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CEO MESSAGE

Defining Learner-Centric

Mark A. Elgart, Ed.D., President and CEO, AdvancED®

More and more educators are embracing the concept of learner-centric, but do we really know what it means? Do we have a common definition that can guide our work and ensure that genuine implementation of learner-centric educational environments is understood and shared by all?

I would suggest that we are still defining "learner-centric," both by our words and our deeds. Efforts to allow students more input into what they learn and how they learn have been documented and shared. However, a true learner-centric environment is one in which learning is no longer based on time but rather on the learner. When time becomes a variable and learning is the constant; when we move from standardization to customization, our educational system will be learner-centric.

In the future, students and institutions should have the opportunity to construct their curriculum so that all students enjoy a customized and personalized educational experience that ensures readiness and preparedness for their futures. Schools and school systems will broaden how student success is measured and how learners demonstrate success will differ from student to student.

This *AdvancED Source* issue on ***Creating Learner-Centric Environments*** begins with Barbara Bray, Creative Learning Officer/Co-Founder of Personalize Learning, LLC, and Kathleen McClaskey, CEO/Co-Founder of Personalize Learning, LLC, who explore the stages of implementing a flexible learning environment. They share how personalized learning subsequently changes the role of both the teacher and the student in *Building Personalized Learning Environments*. In *Creating Learning Environments that Work for Kids*, Hillary Dack, doctoral student in Curriculum, Teaching, and Learning at the Curry School of Education, University of Virginia; and Dr. Carol Ann Tomlinson, Professor and Chair of Educational Leadership, Foundations, and Policy at the Curry School of Education, University of Virginia, describe a truly flexible classroom in which students are at the center.

AdvancED's senior researcher Dr. Matt Dawson shares the results of the classroom observation tool used in over 26,000 classrooms to assess effective learning environments in his article, *Analyzing Results from AdvancED's Classroom Observation Tool*. Educational veteran Arnold Langberg shares his experiences with and the critical components for creating and sustaining learner centric schools in *The Creation of One Learner Centric Learning Environment*. Our next author, Dr. Debra Howe, Superintendent of Tri-Creek School Corporation, in *Engaged…Equipped…Empowered*, explains how project-based learning is at the heart of engagement and builds not only students' knowledge, but their skills for success, too.

In *SE2R Can Revolutionize How We Assess Learning*, author and consultant Mark Barnes describes and demonstrates a system of evaluation and reporting that engages students and creates mastery learning. Father and son team Terry Doyle, Professor of Reading at Ferris State University, and Brendon Doyle, research assistant at Ferris State University, outline the five areas that can improve learning readiness in *A New Paradigm for Student Learners* — a good read for teachers, parents and students. Dr. Tim Hudson, in *Student-centered Learning Powered by Technology*, describes how technology can support both student independence and teacher decision-making.

The broad perspectives of our authors reinforce that we may not yet have a shared definition of learner-centric, but they all offer great examples of how we can begin to put into action important elements of such a system. We appreciate them expanding our view of the opportunities presented when we are ***Creating Learner-Centric Environments***. ✱

In This Issue

STAGES OF CHANGE

Building Personalized Learning Environments

By Barbara Bray and Kathleen McClaskey

The idea of creating environments that are learner-centered sounds attractive. However, developing a culture around learners and building systems to support learner-centered environments takes time and a process. Most teachers join the teaching profession to make a difference in children's lives. Then reality sets in with their daily practices when they realize that most educational systems block the process. To initiate and move the process, key stakeholders need to start with a shared meaning of what learner-centered is all about. We call it "Personalized Learning."

The Buzz

Recently, educational companies have described "Personalized Learning" by framing their products to be all that schools need to personalize learning. When you look closer at their messaging, it is more about the technology personalizing the learning instead of the learner taking responsibility for their learning. Personalizing learning is not something that someone does TO a learner. It is about learners owning their learning and teachers guiding the process. When this happens teacher and learner roles change and that impacts the school culture.

The Confusion

The confusion around personalized learning exploded in 2010 with the release of the National Education Technology Plan that defined the terms: Individualization, Differentiation and Personalization. All three terms were identified in the plan as "instruction." Each term meant what teachers were to do to the learning needs of learners.

- *Individualization* refers to instruction paced to learning needs of different learners.
- *Differentiation* refers to instruction tailored to learning preferences of different learners.
- *Personalization* refers to instruction paced to learning needs, tailored to learning preferences and tailored to the specific interests of different learners.

This was also the year that we, Barbara and Kathleen, were introduced to each other by a mutual friend who encouraged us to bring our individual practices of personalized learning together. We realized that we first had to do something about defining the terms. We both believed that personalized learning is about the learner and about the learner driving their learning, NOT focusing on instruction.

Personalization vs Differentiation vs Individualization (PDI) Chart

We decided to compare the three terms above in a Personalization vs Differentiation vs Individualization (PDI) chart. Differentiation and Individualization are teacher-centered. Personalization is learner-centered. In teacher-centered environments, the teacher tends to be the hardest working person in the classroom. Under learner-centered environments, learners take control of their learning and are challenged to work harder than their teacher.

Table 1: Personalization vs. Differentiation vs. Individualization Chart

Personalization The Learner...	Differentiation The Teacher...	Individualization The Teacher...
drives their learning.	provides instruction to groups of learners.	provides instruction to an individual learner.
connects learning with interests, talents, passions and aspirations.	adjusts learning needs for groups of learners.	accommodates learning needs for the individual learner.
actively participates in the design of their learning.	designs instruction based on the learning needs of different groups of learners.	customizes instruction based on the learning needs of the individual learner.
owns and is responsible for their learning that includes their voice and choice on how and what they learn.	is responsible for a variety of instruction for different groups of learners.	is responsible for modifying instruction based on the needs of the individual learner.
identifies goals for their learning plan and benchmarks as they progess along their learning path with guidance from teacher.	indentifies the same objectives for different groups of learners as they do for the whole class.	identifies the same objectives for all learners with specific objectives for individuals who receive one-on-one support.
acquires the skills to select and use the appropriate technology and resources to support and enhance their learning.	selects technology and resources to support the learning needs of different groups of learners.	selects technology and resources to support the learning needs of the individual learner.
builds a network of peers, experts and teachers to guide and support their learning.	supports groups of learners who are reliant on them for their learning.	understands the individual learner is dependent on them to support their learning.
demonstrates mastery of content in a competency-based system.	monitors learning based on Carnegie unit (seat time) and grade level.	monitors learning based on Carnegie unit (seat time) and grade level.
becomes a self-directed, expert learner who monitors progress and reflects on learning based on mastery of content and skills.	uses data and assessments to modify instruction for groups of learners and provides feedback to individual learners to advance learning.	uses data and assessments to measure progress of what the individual learner learned and did not learn to decide next steps in ther learning.
Assessment AS and FOR Learning with minimal OF Learning	Assessment OF and FOR Learning	Assessment OF Learning

Individualization is usually where the teacher accommodates learning needs for each learner. Differentiation means the teacher adjusts learning needs for groups of learners. Personalization means each learner connects learning with their interests, talents, passions and aspirations.

The PDI chart is used as a guide, with prompts as conversation starters, especially for schools that want to build a common language around the term "Personalized Learning."

Learners NOT Students

You will notice that we do not use the word "student" when talking about learners. All of us were born curious and open to learning or we wouldn't walk or talk. We were not born students — we were born learners. Our first experiences of learning were through play and discovery.

If you consider anyone who is learning at any age and anywhere a "learner," then you give the responsibility for the learning to the learner. When the institution or anyone who is teaching students are accountable for the learning — not the learners — the

responsibility falls on the teachers for what "students" learn. Doesn't this seem backwards? Where is the incentive and motivation to learn if all the responsibility is on the teacher? If you change the thinking behind the terms, then using the term "learners" makes more sense. (Read more at: http://www.personalizelearning.com/2013/04/learners-not-students.html.)

Universal Design for Learning for All Learners

We believe Universal Design for Learning (UDL) is the foundation of personalized learning. The Center for Applied Special Technology (CAST) developed UDL which was about reducing or eliminating the barriers in the curriculum that keep learners from learning; it was not about learners overcoming their barriers. [www.cast.org]

UDL is based on decades of brain research and neuroscience of individual differences, human variability and how we learn. UDL can assist teachers in planning universally-designed lessons that reduce barriers to learning as well as optimizing levels of challenge and support to meet the needs of all learners from the start. UDL informs the design of the environment so that it is flexible enough to address the variability of all learners. It is time to rethink how we design learning environments that support the full range of learners in our classrooms.

The Process

When learners have a voice and choice in their learning, teachers change the way they teach. When we first introduced this to teachers, they scratched their heads and wondered how they would make this change. We came up with a process that helps teachers dip their toes into personalized learning by reducing some of the barriers that keep learners from learning.

- **Traditional: Teacher-Centered with Direct Instruction.** This is where teachers review existing lessons that are teacher-centered in a traditional environment to determine where there is need for learners to have a voice and choice in their learning.
- **Stage One: Teacher-Centered with Learner Voice and Choice.** This is where teachers design activities that engage the learners and redesign the curriculum and the environment so they are more flexible to address the variability of the learners in their classroom.
- **Stage Two: Learner-Centered with Teacher and Learner as Co-Designers.** This is where learners have the skills and knowledge to choose and use the most appropriate tools and strategies to co-design the curriculum and environment with the teacher.
- **Stage Three: Learner-Driven with Teacher and Learner as Partners in Learning.** This is where learners have the skills and knowledge to choose and use the most appropriate tools and strategies to drive their learning based on their learning goals, plan and pathway with support from their teacher, peers and community.

After we shared this process with some of the teachers we worked with, we heard a big sigh of relief. Most of the comments were that they didn't have to do everything all at once and if some lessons are Stage One then others might be Stage Three. The conversations were exciting for us because their concerns were valid. Teachers only know what they were taught as students or as teachers. This is all new for them and for most learners. When this same process was shared with learners, they had concerns about their grades and how they would know what to do if the teachers expected them to design their goals.

Flexible Learning Environment Starts in Stage One

Instead of designing for the average learner in a "one size fits all" environment, we ask teachers to look at four diverse learners and design for the extremes in their classroom. From what we learned from UDL and brain research, teachers need to know who their learners are first. This is what we call a "Class Learning Snapshot™." This snapshot is about diverse learners' strengths, challenges and interests. We use the UDL principles to guide how learners prefer and need to learn and then develop instructional and learning strategies that reduce barriers and optimize challenges for the learners. When you design for four diverse learners who are at the extremes in your classroom, you meet the needs of most of your learners instead of designing for what you believe is the "average" learner.

THERE IS NO AVERAGE LEARNER.

How Roles Change for both Teacher and Learner in a Stage One Personal Learning Environment

The Teacher…

- makes instructional decisions based on four diverse learners.
- redesigns the learning environment for individual and group projects based on how learners learn best.
- revises existing lessons or projects to include voice and choice to engage learners so they are motivated to learn.
- universally-designs instruction so materials are more accessible for all learners.

The Learner…

- works with teacher to establish learning goals and personal learning plans.
- chooses the best learning environment for individual or group work for given activity.
- has more opportunities to have a voice and choice in how and what they learn.
- has more options to choose tools and strategies that are more appropriate to support their learning and express what they know.

The process works if teachers have the time and a flexible schedule to revise lessons. Teachers need a supportive environment where taking risks and failing is okay. This article only touches on a few of the ideas that will be coming out in our soon-to-be published book on personalized learning by Corwin Press in Fall 2014.

To download the chart and stages go to: http://www.personalizelearning.com/p/toolkit.html. For more information about Personalize Learning, go to www.personalizelearning.com or contact us at personalizelearn@gmail.com. ✱

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SUBMIT YOUR STORIES

Today's Learning Paradigm

How has today's digital age student changed the learning environment? Teachers and administrators around the world are adapting to changing educational cultures, embrace social media, and apply technology and new instructional techniques.

In the new learning paradigm, students are often their own teachers, accessing media for content and knowledge beyond the classroom. The fall 2014 issue of *AdvancED Source* will explore how classrooms and other platforms of learning are teaching 21st century skills, preparing students for the global economy and applying new programs such as STEM. *AdvancED Source* is seeking submissions from educational leaders, practitioners and authors that highlight how educational institutions of all types are embracing ***Today's Learning Paradigm***.

AdvancED Source publishes articles on educational strategies and practices supporting educational quality. Articles should contain useful information and techniques for practitioners serving students Pre-K through grade 12. Articles based on original research also are welcome.

Articles now are being accepted for the fall 2014 issue. Submissions should be between 900-1500 words and submitted electronically in Microsoft Word® to joliver@advanc-ed.org by **September 10, 2014**. View *AdvancED Source* editorial guidelines at http://www.advanc-ed.org/advanced-source. For additional information, please contact Jennifer Oliver at the email above or 888.41ED NOW, ext. 5547. ✱

STUDENT-CENTERED CLASSROOM

Creating Learning Environments that Work for Kids

By Hilary Dack and Carol Ann Tomlinson , Ed.D.

Marie was the kind of pre-service teacher who believed that, in her future classroom, anything would be possible — and who made you believe it, too. We taught Marie in a class on differentiated instruction during her last semester of coursework before she began her teaching career. The following fall, she invited us to spend some time in her school so we could watch her new classroom in action.

What we encountered during our visit was a thoughtfully developed learning environment where kids came first and learning happened through a partnership between student and teacher. At the end of that day, we eagerly asked Marie what she'd done during the first few months of school to develop the climate we'd seen. Marie's answers serve as a guide to all educators who hope to create classrooms and schools where students take ownership of their learning — and like it that way.

What we encountered during our visit was a thoughtfully developed learning environment where kids came first and learning happened through a partnership between student and teacher.

Developing a Growth Mindset

Marie began by telling us a story about her own childhood. Although she was a successful student, her greatest fear was that her teachers and peers would discover she wasn't smart. Marie thought of being smart as something you either were or weren't, and there was nothing you could do about it. When given a choice for an assignment, she always selected the option on which she was most likely to get an A. On the rare occasions she didn't do well on a task, she gave up immediately, blaming the task as badly designed or saying she hadn't really tried.

It wasn't until Marie got to college that she realized researcher Carol Dweck (2006) had given a name to this type of thinking: a "fixed mindset." People with this mindset see intelligence as a static trait that can't be changed, while those with a "growth" mindset see it as a trait that can be developed through learning as a result of effort. While those with fixed mindsets don't believe in the potential for people to grow and therefore see mistakes as failures, those with growth mindsets view their mistakes as opportunities to improve.

As a pre-service teacher, Marie saw a connection between a teacher's mindset and the kind of classroom environment she was likely to create. Through lots of reflection and self-talk, Marie changed her own mindset. She entered the classroom with a strong belief that a student's present lack of particular knowledge and skills isn't tantamount to a limited potential for learning.

At the beginning of the school year, Marie shared her own story with her students and read short selections from Dweck's (2006) book, *Mindset: The new psychology of success,* to the class. She encouraged them to think about which mindset they had and the relationship between their mindsets and their attitudes towards challenges and mistakes. The class decided to outlaw the phrase, "I can't do this," agreeing they'd have to add the word "yet" to the end of that phrase to use it in their room. As the year went on, Marie would give students lots of opportunities to self-assess and reflect on their growth in key skills and understanding. Students recorded these reflections and stored work they felt reflected their most important growth in an Evolution of Thought Portfolio. When we visited Marie's classroom, we heard one boy whisper to a frustrated friend working on a project, "It sounds like you're in the grips of a fixed mindset, but you can do this."

Marie also recognized that each of her students would enter a given lesson at many different starting points with respect to her objectives. She had equally high expectations for the growth of every student but knew her students needed different kinds of challenges and supports to grow beyond where they began. Marie used differentiated instruction (Tomlinson, 2001) to maximize the capacity of each learner.

Inviting Students into a Vision

Because her class included students with varied interests, needs and ways they liked to learn, Marie's instruction was responsive to those differences. This meant that, while virtually all students worked to meet the same learning objectives or move beyond them, they might do so through different but equally challenging versions of a task, at different paces or through different modes of expression. Since Marie knew a differentiated classroom would be new to many of her students, she introduced the idea to the class directly a few weeks into the school year, after their mindset discussion.

While there are many ways she could have done this, Marie decided to use an activity called "Graphing Me" (Tomlinson & Imbeau, 2010). She chose a number of skills, both academic and non-academic, and wrote them on one axis of a simple bar graph she'd drawn on the board. On the other axis, she wrote descriptors like "outstanding," "on my way there," and "still needs some work." She then completed her graph for the class, explaining that while she was a fairly good cook and a great writer, she still struggled with spelling sometimes and was not a strong swimmer. Her students graphed their own skills in a similar way and then hung their graphs around the room. Everyone walked around to see what their peers had drawn.

This activity allowed students to see their peers more clearly. Students whom the class viewed as the ones who never struggled had areas in which they needed to grow just like everyone else. Students whom their peers saw as frequently struggling had plenty of skills that were already strong. As the students discussed what they had learned about their peers through the activity, they began encouraging each other to work on improving what they decided to call their "growth areas," offering to provide help in their own areas of strength when the need arose during the year. Marie said this was the day her class became a community.

This activity also caused students to notice that no one had exactly the same strengths and growth areas. When Marie asked the class how she should teach them since this was the case, a student called out, "Maybe this means you can't always teach us all the same way. If you did, how would we each grow where we needed to?" Another said, "I think we should tell you more about our other growth areas so you know how to teach us better." As students gained experience working on tasks in ways that were different from their peers, they came to understand that fairness meant everyone getting what they needed to grow, rather than everyone getting the same thing at the same time.

Managing a Flexible Classroom

Marie's classroom was structured enough to run smoothly but was flexible enough to make room for instruction tailored to varied student needs. This kind of flexible-structured learning environment was necessary for instruction that emphasized students making meaning of content and solving problems, rather than rote learning. Marie also saw it as an essential part of a differentiated classroom, where students are active participants in work that is inquiry-based, done independently or in small groups, or accomplished at varied paces. Although some teachers think students will only behave appropriately in highly structured settings, Marie knew behavior issues would be significantly reduced in a setting where students were not asked to do work that was consistently too hard or too easy for them and where they felt like partners in making the classroom work.

At the beginning of the year, Marie spent lots of time teaching and practicing classroom routines, including how to access materials independently. She enlisted the help of her students to be full participants in the running of the classroom, and as a result, her students saw the classroom as theirs. Every aspect of its physical set-up was designed to support learning. One corner with five desks was an independent study area for individual work, while another had several armchairs where students could spread out. Marie taught the class three different desk arrangements which supported whole-class, small group, or individual work, and the students were responsible for rearranging desks quietly and efficiently as they transitioned between tasks. "Hint cards" with reminders of how to complete tasks or processes students may have forgotten covered a bulletin board. Rather than asking Marie for help, students referenced these cards independently during individual and small group work.

As she designed learning activities, Marie proactively planned for the management challenges that might come with them. For example, when an activity called for small group work, Marie assigned students the role of noise monitor. She also gave each group a set of green, yellow and red plastic cups, asking them to display one cup as their group worked to represent working successfully, having a question but still working, or being completely stuck. This allowed Marie to monitor group progress and prioritize giving support.

The classroom we've described here might have been full of high school seniors, but it wasn't. Marie taught third grade. Her student-centered classroom demonstrates the kind of environment in which students see themselves as active learners responsible for their own growth. ✱

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Analyzing Results from AdvancED's Classroom Observation Tool

By Matt Dawson, Ph.D.

Beginning in the 2012-13 school year, the use of the Effective Learning Environments Observation Tool™ (ELEOT™) became an integral part of both AdvancED® accreditation and diagnostic reviews. AdvancED has since collected data from over 26,000 direct classroom observations. Given the widespread use of ELEOT, the AdvancED Research Team has conducted extensive analysis of the data, the results of which are summarized below. The analysis described constitutes only a small number of potential analyses that could and have been done with the current ELEOT data. In addition to the knowledge gained from the data, AdvancED conducts regular analyses to ensure that all of the measures are performing as designed and to guide recommendations for future updates of the measures.

Description of the ELEOT

The ELEOT is comprised of 30 items organized in seven learning environments based on a review of widely used observation instruments like the Classroom Assessment Scoring System (CLASS) and those developed by Marzano and Danielson. A literature review also was conducted on learner-centric tasks, attitudes and dispositions that were conducive to optimal learning including digital learning as set forth by the ISTE Standards. In essence, ELEOT measures the extent to which there is observable evidence (or no evidence) that students are engaged in certain activities or demonstrate certain knowledge, attitudes and/or dispositions in a classroom during a defined period of time as measured on a four point scale (1 being "not observed;" 4 being "very evident").

The environments examined are:

- Equitable Learning
- High Expectations
- Supportive Learning
- Active Learning
- Progress Monitoring and Feedback
- Well-Managed Learning
- Digital Learning

Trained observers spend at least 20 minutes in all or nearly every classroom in the school and record their observations on a standardized reporting template. Data are then uploaded and stored by AdvancED.

The ELEOT is used to provide structured and quantifiable data on the extent to which learners are engaged in activities and/or demonstrate knowledge, attitudes and/or dispositions that are conducive to effective learning. The tool is meant to provide an aggregate picture for an entire school, but could potentially be used by grade level and/or in content specific ways (e.g., to examine the overall performance of sixth grade math teachers) as opposed to providing ratings of individual teachers. This aspect of ELEOT, as well as its attention on students' experiences by focusing on what kids are doing, not what teachers are doing, differentiates it from other widely used measures of classroom practice.

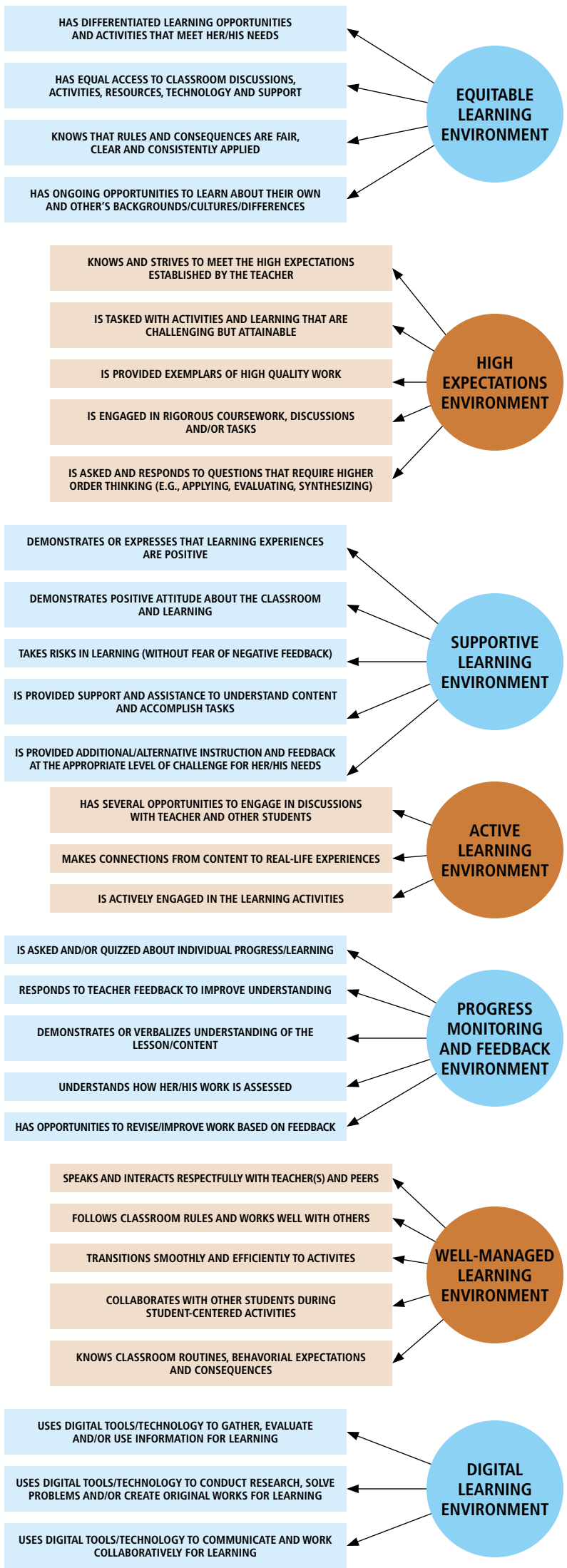
The ELEOT has demonstrated strong psychometric qualities. The overall reliability of the measure is .94 using Cronbach's Alpha, which is considered a very strong level of reliability. In addition, confirmatory factor analysis of the measure revealed the root mean square error of approximation (RMSEA) as .066, which also is very good in social science research. The RMSEA is a measure of how well the theoretical model structure (i.e. the figure at right that shows how the individual items are related to the overall concepts such as "Equitable Learning Environment, High Expectation Environment," etc.) matches the actual structure from the data.

Summary Results

Across 26,347 classrooms observed, the average overall ELEOT score was 2.77, meaning that, on average, observers saw some evidence of each of the environments measured. Looking individually at each of the seven environments, a Well-Managed Learning Environment was observed most of the time (average of 3.09), followed by a Supportive Learning Environment (3.03), an Active Learning Environment (2.94), High Expectations Environment (2.78) and a Progress Monitoring and Feedback Environment (2.73). The two lowest rated environments were the Equitable Learning Environment (2.66) and the Digital Learning Environment (1.88).

The ELEOT is used to provide structured and quantifiable data on the extent to which learners are engaged in activities and/or demonstrate knowledge, attitudes and/or dispositions that are conducive to effective learning.

Figure 1: Items Measured in Learning Environments



Digging deeper into the data, we examined whether there were differences based on the subject being taught. The table below shows the results from that analysis. Examination of the table shows a fair level of consistency across subject areas. In all subject areas, the consistently lowest rated environment was the Digital Learning Environment, which indicates that technology integration remains low in a large number of classrooms. At the same time, teachers seem to be fairly consistent in their use of effective strategies across all environments outside of the Digital Learning Environment, with aspects of the Well-Managed Learning Environment being the most observed across all subjects except for Special Education.

If we look at scores across the environments based on grade level, we see a similar pattern, whereby the Well-Managed Learning Environment is consistently the most observed environment. Interestingly, scores across all environments are highest for Grades K-5, while lowest for Grades 9-12 across all environments except for the Digital Learning Environment, where Grades 9-12 have the highest average scores while grades K-5 have the lowest. The differences across all environments between Grades K-5 and Grades 9-12 are statistically significant.

Table 1: Average ELEOT Scores by Subject

Environments	ELA	Math	Science	Social Studies	Foreign Language	Special Education	Elective
Equitable Learning	2.67	2.54	2.58	2.67	2.76	2.89	2.73
High Expectations	2.77	2.85	2.78	2.64	2.81	2.74	2.73
Supportive Learning	3.03	3.04	2.97	2.87	3.05	3.28	3.03
Active Learning	2.93	2.76	2.98	2.92	2.97	2.96	3.08
Progress Monitoring & Feedback	2.71	2.84	2.68	2.55	2.79	2.84	2.66
Well-Managed Learning	3.10	3.07	3.09	3.00	3.09	2.96	3.11
Digital Learning	1.75	1.94	1.89	1.90	1.77	1.93	2.06
Overall ELEOT	2.76	2.77	2.75	2.68	2.80	2.85	2.80

Table 2: Average ELEOT Scores by Grade Level

ENVIRONMENTS	K-5	6-8	9-12
Equitable Learning	2.72	2.66	2.63
High Expectations	2.81	2.78	2.77
Supportive Learning	3.12	3.03	2.96
Active Learning	2.97	2.94	2.92
Progress Monitoring & Feedback	2.79	2.70	2.68
Well-Managed Learning	3.17	3.09	3.04
Digital Learning	1.76	1.86	1.95
Overall ELEOT	2.82	2.78	2.75

When looking at individual items, the top three rated items, all of which are part of the Well-Managed Learning Environment, are as follows:

- Speaks and interacts respectfully with teacher(s) and peers 3.40
- Follows classroom rules and works well with others 3.30
- Knows classroom routines, behavioral expectations and consequences. 3.23

The three lowest rated items were as follows:

- Uses digital tools/technology to conduct research, solve problems and/or create original works for learning 1.80
- Uses digital tools/technology to communicate and work collaboratively for learning. 1.80
- Has ongoing opportunities to learn about their own and others' backgrounds/cultures/differences 1.97

Additional examination of the items shows that one item in particular, "Has ongoing opportunities to learn about their own and others' backgrounds/cultures/differences" tends to be confusing for respondents. ELEOT trainers report that they have updated the training modules to highlight this item to address confusion about the item. We will revisit this issue in future data analyses to see if additional training has improved the performance of this item (as well as all of the other ELEOT items) or whether it will need to be re-written in future iterations of the ELEOT.

In summary, analyses of the ELEOT confirm the reliability and validity of the measure's ability to accurately reflect classroom practices across a school on a given day. The result of extended psychometric review reveals that the performance of ELEOT is robust across multiple subjects and grades, as well as extremely stable across multiple environments. In the future, the AdvancED Research Team will examine the relationship of ELEOT scores to other outcomes of interest including student academic, social/emotional and behavior outcomes as well as teacher professional development outcomes. *

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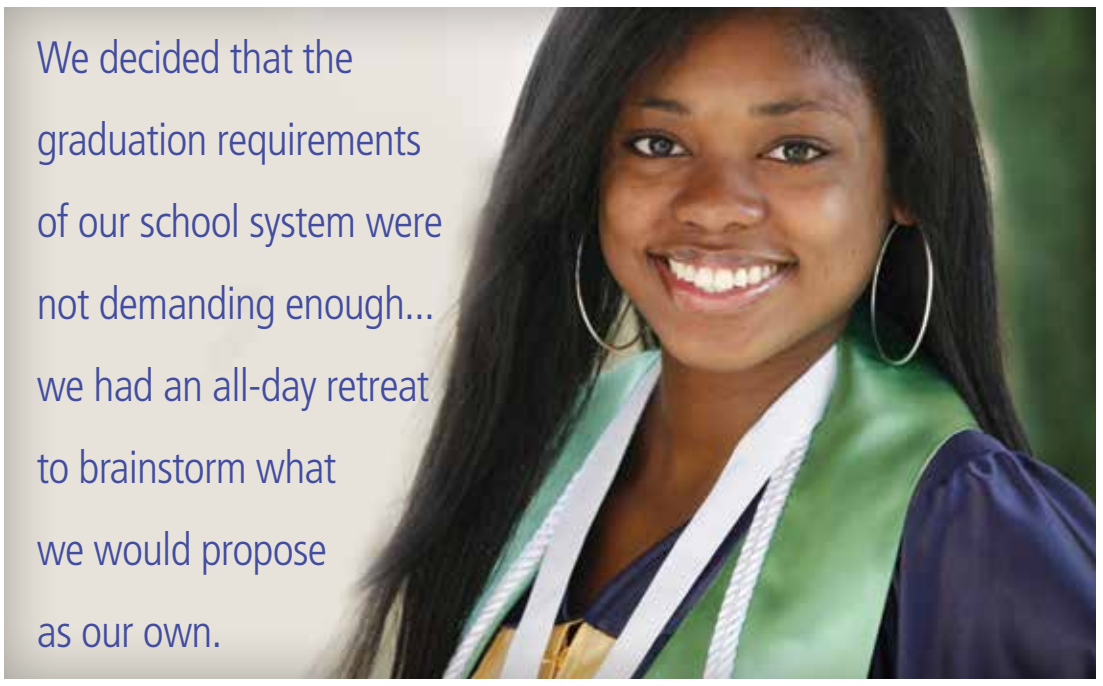
The Creation of One Learner Centric Learning Environment

By Arnold Langberg

I have been involved in the creation of learner-centric public high schools throughout my professional career, in Colorado and in New York. Described below is the beginning of one such school in a Colorado school system in 1975. The school continues to this day, although I have been gone from it since 1986.



Building a Culture of Trust

The "system" was defined for me in a memo that I discovered in the desk that I had been given. There were just three items that were declared to be non-negotiable: we must abide by the school system's employee contract, we must cost no more per pupil than the other high schools and we must meet the school system's existing graduation requirements. That was it. No small print!

The contract demand was easy. We had over 300 applicants from around the country for six teaching positions, and a committee of nine parents, nine students, a teacher from our feeder school and myself, spent four days interviewing the 24 candidates who were invited to come at their own expense.

We agreed that hiring would be by consensus, and we finally finished at 2:00 a.m., but the process was wonderful. The highlight was when one of the students, whose normal speech included "chick" and "dude," politely asked one of the parents, a physicist with a cultured British accent, whether he was uncomfortable, as she was, with the fact that they often disagreed with each other. It paved the way for the eventual consensus!

As you read carefully through these first paragraphs, be aware that the school had not yet officially opened. What we had been doing helped to create an environment of trust, and trust is at the heart of self-directed learning. Students were authentic participants in the choosing of the entire staff, myself included. We all were teachers, and we all were learners.

To respond to the budget demand, we did a careful analysis of the school system's budget book. We made the case that, although we didn't want to participate in interscholastic athletics and some of the other conventional school extra-curricular activities, we were entitled to a comparable per-pupil allotment for activities that were appropriate to our own design, primarily educational travel. We were given an additional $10,000 which enabled us to rent nine-passenger vans that we used for trips across the United States and into various parts of Mexico.

We decided that the graduation requirements of our school system were not demanding enough. Over the course of that first semester we had students, parents and staff members study other possibilities, and in December we had an all-day retreat to brainstorm what we would propose as our own. The school board was pleasantly surprised to find that we were going to expect more of our graduates than any of the conventional high schools.

Three factors had given us a head start in creating our personalized learning environment. The students all chose to attend this public school, so did all of the teachers, and the original enrollment of 100 grew within the first month to 150, the maximum that had been approved by the school board. Even with our small size we wanted to avoid the feelings of anonymity that plague large conventional high schools, so we created an advisory system wherein every teacher would serve as a mentor and advocate for 16 students.

Advisory groups functioned as families within the school society. When one of the original teachers suggested that we should have a "disorientation," a series of challenges to help students (and teachers) free themselves from dependency on the "system-centric" schooling, it was through the advisory groups that we were able to accomplish a risky adventure with people who were still strangers to each other. Each group spent one week in the wilderness and another week in the inner city, learning how to work together and learning how to use the real world as their "classroom."

One young woman told her group that her asthma would prevent her from going on the wilderness trip, but the others offered to help carry her pack and provide whatever other support she might need because she belonged to their family. On the city trip, one student spent the day helping an elderly black couple with household chores. That evening, as each person reflected upon what he/she had learned, this young man said, "I learned that I will never use the N-word again!"

Redefining Curriculum

The disorientation was an introduction to our curriculum process: experience followed by reflection. In addition to the evening discussions, the students were expected to write a detailed reflection upon their learning at the end of each week. These were shared with their advisor and became the first elements of a student's portfolio of self-evaluation. The advisors would help their advisees learn how to be more specific than, "It was fun; I learned a lot," which would be a typical first attempt.

The students, having been in "school" for 24 hours for 10 days, were then given a couple of days off, during which time the teachers created a schedule for the remainder of the semester. Some students chose to participate in that activity and, of course, they were welcome. The first schedule included time for weekly advisory group meetings and time for individual advising. After that priority was established, ideas for classes came from three sources: from the advisors, based upon what they learned about the students during the disorientation, from the teachers' areas of expertise and enthusiasm, and from outcomes desired by the system.

I have avoided the usual curriculum language, including "requirements," because we discovered that it narrowed our vision and generated a one-size-fits-all mentality. The proposal that we presented to the school system, as a result of the December retreat, divided the graduation "expectations," rather than requirements, into three domains: personal, social and academic. A few of the expectations necessitated demonstrating competence, including literacy and numeracy. A second set of expectations were areas for developing habits of life-long learning such as knowledge of inner resources, community service, health and physical education. A third set were designed to ensure that every student was exposed to laboratory science and the scientific method, to music and the arts, and to at least one other language and culture in addition to his or her own.

The school as an organization changed and grew just as the participants did, with the creation of a Walkabout curriculum structure emerging by the fifth year. This has provided clarity for communication within the school and between the school and prospective students and their parents, while sustaining the values of self-direction and trust upon which the school was founded. We added a series of culminating Walkabout experiences which we called "Passages" - demonstrations that the skills being acquired in school could be applied in the real world.

One example with which I was personally involved was when my daughter spent four months, starting in the summer and extending into her senior year, studying dance in Chicago and New York. She had been told locally that she was good, but she wanted to see if she also would be recognized in the more demanding big city studios. She wrote a proposal that involved Career Exploration, Practical Skills (living within a budget) and Adventure (including people in each city to whom she could turn for assistance if necessary.) A committee that included her advisor, her parents, at least one other teacher, another student and a community expert read her proposal; suggested modifications; and served as a support group for her. Upon her completion of the Passage experience, she made an oral presentation to her committee as well as a written one to be included in her portfolio.

An Authentic and Personal Method of Evaluation

There are two important reasons why we eschewed the conventional system of grades and credits. We considered all three domains, personal, social and academic, to be of equal importance, but while it may be possible to determine a letter or number grade for some of the academic expectations, it made no sense to try to do so for "knowledge of inner resources" or most of the other items in the personal and social domain. Giving grades in just one domain, however, would suggest that the others didn't "count" as much, and eventually they would be ignored.

The main other reason we chose not to have letter grades was to help the students become capable of realistic self-evaluation. We believe that is a necessary outcome of true self-directed learning. As I described above, at the end of the disorientation the student would write a self-evaluation, and this continued to be the basis for our alternative to conventional grading. At the conclusion of any course, trip, apprenticeship or other learning experience, the student would write a detailed reflection of the learning that took place and then share it with the leader of the activity. This document was a personal narrative that was annotated afterward to reflect the graduation expectations that the student had met, and then it was shared with the leader of the activity, who would write a response to the student's self-evaluation. These were collected by the advisor into the student's portfolio. The evaluation process itself became part of the learning process.

Twice a year, each student was expected to write a broader self-evaluation, and this would be the source material for a student/parent/advisor conference. When it became time to consider graduation, as mutually determined by the student and advisor, the student would distill the elements from the three- or four-year portfolio into a single document. My daughter's totalled 40 pages. It included the student's reflection on his/her total school experience as well as examples of work at different stages of his/her development. It also included support letters from her advisor and other teachers and community members with whom she had worked.

From the opening days of creating a trusting environment that was respectful of all participants, to the student self-generated final transcript, to the individual graduation ceremonies as well as one for all the graduates, everything we did reflected love, trust and respect for all by all. ✱

Arnold Langberg has been working in public education in New York and Colorado since 1956. Mr. Langberg finds it difficult to give a brief biography of his almost 60 year career, so he recommends two books for anyone who might be interested in more details about him or the school that he refers to in this article: *Turning Points - 35 Visionaries in Education Tell Their Own Stories*, edited by Jerry Mintz and Carlo Rossi, and *Lives of Passion, School of Hope* by Rick Posner. Mr. Langberg may be contacted at alangberg@yahoo.com.

PROJECT-BASED LEARNING

Engaged...Equipped... Empowered

By Debra Howe, Ph.D.

In the *The World is Flat*, Friedman (2005) notes that students acquire the skills and commitment for lifelong learning so as to be "really adaptable." "Really adaptable" workers are resilient, patient, adaptable, persistent and responsible. They are self-directed learners with responsibility for their own learning. Martinez and McGrath (2013) identified three commonalities in developing self-directed learners. These were: disrupting traditional expectations of teaching and learning; socializing students into a school culture signaling the expectations for learners; and using a consistent pedagogical approach in which students manage complex projects and assignments, seek feedback, revise work and reflect on what they've learned.

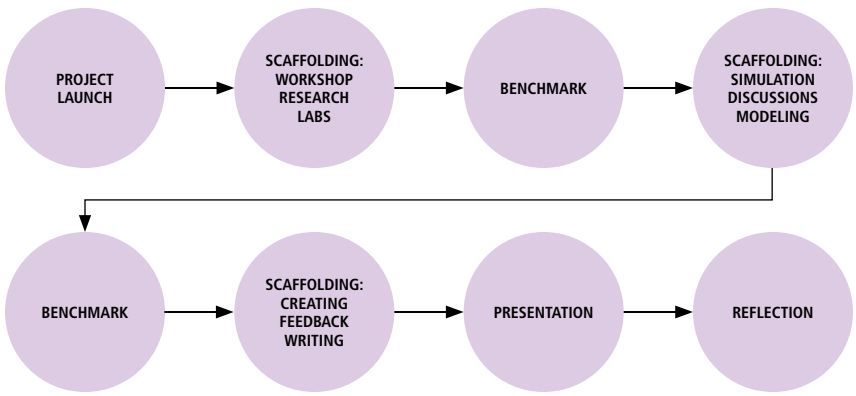
Understanding the need to support the development of adaptable workers, the Tri-Creek School Corporation focused on college and career readiness. To accomplish this, we needed to find an approach that would ensure students were, as our mission statement indicates: Engaged to Learn, Equipped to Achieve, and Empowered to Succeed. An examination of several approaches led the corporation to look at the instructional and programming strategies of project-based learning and the New Tech Network. Strategies were identified and implemented to ensure students not only mastered content, but also had an understanding of college-level and workforce expectations within the context of self-advocacy.

Engaged to Learn

Project-based learning (PBL) is at the heart of engagement and exemplifies the "really adaptable" worker. In PBL, students engage in purposeful, collaborative projects requiring critical thinking, creativity and communication during the learning process, which is different than having students complete projects at the end of a unit. Students in PBL are motivated to learn through the process of working to solve a real-world problem. Instruction is guided or facilitated by faculty who have some understanding of what knowledge the student brings with them and what might be needed in order to complete the problem-focused project.

A TRADITIONAL CLASSROOM PROJECT TYPICALLY FOLLOWS THESE STEPS:
LECTURE – ACTIVITY – QUIZ – LECTURE – ACTIVITY – QUIZ – REVIEW – EXAM – PROJECT

A PBL unit project is launched with an entry event, rubric creation, "Need to Knows" and next steps. The framework looks as follows:



The New Tech Network advocates the PBL approach using 1:1 technology integration and inquiry to engage students in relevant experiences. Students think in complex ways and apply their knowledge and skills in integrated and cross-disciplinary projects to create solutions and take action that further develops their skills and knowledge.

The project entry document frames the project providing the overall expectation. Imagine entering a classroom where the teacher hands you a letter from a congressman requesting your help in investigating energy efficiency, as he must provide an energy recommendation to Congress. The project culminates in your group's recommendation to the congressman in person. How exciting would it be for a student to engage as a genetic counselor for a young couple planning a family? Can you imagine the passion generated as a teacher tells a class they have been asked to study the vegetation issue of their local lake and the resulting tourism impact and then to make a recommendation to the Town Council on how to alleviate the problem? Standards are embedded into each project ensuring the content is taught. Brainstorming generates a list of what is known about the project and what they need to know in order to solve the problem and complete the project. Groups of students identify their project manager, sign a contract for roles and responsibilities and begin their work. The teacher develops scaffolding activities to help students master the content and skills. They engage in "workshops" that may be direct instruction on "just in time" information needed to continue.

A Lowell High School teacher states: "With the implementation of project-based learning, I have seen tremendous growth in my students' abilities as critical thinkers and communicators. Students are learning to analyze what they need to know in order to be successful with a given project; exploring various ways to tackle the task at hand; and possibly most importantly, how to ask thoughtful, clear and professional questions. Students see the reason behind what they are learning. My favorite moments are when my students come up with a better way of presenting their ideas than I came up with, or when they ask me to teach them more about a specific aspect of the discipline."

Another high school teacher stated: "Learners are expressing ownership in our projects. Our driving questions are directly related to our learning goals and the themes of our projects; in-turn, our students don't spend a day in the classroom without knowing exactly why the benchmarks and tasks are absolutely necessary in the process of successfully completing each project. I leave every day exhausted but feel fulfilled in knowing that each class-period is receiving the differentiated instruction necessary to fully prepare each unique learner for college and career readiness."

Equipped to Achieve

Project-based learning is presented in a 1:1 technology environment. The technology is the collaborative tool that enables the student to delve deeper into learning. Collaborative learning technology enables the student to continue learning in and outside the traditional classroom. One fifth grade teacher expressed her excitement regarding the impact of technology on her students after school learning, "What I find so exciting is that my students are having this conversation about their writing from home at 6:00 p.m. This is not homework, just information I shared if they wanted to know more. They are engaged and talking about themselves as authors outside of the school day. One group of students was having a conversation about tonight's homework assignment. They ask each other questions and by the time I give my feedback, they have usually already solved their problem. For me, that is something to be excited about."

The experience of the Tri-Creek School Corporation seems to have demonstrated that appropriate use of technology as a learning and creation tool is extremely important in learning. Utilizing the technology early ensures that students understand digital citizenship and digital literacy. It is imperative that we equip students with the knowledge, skills, tools and desire to extend their learning.

Empowered to Succeed

A strong focus on self-directed learning and learner outcomes promotes trust, respect and responsibility. Working on projects as teams makes students accountable to each other and reflects what they will experience in the work environment. Education and learning should be about empowering students to reach their goals and dreams. Students must have the opportunity to apply the knowledge and skills in familiar and unfamiliar ways to continue their learning and build their confidence.

Assuring that a student has developed the skills to be a self-directed learner includes identifying, teaching and assessing those skills. The New Tech Network Learning Outcomes include:

- Knowledge and thinking
- Written Communication
- Oral Communication
- Collaboration
- Agency (time management, work ethic, persistence, etc.)

Students sometimes find the focus on learner outcomes hard as so often school has become an isolated, individual game of memorization to answer questions and gain a good grade. It is not about learning skills. The culture of project-based learning is about ownership of the learning and the environment. One middle school student indicated that, "Project-based learning is good for me because I do better learning when I'm one-on-one with others or in a group." Another felt, "Project-based learning has taught me how to work well with others effectively."

PBL embodies a culture of support and empowerment. By engaging, equipping and empowering students, they acquire the knowledge, skills and attributes to be successful in college, careers and life. Transitioning to PBL is not an easy task for teachers or students. It is a disruption of the status quo. As one middle school teacher explained, "Teaching in a PBL environment is a lot of work, but the processes and outcomes are so worth it that I want to put in the effort. It's also exciting to teach, talk and learn in a PBL environment. There's no other way of teaching/learning for me. PBL has changed my outlook on education and our future...both are looking great!" Another teacher sums it up for all of us, "It is the most important thing I have done at work in 10 years!" ✱

Debra Howe has been the Superintendent of Tri-Creek School Corporation since 2011 and was previously the Superintendent of Rochester Community Schools in Rochester, Indiana. She has led both school systems through the transformation process to a project-based instructional model with the New Tech Network. In her three years at Tri-Creek, graduation rates have risen from 87 percent to 95 percent, the high school rating has risen from a D to an A, and suspensions and expulsions have been significantly reduced. In 2010, Dr. Howe was named one of "20 To Watch" in Technology and Learning by the National School Boards Association, and in 2011 she received the AdvancED Innovation Award. Dr. Howe can be reached at dhowe@tricreek.k12.in.us. The school system website can be accessed at www.tricreek.k12.in.us.

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What is PBL: www.newtechnetwork.org/video/tutorial-what-pbl

FORGET THE ABCs

SE2R Can Revolutionize How We Assess Learning

By Mark Barnes

A student and teacher huddle around a laptop computer. The student clicks an Internet tab, and her classroom website fills the monitor. She opens one page that contains a reading project and another with embedded media, including a narrated slide show. Another click and she introduces her personal blog, which houses dozens of writing samples on an array of topics. "You asked me to review the video on reflection letters," she explains to the attentive teacher. "So I went back to these three posts and added the vocabulary you said was missing." The teacher smiles and says, "Okay, we need a report card grade. What should it be?"

This is how evaluation and reporting works in the student-centered classroom that I like to call a Results Only Learning Environment (ROLE). There is no room for numbers, percentages or letter grades in a ROLE. Instead, students collaborate with each other and with their teacher, in order to demonstrate mastery of various objectives contained in yearlong projects. Learning is a conversation built on a system of summary, explanation, redirection and resubmission — something all stakeholders in the classroom come to know simply as **SE2R**. If a report card is required, the student and teacher agree on what that final grade should be, based on how all feedback was handled throughout a grading period.

With the emergence and ubiquity of digital tools and mobile devices, the way we assess learning is changing. Collecting papers and workbook pages is no longer necessary, as almost any task can be completed on a website or mobile application, where the teacher can provide instant feedback. Teaching and learning in a cloud-based environment creates a powerful two-way conversation about what students understand and what they do not.

SE2R Creates Mastery Learning

Narrative feedback in a Results Only Learning Environment is based on SE2R:

Summarize — Explain — Redirect — Resubmit

Instead of judging work, based on arbitrary numbers, percentages or letter grades, teachers offer a one- or two-sentence statement that summarizes what the student accomplished in a task or project. A more detailed explanation follows, outlining concepts and skills mastered or omitted, based on the specific guidelines that were provided. The two Rs are the key to success in this kind of feedback, as redirection and resubmission are typically left out of more traditional classrooms. In a system built on lecture, practice, test and move on, the opportunity for mastery learning is lost on many students.

In a student-centered classroom, founded on collaboration, project-based learning and the use of the Web and mobile tools, learning becomes a constant, often virtual, conversation, and students are given the opportunity to learn from mistakes, revisit prior lessons and models and make changes to demonstrate mastery.

A Results-Only Learning Project

Seventh graders are researching a particular time in history. Students select a historical period of interest — the American Civil War, the Civil Rights Movement and the Great Depression are just a few. Each student creates a fictional character and places him or her in that time period. The authors write weekly journal entries, chronicling life in the time period from the character's point of view.

The young writers produce these detailed journals on their personal classroom websites, all contained in the teacher's online learning management system. The students add pictures and videos to the journals, bringing their characters and time periods to life for peers, parents and any other interested readers; of course, their teacher will read all entries, evaluating their research and writing skills as the project grows. The old-school educator would most likely collect papers, assign an arbitrary point value to the project and place a subjective grade on the journals. In this old scenario, very little learning takes place. The teacher in the results-only classroom evaluates the young writers much differently.

SE2R Feedback in Action

As this immense project progresses, the teacher in this vibrant student-centered classroom provides brief, interactive lessons on myriad related skills and concepts. Students apply these lessons to their research and to their writing. The teacher moves quietly around the room, observing the authors unobtrusively, while occasionally kneeling next to individuals to ask a question or to comment on something he's read. Later, he'll write detailed feedback on each student's Web page, following the SE2R model. This is what it looks like:

> "Jerome, you wrote a three-paragraph journal entry from the point of view of Malcolm, a young black soldier, fighting in the Civil War. ***(Summarize)***
>
> "I like the way you're developing the protagonist. In this entry, you place him in a specific battle, where he describes the scenery around him, using several adjectives and strong verbs. This demonstrates sound understanding of our mini lesson on improving diction. Several proper nouns are not capitalized, and this was another focus area for this week's journal entries. These errors make me wonder if you don't understand proper nouns or if you simply failed to proofread carefully. ***(Explain)***
>
> "While this is a well-written entry overall, I need you to return to it and correct any capitalization errors you see, so I know you understand this focus area. ***(Redirect)***
>
> "Please tell me when you've made the changes, so I can return to your Web page and re-evaluate this entry." ***(Resubmit)***

Revolutionizing Assessment

What makes SE2R dynamic is the immediate feedback the digital environment presents and the opportunity for the student to revisit prior learning and make changes to the work, without the punitive nature of traditional grades. Jerome receives no number, percentage or letter grade on his journal entry, which is one of approximately 30 that he'll write over time in this yearlong project. Students like Jerome report a willingness to improve their work, because they like the feedback and working on the project digitally simplifies making changes, which leads to mastery of skills and concepts. Best of all, the SE2R model can be used on any activity or project and in any grade or subject.

Many teachers worldwide are embracing digital learning and narrative feedback, in lieu of traditional assessment. As the movement toward making learning a conversation, rather than a measurement, continues, students will become independent learners. In a world that is racing toward online classrooms, content curation and social learning, encouraging this kind of independence and self evaluation is not only important, it is a vital part of modern education. ✱

Mark Barnes is a veteran teacher and author of *Role Reversal: Achieving Uncommonly Excellent Results in the Student-Centered Classroom* (ASCD, 2013) and *The 5-Minute Teacher: How do I maximize time for learning my Classroom?* (ASCD, 2013). He is the creator of the award-winning how-to video website for educators, www.learnitin5.com, and the popular education and variety blog, www.Brilliant-Insane.com. A recognized authority on student-centered practices and digital learning, Barnes works with teachers internationally, helping them build Results Only Learning Environments, driven by his SE2R system. His new book on using mobile devices and social media in the K-12 classroom is due from Corwin in September. Barnes can be reached at markbarnes19@gmail.com.

CALLING ALL STUDENTS

A New Paradigm for Student Learners

By Terry Doyle and Brendan Doyle

Twenty years ago, *Change: The Magazine for Higher Learning* published John Tagg and Bob Barr's seminal article "From Teaching to Learning." In the article, Tagg and Barr outlined what has come to be known as Learner Centered Teaching (LCT). By definition, LCT employs instructive practices designed to optimize opportunities for student learning. In order to optimize students' learning, teachers must be able to answer two essential questions:

1. Am I up-to-date on what is known about how learning happens in the human brain?
2. Do I know what teaching actions are in harmony with what is known about human learning?

My conclusion is that most teachers are up-to-date and continually integrate new findings about teaching and learning as they are revealed. However, I am dismayed that as our knowledge about human learning has dramatically increased, in turn providing solid evidence that LCT practice is the best way to teach, improvements based on this research are still not prevalent in American education. In the past 20 years, college graduation rates have not improved, and the national K-12 system continues to be criticized for failing our students.

A New Paradigm for Students

So how do we improve performance? We need the students' help. It is clear from research findings that the human brain needs to be **prepped for learning in order to learn at its best.** I am proposing **a new paradigm for student learners**, one in which they take on a greater responsibility for their success by preparing their brains for effective learning. I see no other pathway to improved school success. Teachers alone, even learner-centered teachers, cannot fix the problems facing the current education system. We need help, and that help must come from our students.

Five Areas that Improve Learning Readiness

Brain researchers have discovered there are five things that humans must provide their brain for it to function at its optimum level for learning. These five things are adequate oxygen, ample hydration, a proper diet, healthy sleep habits and aerobic exercise. These key elements are, to a great extent, controlled by students once they reach adolescence. Students at younger ages will need parental and school assistance to prepare their brains for learning.

1 THE BRAIN NEEDS OXYGEN FOR LEARNING

Proper delivery of oxygen to the brain is crucial for developing the energy the brain needs to learn. Although the human brain represents only two percent of the body's weight, it receives 15 percent of the cardiac output and 20 percent of total body oxygen consumption. As learning challenges increase, so too does the brain's demand for energy in the form of oxygen and glucose. To keep up with the high energy demand of the brain, oxygen delivery and blood flow to this organ are essential for learning. The bottom line is that students need to be taught how to breathe correctly (diaphragmatic breathing), must choose to get daily physical activity and must be aware that when learning gets difficult or challenging they need to add some extra deep breaths.

2 HYDRATION AND BRAIN COMMUNICATION SYSTEMS

Many students leave for school dehydrated on a daily basis. A large reason behind this is that humans lose two pounds of fluids through normal respiration while sleeping. Given that many students don't adequately hydrate in the morning, they arrive at school with a brain that will have trouble learning. Even mild dehydration can influence mood, energy levels and the ability to think clearly.

When students lose too much water, their brain cells lose efficiency. Research by EM Gorman in 2012 showed dehydration can impair short-term memory function as well as the recall of long-term memory. Even mild levels of dehydration can impact school performance. It seems like a simple thing, getting hydrated in the morning and maintaining it throughout the day, yet few students are even aware of how a lack of hydration impairs their learning and memory. Teachers need well-hydrated learners.

3 A BALANCED DIET

The brain requires about 22 times as much energy to run as the equivalent mass in muscle tissue. The energy required to run every bodily process comes from the food we eat. The foods we consume greatly affect brain function, including everything from learning and memory to emotions.

Hungry students are poor learners. It is crucial to eat before new learning and before studying, because the brain needs energy to learn. It also is important to maintain a healthy and balanced diet. Diets that are high in saturated fat have been shown to reduce molecular substrates that support cognitive processing. Research by Fernando Gomez-Pinilla in 2002 found this kind of diet also reduces hippocampal brain-derived neurotrophic factor (BDNF), which is crucial to new learning and neuronal plasticity. Students who eat a balanced diet have brains that are ready to learn.

4 SLEEP AND LEARNING

Sleep likely has the greatest impact upon the brain's readiness to learn. Sleep is the one student behavior that teachers have virtually no control over. It's no revelation that a tired brain doesn't learn very well, but what is so significant about proper sleep, which for adults is 7.5 to 9.0 hours per night and for teens 9.0 to 10.0 hours, is that memories are made during sleep. Research by Bryce Mander and colleagues in 2011 discovered that when we sleep, "sleep spindles" or bursts of brain waves help to shift memories from the brain's hippocampus — which has limited storage space — to the nearly limitless prefrontal cortex, thus freeing up the hippocampus to take in fresh data (new learning) the next day. Much of this process occurs during the second half of the night, so if students sleep only six hours or less, they are shortchanging themselves and impeding both learning and memory.

In addition, the work of Alhola and Polo-Kantola in 2007 demonstrated that brains that are sleep deprived actually shut down key mental functions needed for learning and memory because the brain is exhausted. This shutdown has consequences on mental performance and function worsens correlatively with more time spent awake.

The effects of sleep deprivation on learning are profound. Poor memory, attention and judgment are just a few of the consequences of not getting enough sleep. If students are to be optimized for learning then adequate sleep is a must.

Sleep researcher Dr. Jessica Payne follows her own research findings, "I give myself an eight-hour sleep opportunity every night. We can get away with less sleep, but it has a profound effect on our cognitive abilities."

5 EXERCISE AND LEARNING

Laura Carstensen, the Director of Stanford's Center on Longevity, explains that rarely do neuroscientists, psychologists and physicians unequivocally agree on anything, but they do agree that exercise is the best thing one can do for the brain. John Ratey writes in *Spark: The Revolutionary New Science of Exercise and the Brain*, "Exercise is the single most important thing a person can do to improve their learning." This is because exercise that causes one to raise his or her heart rate and break a sweat, and lasts at least 30 minutes, allows the brain to release greater amounts of three important neurochemicals: noradrenalin, dopamine and serotonin. These three neurochemicals improve several brain functions that are vital to new learning. The first vital function is the brain's ability to pay attention, which is the cornerstone of learning. The brain only learns what it pays attention to, and when it comes to new learning, it can only pay attention to one thing at a time. The second function improved by these neurochemicals is the brain's ability to stay on task for longer periods of time. Third is improved mood and motivation for new learning.

In addition, and perhaps even more exciting, exercise causes the brain to make more of a protein called BDNF (brain derived neurotropic factor) which stimulates the growth of new neurons in the hippocampus, the area of the brain involved in memory and learning, and actually makes it easier for neurons to wire and fire, the basis of new learning. John Ratey calls BDNF "Miracle-Gro for the Brain."

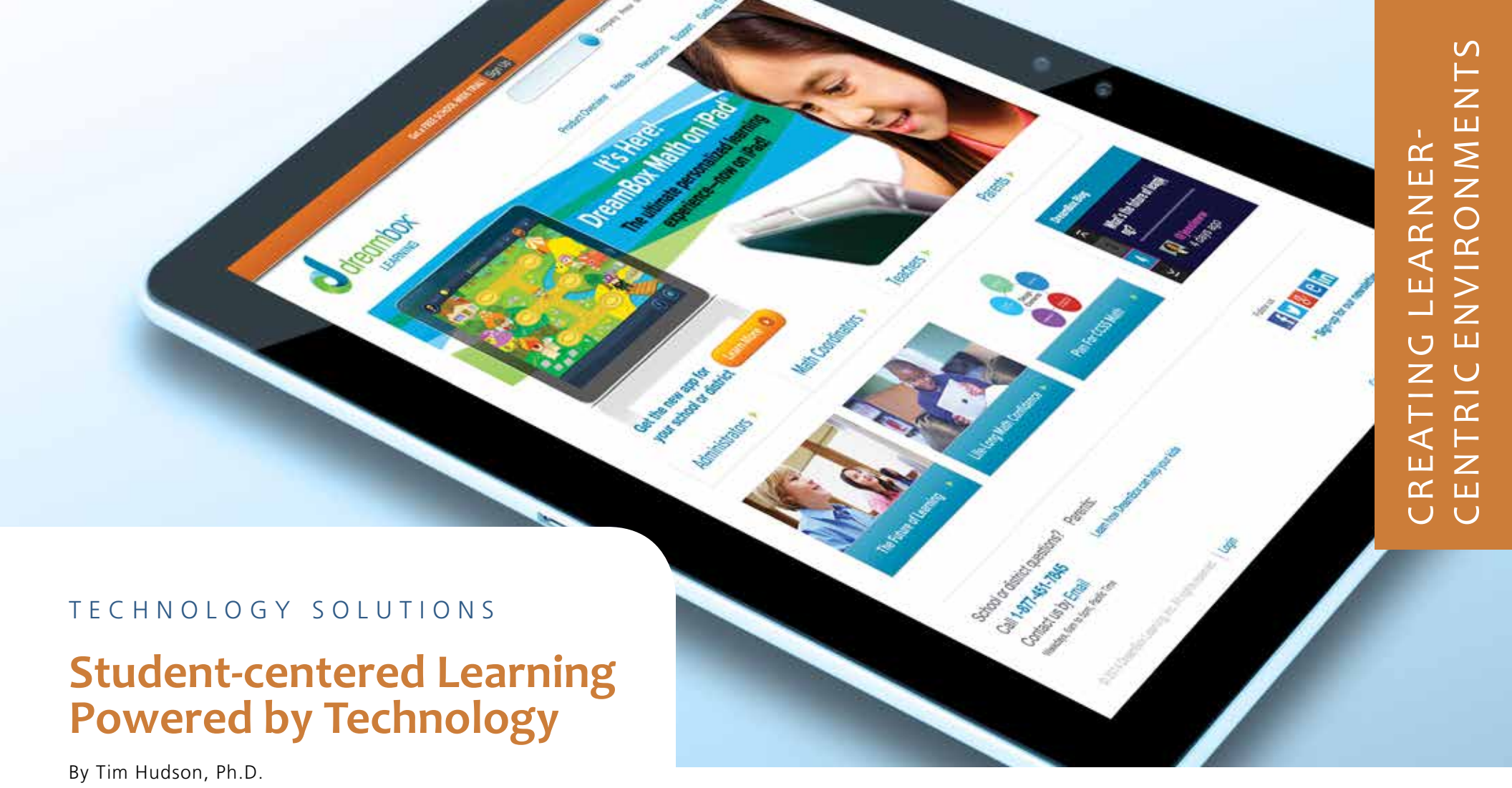
A brain that has benefitted from exercise is a brain ready to learn. It is a brain that is motivated to pay greater attention and focus on tasks longer. It is a teacher's dream brain. If students can run or walk at a rate above three mph for a half hour or more, they can have a brain optimized for learning.

A Shared Responsibility

If teachers alone could repair what is wrong with schools by changing their teaching behaviors, the problem would already be fixed. I'm not claiming that all teachers have embraced LCT, but after 20 years of LCT methods being proven effective and a decade of brain science findings, most teachers are much better practitioners. Our students have to step up. They have to see that their long term success is tied to their ability to be lifelong learners. They have to become equal partners in their education. We can't do it without them. We have been trying for 20 years, and it hasn't worked. *

Terry Doyle is an author, nationally recognized educational consultant and Professor of Reading at Ferris State University where he has worked for the past 37 years. Professor Doyle has presented over 70 workshops on teaching and learning topics at regional, national and international conferences since 2000. During the past five years he has worked with faculty in Taiwan, South Korea and Canada as well as faculty on 120 different colleges and universities across the United States on ways to develop a learner centered approach to teaching. He is the author of *Learner Centered Teaching: Putting the Research on Learning into Practice* and *Helping Students Learn in a Learner Center Environment: A Guide to Teaching in Higher Education*. His newest book published in August 2013, co-authored with Dr. Todd Zakrajsek, is titled *The New Science of Learning: How to Learn in Harmony with your Brain* and is written for college and high school students. For further information, contact Professor Doyle at TerrenceDoyle@ferris.edu.

Brendan Doyle is a 2013 summa cum laude graduate of Ferris State University in biology. He is currently working as research assistant at Ferris State University on three projects: the effect of exercising intensity on learning and memory in humans, the effect of upper body resistance training on learning and memory and the effect of spinal cord injury on learning and memory in rats. The findings will be presented at the National Conference on Undergraduate Research in spring 2014. Mr. Doyle is in the process of applying to Ph.D. programs in neuroscience.



TECHNOLOGY SOLUTIONS

Student-centered Learning Powered by Technology

By Tim Hudson, Ph.D.

Perhaps the most challenging aspect of teaching is effectively reaching all learners. With 20, 30 or even 40 students in their classrooms, elementary teachers have the daunting task of meeting every student right where they are, supporting progress toward grade-level standards and cultivating the development of the whole child.

On a daily basis, teachers make student-centric decisions by providing remediation, grade-level work or enrichment as appropriate. But this requires significant amounts of time, resources, data and content-area expertise. So when a fourth grade student doesn't understand second grade mathematics, teachers rarely have the time or opportunity to revisit foundational number concepts with her. And with education funding cuts, the school may not have staffing resources to work with this student outside of class. At the same time, another fourth grader might understand mathematics at a sixth grade level, but she also may not receive the required support. The school's schedule and resources are often limited and thus don't enable teachers to make student-centric decisions for each student every day.

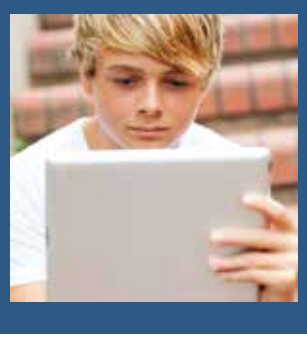
Despite the challenges, dedicated teachers design and implement student-centered lessons to gain insight into what each child knows and understands. Teachers could make the best use of precious class time if they had better information about what each student is thinking throughout any given lesson or learning experience. Yet with all that teachers are expected to do on a given day for a class with dozens of students, how learner-centric can classrooms become?

Potential of Technology

Many teachers and schools are looking to educational technologies to support and enhance student learning in their classrooms. Many of these technologies digitize certain instructional practices such as video lectures, textbook explanations and worksheets. But if greater access to textbooks and lectures were the key to closing achievement gaps, we would have witnessed high achievement for all students long ago. From a pedagogical perspective, static resources that simply transmit information in one direction to student "receivers" are limited in their ability to improve student understanding and enable the transfer of learning. Therefore, student-centric learning environments require engagement, independent thought and interactivity on the part of each individual student. Every classroom teacher needs lessons and resources that engage students in meaningful learning, and technology can provide support by differentiating for students while they are active learners rather than passive receivers.

Such technology needs to invite students to think independently and be capable of responding to their thoughts and ideas just as a teacher would — moment by moment — observing what each student is doing and how she is approaching each problem along with analyzing the strategies she uses. Ideally, this information can be used by both the teacher and the software to inform decisions about the student's progress along a developmental pathway. Technology can therefore complement teachers and classrooms by first empowering individual learners when they are working independently, and then by providing data that inform teachers' instructional planning, communication with parents and student goal-setting.

An ideal online learning experience for students provides classroom teachers not only with data about individual student understanding and performance, but also intelligently adapts in real time to provide a differentiated experience for each child. It engages students in a rigorous curriculum, reflects evidence-based learning principles and provides a personalized environment that supports motivation and inspires persistence. Online lessons also should include continuous formative assessment and provide meaningful feedback to students that is tailored to how they are solving problems. Just as in student-centric classrooms, effective learning technology can create an adaptive environment that improves student learning and closes achievement gaps.



Research-based Learning Principles

The pedagogy inherent in online lessons must engage students in "thinking and doing" rather than "sitting and getting." It also must be informed by research-based principles of learning and cognitive development. Learning is a complex process, in which students develop understanding and expertise by connecting ideas, working across multiple contexts and engaging in experiences where they reason inductively and deductively. Decades of cognitive research validate the need for students to develop understanding by making sense of ideas in ways that honor their unique prior knowledge and skills. As teachers successfully do in classrooms, student-centric learning technology must effectively activate students' prior knowledge in new situations that require critical thinking while engaging in achievable challenges.

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In addition, the learning process should not be linear. Instead, each student should move through developmental learning progressions and pathways that are informed by decades of research and that differentiate for students based on their growth in reasoning, rather than their birthdate and grade level. Student-centric learning is at the core of a competency-based approach in which students progress through lessons, units and courses based on demonstrated proficiency. Educators must be sure that the competencies aren't simply checklists of skills and isolated facts. Student learning must be measured by the ability to transfer knowledge in unfamiliar situations, performance in authentic situations and demonstrations of expertise in other contexts.

Partnering with Teachers and Empowering Students

To ensure high achievement for all students, we have to think differently about how to design and implement a student-centric environment for all students. And we therefore have to think differently about how new technologies can help accomplish this goal — when they're designed in student-centric ways and honor principles of learning and cognitive research. Technology also should provide teachers with real-time, actionable data that improve their effectiveness in tailoring classroom instruction to personalize teaching and close achievement gaps.

At DreamBox, we build student-centric lessons and teacher-centric reporting to help realize the goal of high achievement for all students. Our technology enhances student thinking and complements what teachers are trying to accomplish in their classrooms. As demands on teachers increase and school resources decrease, teachers can't always find time to connect with each student every day to know what they're thinking and understanding. Therefore, we design DreamBox to be a trustworthy partner for teachers that supports student-centric learning so that each student will persist, progress and achieve. *

Dr. Tim Hudson, Senior Director of Curriculum Design for DreamBox Learning, is a learning innovator and education leader who frequently writes and speaks about the goals of learning and educational strategies. At DreamBox, he oversees the development of innovative and interactive digital lessons that differentiate and adapt uniquely for each student. Prior to joining DreamBox, he spent over 10 years in public education, first as a high school math teacher and then as the Mathematics Curriculum Coordinator for a K–12 school system of over 17,000 students, where he also helped facilitate the system's long-range strategic planning efforts. You can contact Tim at tim.hudson@dreambox.com or on Twitter @DocHudsonMath.

SUGGESTED READING

De-grade your classroom and instead use narrative feedback

Mark Barnes, *SmartBlog on Education*

Author of *Role Reversal: Achieving Uncommonly Excellent Results in the Student-Centered Classroom* (A 2013 Best Professional Book), Mark Barnes explains how he stopped grading his middle school students, instead using only narrative feedback. Barnes cites the research of formative assessment expert, Dylan Wiliam, to support his claim that students complete activities willingly and become high-achieving independent learners, once all number and letter grades are eliminated.

>>> **http://smartblogs.com/education/2012/12/18/de-grade-your-classroom-narrative-feedback-mark-barnes/**

Knowledge in Action Research Helping to Make the Case for Rigorous Project-Based Learning

Edutopia Staff, *Edutopia*

This research project examines whether project-based learning can deepen student learning and increase Advanced Placement test scores. The comprehensive article provides an overview of the study, project-based learning course design, student demographics and results to date.

>>> **http://www.edutopia.org/knowledge-in-action-PBL-research**

5 Ways to Make Your Classroom Student-Centered

Marcia Powell, *Ed Week Teacher*

Author Marcia Powell explores the teacher strengths needed for creating a student-centered classroom and how teachers can refine those. She encourages teachers to identify areas of focus to improve their relationships with students and their classroom results.

>>> **http://www.edweek.org/tm/articles/2013/12/24/ctq_powell_strengths.html**

Teacher vs. Learner-Centered Instruction

National Capital Language Resource Center

This chart outlines the key characteristics that differentiate teacher-centric versus learner-centric environments.

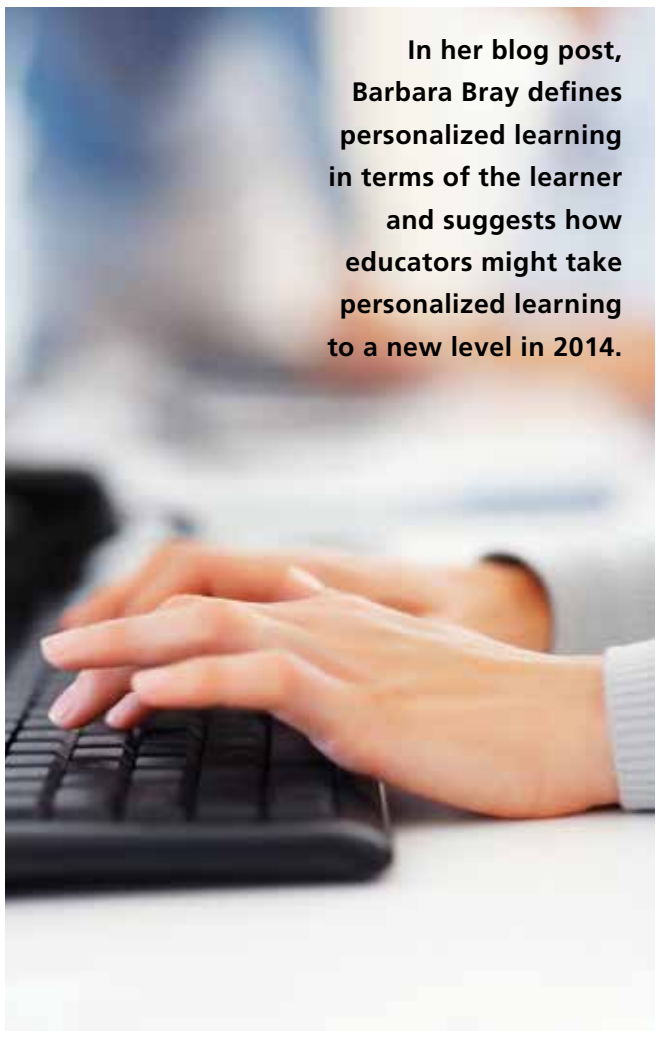
>>> **http://www.nclrc.org/essentials/goalsmethods/learncentpop.html**

10 Trends for Personalized Learning in 2014

Barbara Bray, Personalize Learning

In her blog post, Barbara Bray defines personalized learning in terms of the learner and suggests how educators might take personalized learning to a new level in 2014.

>>> **http://www.personalizelearning.com/2014/01/10-trends-for-personalized-learning-in.html**



About AdvancED
AdvancED is the world leader in providing improvement and accreditation services to education providers of all types in their pursuit of excellence in serving students. Our mission is to lead and empower the education community to ensure that all learners realize their full potential.

We have been experts in accreditation and school improvement since 1895 and bring this 100+ years of experience and expertise through three US-based regional accreditation agencies — the North Central Association Commission on Accreditation and School Improvement (NCA CASI), the Northwest Accreditation Commission (NWAC) and the Southern Association of Colleges and Schools Council on Accreditation and School Improvement (SACS CASI). AdvancED works with over 32,000 institutions in more than 70 countries serving over 20 million students.

AdvancED's position as a leader in education continues to expand as we provide a national and international voice to inform and influence policy and practice on issues related to education quality.

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