside of their comfort zone. It's difficult for a professional to go to work every day feeling that they are going to bumble and stumble. Supporting educators to feel safe and comfortable amidst professional discomfort is one of the most important jobs of district and school leaders.

Alignment: Ensuring Culture and Structures Support Mastery Learning

If learning is the goal, then schools need to fully align themselves around it. That means using the research on learning and 'what's best for kids' in making decisions big and small. This section looks at the different ways schools are aligning different components: providing timely and differentiated support, communicating progress, mastery credits, and equity. However, efforts to align will be futile if the belief systems of the traditional education model live on. Fixed intelligence, compliance, and ranking must be replaced by growth mindsets, strategies to build intrinsic motivation, and a commitment to success for each and every student.

Timely and Differentiated Supports

The concept of differentiated instruction has been around for over forty years. However, it was difficult to do in a traditional model because learning targets weren't clear and the emphasis was on delivering one-size-fits-all curriculum based on the age of the student. Mastery learning makes it much easier to differentiate. In fact, they are two sides of the same coin. You can't do one without the other.

Differentiation is at the heart of CVU's standards-based learning approach. Teachers use a template to help them plan for differentiation within their units, including:

→ learning target and scale to identify where they are in relationship to the learning target;

→ sorting students into four groups based on formative assessments that indicate where they are on the scale;

→ defining ways they might move each group forward toward the next stage on the scale; and

→ planning for instruction, activities, and outcomes for each group.

CVU also applies differentiated learning to teacher professional learning as well. Teachers are all developing their skills based on their own readiness toward specific targets within a common scale.

As Northern Cass developed their personalized learning approach, they introduced the idea of leveling: a social level (age-based) and a learning level. Once they started thinking about students through this dual lens, they realized that there other ways to organize students than by age. The elementary school has been restructured around multi-age cohorts. Cohorts are either 1-3 or 4-5 each, with a wing of the school that has been redesigned with big, open, flexible spaces.

The co-teaching model enables educators to better reach all of the learners. Through careful analysis of where learners are in their learning, flexible grouping is possible to help learners build the skills they need to continue to progress. If learners are missing skills, educators design ways to "backfill" the gaps. One elementary school educator explained, "Before, I was teaching all second graders the second grade standards. But some kids weren't ready for them. They needed something else before they could reach the standards. Working in a cohort model of grades 1-3 allows us to focus on learners and their learning. The standards, in the form of learning targets and proficiency scales, help us make sure learners are progressing." Northern Cass understands how easily this might slip into a new version of tracking. They use their learning management system to see where learners are, how they are progressing, and which learners aren't progressing as expected.

However, schools will need to provide additional instruction and support beyond what a teacher can do in a classroom. They have to be prepared to respond when students' readiness level is significantly below the learning target or if there are gaps. They have to be prepared to provide supports to help students strengthen their capacity for self-regulation, metacognition, or habits of work. They also need to be ready to respond to help students navigate and self-advocate personal issues that are impacting their learning.

Northern Cass has modified summer school so that learners are able to "backfill standards" by focusing on the standards they need help with rather than take the whole course again. They have also organized a day once a month where students can get extra help and participate in enrichment activities.

At Pathways, they've built additional support into the core schedule with the 'Cohort' classes to help create a strong community of learners, coach students in advocating for themselves, and build specific academic skills they will need in seminar. There is extra time each day spent on reading and math as well.

Communicating Learning and Progress

In traditional high schools, grades give feedback, albeit often misleading, to students on how well they are doing and then are used to rank them. Although motivating for some high-achieving students, grades and ranking have the opposite effect for most others. In mastery-based schools, grades are designed to communicate progress and learning. The goal is for every student to reach the graduation expectations. Students will hopefully excel beyond graduation levels in some domains and/or develop more personalized areas of achievement based on their own interests.

Habits of Work and Learning

Most schools separate academic achievement and habits of mind (also called habits of work or learning or some other variation) so that the "grades" clearly tell how students are doing in progressing toward specific learning targets. Some schools provide direct feedback on the habits or use them in reflection with students to explore the relationship of the habits with academic success.

For example, at Tilton School ,the academic achievement grades reflect what students know and can do: *Content Knowledge, Unit-Driven Understanding, Oral and Written Communication Skills, Critical Thinking and Flexibility, and Creative Engagement*, and *Problem Solving*. Habits of Mind grades are traits that contribute to success in the classroom: *Intellectual Curiosity, Openness and Engagement, Time and Resource Management, Persistence, Resilience and Patience, Risk-Taking and Self-Advocacy, and Dependability and Punctuality.*

Northern Cass wanted a personalized learning system that would work for every learner. There was concern about how students without the maturity or skills for independent learning would fare in a personalized system. At first they focused on pace, but then they realized that what they really needed to do was help learners build the skills to be independent and self-directed. They introduced Habits of Work (engagement, preparedness, and respect) and gave learners daily and weekly feedback. One educator explained, "I saw a big change in my kids last year when we took the Habits seriously. Their ability to advocate for themselves, their ownership over their learning because they were making decisions, and their sense of responsibility all notched up."

Focus on Learning

All of the schools want to keep the focus on learning, not grades. At the high school level, this becomes particularly difficult due to the use of the Grade Point Average (GPA) in NCAA's athletic eligibility, college admissions, and merit scholarships. As needed, schools convert standards-based scoring into grades and then into the GPA. However, they try to downplay it. CVU only shows students their traditional grades three times per year. Tilton School doesn't turn standards-based progress into a GPA. They'll create an approximation for college applications but they don't aggregate the data.

At SAS, elementary and middle schools did away with grades altogether, using only meeting expectations and near expectations. At the high school, department heads held a study group reading of *Repair Kit for Grading: 15 Fixes for Broken Grades* by Kevin O'Connor. Taking two to three fixes at a time, they slowly constructed a schoolwide grading policy linked to standards. Behavior grades are separated from academics. Formative assessments can't be more than 15 percent of the grade. They took away minuses—you either hit the standard or you don't. They kept letter grades so the options are A+, A, B+, B, C+, and insufficient. The challenge, of course, is helping parents learn how to use and feel comfortable with standards-based report cards so that one day they'll know exactly what to ask and how to respond.

> All of the schools understand that the way progress is communicated (i.e., grading) is one mechanism within an integrated system. "You can't separate the grading policy from the overall structure," noted Angelique Byrne, Pathways High's curriculum director. "If you are going to move toward standards-based learning and create living and breathing grades that change as students learn, then you are going to need structures that are going to live and breathe as well. You'll need flexible structures that move forward and slow down as the student moves."

Mastery Credit

As members of the Mastery Transcript Consortium, the schools were looking forward to the day that their students would have the option to use a Mastery Transcript to showcase their achievement. The Mastery Transcript is designed to provide college admissions (or employers) with a snapshot of student achievement in core academics and skills they developed, while also enabling students to tell their own story about their interests and where they excelled. Thus, each of the schools was thinking through what it meant to have two levels of mastery credits—foundation and advanced. The foundational level is usually set at a level for graduation. The tricky part is how to create a set of advanced courses that will encourage every student to excel in some way while still meeting the needs of students who want to show excellence in every domain as they compete for admission to the most selective colleges.

Worried about how many Advanced Placement (AP) courses students were taking, Singapore American Schools introduced Advanced Topics (AT) into their curriculum. AP has been increasingly problematic for high schools, as it reinforces the traditional education model with one curriculum delivered to all students with a summative examination at the end. No deeper learning. No application. No ownership of the learning. With a mission to develop exceptional thinkers, SAS wanted options for advanced courses that would provide students with the opportunity to dive deep and engage in complex problems.

They capped the number of AP courses students can take at seven. AP teachers developed equivalent courses aligned with the seven desired student learning objectives. Instead of an exam, students demonstrate their learning. For example, an Advanced Topic writing workshop produces a book at the end of the semester made up of the short stories written by students rather than taking an exam on American literature. SAS is monitoring students

who take Advanced Topics courses and then choose to take the AP exam. To date, there has been no statistical difference in their scores.

In Pathways High's seminars, students know exactly which standards they are working toward and how they relate to earning foundational mastery credits. The standard may be a step in the progression or set as the performance level of proficiency. The graduation requirement is to achieve twenty-six foundation level mastery credits in six domains. They can also pursue advanced credits through a portfolio of work or by tackling challenging topics through in-depth projects that are personalized within areas of special interest.

In Tilton's model, the mastery approach is organized around helping students develop five essential skills (communication, critical thinking and decision making, creative engagement, innovation and design thinking, and mindfulness) across six areas of self-discovery (academics, community, exploration, intensives, partnerships, and wellness). Students develop artifacts and make a pitch to a committee that demonstrates and describes their learning for each of the skills in each of the domains. That's thirty artifacts to earn their foundational mastery credits and even more if they want to earn advanced credits. It's expected that they will earn all the foundation credits by the end of the junior year and then be able to dive deeper and go further to earn advanced credits in their senior year.

In this model, the same activity or learning experience can mean different things for different students. For example, two students may join the lacrosse team. One student who has never played lacrosse before will consider it as an exploratory experience, whereas another student who wants to play lacrosse in college may set goals that make it an intensive.

Tilton sees the Mastery Transcript as a critical tool for their Mastery Approach. They are determined not to let the Mastery Transcript slip into the transactional nature of traditional education, with students submitting assignments or taking tests in return for a grade. Shannon Parker, director of innovation and teaching, explained, "We want our students to be able to narrate their apex toward their potential. Mastery is about their understanding of themselves, what they can do, and what they are learning. It is being able to tell their story about how they are building the skills they are going to need in the adult world. The driving force of the economy is self-employment, entrepreneurship, and being able to catalyze opportunity. We want our students to be able to see and develop opportunity. We want them to be prepared to take charge of their lives."

Tilton School and Pathways High share an interest in students experiencing the "rigor of the real world." Supporting these endeavors requires an operational mindset shift in schools. Staff and teachers need to tap into their networks to find real-world opportunities for students. Time and resources are directed toward getting students out of school and bringing people from the community in.

Driving Toward Equity

If mastery learning is going to fulfill its promise, districts and schools need to be very intentional about design and implementation so that students who have been historically underserved finally receive the education that responds to their unique challenges.[4] For example, CVU developed guidance on how to use the Know-Understand-Do framework and scales for making appropriate adjustments for students with special needs. Teachers understand when accommodations are needed and when a modification of the scale is called for and how it might be adapted to meet the needs of specific students.

Pathways High's intentional "diverse by design" strategy has enabled them to be laser-focused on equity. Enrolled students come from suburban schools, private Waldorf, and Montessori schools as well as lower-income communities in Milwaukee. Many of these students are struggling with the impact of poverty on their lives. However, being diverse by design isn't achieved solely by the mix of feeder schools and resulting racial and economic mix of the student body. Diverse by design is the culture; the instructional strategy; and a set of supportive, intentional structures that help every student succeed.

Pathways High believes that all students deserve a high quality education. That starts with developing a strong culture of respectful relationships and trust across all learners, students and faculty alike. Students are coached in learning how to use their voice to self-advocate so that they become independent learners and problem-solvers. The learning model is designed around critical thinking with multiple opportunities for students to make connections with the broader world around them.

When a school is diverse by design, it needs to be prepared to support the most underserved and the most privileged. Both groups of students are vulnerable and both may have been traumatized in their lives, although the intensity and frequency of traumatic events may have implications for learning. Pathways High doesn't think about "fixing" students. Kim Taylor, director, explained, "At Pathways, we walk along next to students. We get to know them and find out what is important to them. It can be a mindshift for adults. We often bring assumptions about how the world should be and how students should act. But when we judge before understanding, we break trust. And if students don't trust us, then we aren't going to be able to teach them." When issues in their personal lives overwhelm students, staff are there to coach them in analyzing the problem, thinking about solutions, and developing their voice to engage others in helping them resolve issues as they develop.

Pathways consistently uses interests, options, and choice to engage and motivate students. It's a critical strategy to respond to the diversity of their student population. There isn't going to be one curriculum, topic, or book that is going to engage everyone. Choice among high interest experiences also helps to develop intrinsic motivation, a critical aspect of the Pathways learning model.

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4   If you are interested in the topic of equity in mastery-based schools see *Designing for Equity: Leveraging Competency-Based Education to Ensure All Students Succeed* by Sturgis and Casey at CompetencyWorks.org.

Sustainability: Building Capacity to Sustain Change Over Time

Northern Cass School District is moving quickly toward implementing a comprehensive approach to personalized learning. They are thinking about sustainability even while they are aligning the new system. Personalized learning is a standard item on the school board agenda. The board scheduled a retreat to focus solely on personalized learning and has committed to a goal of spending a half day per year observing classrooms. Resources have been re-allocated to create a director of personalized learning position.

One of the most powerful strategies is keeping the *Why* alive. Superintendent Cory Steiner explained that they are intentional about keeping a sense of common purpose. "There isn't a meeting where we don't go through the *Why* and collective commitments," he said. "We ask ourselves, 'How are we going to live it in the next month?' We ask ourselves, 'What word would we want kids to use when they describe their school?' We are purposeful in developing a shared understanding of a bigger and higher purpose to everything we are doing."

Everyone is expected to have a personal Why that motivates them. Outside each classroom is posted the teacher's *My Why* such as:

→ I want to support each learner in recognizing their capabilities, talents, and passions to help them excel in all they do at Northern Cass and beyond.
→ To define my significance in the world through the impact I leave on its people.

Each of the *My Why* statements ends with the question… *What is yours*?, thereby encouraging learners to think about their own purpose and intentionality.

Northern Cass is also keeping parents and community members engaged. New families move into town. New questions emerge about changes in the school. To ensure that parents and community members can learn about personalized learning and have their questions answered, Northern Cass invites them for tours twice a year. Jaguar Ambassadors, learners from a mix of grades, guide the tours and answer all questions about personalized learning.

Personalized Professional Learning

Schools all spoke about the importance of supporting teachers by personalizing professional learning as a way to both build and sustain the effort. It's important to walk the talk; therefore professional development should be personalized and mastery-based. Teachers should be supported in developing specific skills and then expected to demonstrate them. Jessica Stoen, a personalized learning coach at Northern Cass explained, "We started with the same practices we had always used with timelines and deadlines. Then we came to the realization that we needed to let the research on learning guide our professional development as well. It's okay if they don't meet a deadline as long as they are making progress. Educators need to be working on developing new practices or new skills, but they don't have to be the same one."

Every school talked about the importance of the teacher mindset. Teachers who have developed their own growth mindset and are willing to get out of their comfort zone will thrive in a personalized, mastery-based environment. Those who retain a mental model that intelligence is fixed, about themselves and about their students, remain highly resistant to change. Over time and by seeing their peers introduce new practices, they may take baby steps forward. However, the cost is high and slows the pace of implementation.

Thus, considering a person's mindset during hiring is essential. "Mindsets drive action," Taylor explained. "The mindset of our teachers makes all the difference in the daily experience of our students. Teachers have to be vulnerable enough to question their own assumptions. They have to be vulnerable enough to really listen to students." Taylor says she hires like a startup. "We look for teachers with the right mindsets. We look for that startup mentality. We look for people who embrace change. We look for teachers with a lot of interests. Our world keeps changing. Our kids keep changing. That means the way we do things at Pathways High will keep changing."

Continuous Improvement

Few schools that I've visited over the past decade have developed a robust system of continuous improvement. There are many reasons to explain this situation. Districts and schools are still driven by the top-down bureaucratic nature of how data is used in the public education system. Districts and schools have not traditionally needed a robust analytical capacity; they don't have people on staff with those skills. Information management systems that are focused on student learning are just reaching the point of fully supporting personalized, mastery-based school design. This doesn't mean that schools aren't trying to improve, refine their design, and become more responsive to

students. It's just that they do it with clumps of data, surveys, and on-going qualitative feedback rather than a systematic approach that can drive toward maximizing learning, high quality instruction and assessment, and equity.

Rinkema and Williams pointed out that well-designed summative assessments can create the data needed for continuous improvement. Understanding where students are in achieving the learning targets at given points in time can be used to help answer a number of different questions. How are low-income students doing compared to middle/upper income students? How are students of color progressing compared to their white peers? Are some teachers better able to help students achieve some learning targets? Do students in some teachers' classes take longer or achieve at lower levels as compared to other teachers? What specific strategies may help students accelerate progress toward learning outcomes? Assessment for learning is invaluable to the learning process. So are summative assessments when used by districts and schools to hold themselves accountable and continually improve.

In Conclusion...

No one says redesigning schools is easy. However, everyone who sees their students' minds come alive and fly high will all say it is very much worth it. No one considers stopping. No one wants to turn back to the traditional model.

Some schools have moved rapidly toward mastery learning. Some at a steady pace. Some let implementation gently unfold. Some develop detailed implementation plans. Some schools work with outside providers. Some invest in intensive study and exploration. Others develop their own learning model by drawing on previous experiences, research, and their own creativity.

Each school has taken a very different path on their journey toward mastery learning. None have gone through the five stages—purpose and vision, graduate profile, learning model, alignment, and sustainability—in a linear fashion. However, all are intentionally driving toward a system designed around their vision using research on learning and their deep commitment to better learning outcomes for students to guide them.

For all their differences, the five schools highlighted in this paper share much, much more. They all share a common commitment to providing a rigorous, high quality education to students. They all share a belief that adults can and will need to learn in order to create sustainable mastery-based models. They all share a vision for a world where all students succeed.