THE CENTER for TRANSFORMATIVE TEACHING & LEARNING
AT ST. ANDREW’S EPISCOPAL SCHOOL

THINK DIFFERENTLY AND DEEPLY

The Transformational Classroom: How Research in Educational Neuroscience Enhances Teaching and Learning at St. Andrew’s
Throughout this resource, the following icons will indicate important aspects of each teacher’s instructional practice:

- Research
- Strategies
- Meta-Cognition
- Technology
The Transformational Classroom: How Research in Educational Neuroscience Enhances Teaching and Learning at St. Andrew's
Foreword
The popularization of research from the brain sciences—including neuroscience, cognitive science, and psychology—has sparked interest from professionals from multiple fields eager to use research findings to inform their practice. From the legal profession to advertising, research on human thought and learning is challenging professionals to formulate strategies, practices, and policies consistent with the latest scientific findings on brain structure, function, and human cognition. Nowhere is the application of this research more important than in the field of education, where the emerging science of learning, also known as neuroeducation or educational neuroscience, is beginning to take root in schools across the nation. In increasing numbers, insightful educators are looking to the science of learning to understand how children think and learn, and how this knowledge can improve educational outcomes for every child.

As I work with schools across the country, there is no question that St. Andrew’s Episcopal School and its Center for Transformative Teaching and Learning is a sterling example of how educators are informing the teaching and learning process through research-based practices. These practices encompass every aspect of the educational experience including how we approach the learning environment, how we plan instruction to promote mastery of skills and concepts, how we assure that students are engaged in higher-order thinking and creative problem-solving, and how we use the arts and technology to maximize each child’s learning potential.

Thoughtful leadership, robust teacher training, and a community ready to embrace innovative thinking shapes a school into the kind of educational environment offered at St. Andrew’s. And yet, beyond merely embracing research-based best practices to enhance their own school, the leadership and faculty of St. Andrew’s are eager to share their expertise with other educators, including those in public and private institutions both locally and nationally. Moreover, St. Andrew’s is on the forefront of not only practicing but also advancing this knowledge by engaging in research and discovery that has the potential to inform their own teaching practices as well as the entire field of education. Our research team at the Johns Hopkins University Neuro-Education Initiative was pleased to join forces with the Center for Transformative Teaching and Learning, to conduct an original research study in the Spring of 2012 and we hope to continue to advance the field of educational neuroscience through our collaborative efforts.

Education of our nation’s students in the 21st century will require this type of alliance, where school communities and institutions of higher education work together to learn the best ways to bring all children to their full potential.

Mariale Hardiman, Ed.D.
The Johns Hopkins University School of Education
Assistant Dean, Urban School Partnerships
Clinical Professor of Education
Co-Founder and Director of the Neuro-Education Initiative
Introduction
Imagine a school where 100 percent of its teachers and academic leaders are committed to applying innovative research in educational neuroscience to enhance learning for every student.

Imagine a school from preschool through 12th grade that thinks differently and deeply about how each student’s mind learns.

That school exists.

Since 2007, a key initiative of St. Andrew’s Episcopal School has been to connect the burgeoning knowledge about how learning happens and how the mind works to enhance every teacher’s instructional practices.

This initiative, which advances St. Andrew’s mission to “know and inspire each child in an inclusive community dedicated to exceptional teaching, learning, and service,” led to the creation of the Center for Transformative Teaching and Learning (www.thecttl.org) in 2011.

The CTTL places research from the leading educational neuroscientists in the country, from schools such as Johns Hopkins, Harvard, Stanford and the University of Virginia, into the hands of every St. Andrew’s teacher.

What does this mean for your child?

It means whether he or she is beginning their academic journey in the Lower School or taking the most challenging set of Advanced Placement courses in the Upper School, they are getting an education that is understood with an understanding of student attention spans.

It means your son or daughter will have teachers, at every grade level, with expertise in knowing how the mind learns and how to help every student meet their potential.

It means that your child will become a more confident, independent, self-aware, prepared and happy learner because of the partnership they enter into with each of their teachers. The CTTL trains and educates teachers; the beneficiaries of their knowledge and training are the students.

Connecting the science of learning to the classroom has informed and transformed teaching at St. Andrew’s. Students are consistently asked to reflect on their learning (meta-cognition) in age appropriate ways. It has led to a new report card in the Lower School and deepened focus on the social and emotional learning of each student through the Responsive Classroom in the Lower and Intermediate Schools. It also has led St. Andrew’s to develop original research projects with The Johns Hopkins University’s School of Education and School of Medicine.

The experience and expertise of St. Andrew’s PS-12 teachers generated a model partnership with Teach For America, whose corps members are being mentored by St. Andrew’s teachers on how to design a challenging but supportive classroom.

St. Andrew’s commitment to connecting educational neuroscience to the classroom is reflected in the breadth of programs that have been transformed by research in education, developmental psychology, and neuroscience. What follows in this publication are snapshots into areas of the school that have applied research to validate, improve, or transform programs that have evolved from intuition but have been enhanced by science. The authors of the snapshots are St. Andrew’s teachers or coaches and in each case, they are leaders and constant learners in their individual area of focus. The snapshots also show how deeply St. Andrew’s faculty thinks about curriculum and programming to prepare students for every step of their academic journey. The growth-mindset of a St. Andrew’s teacher is second to none.

All students deserve an education that is shaped by how much we know about how the mind learns. Every St. Andrew’s student receives that education.

Glenn Whitman

gwhitman@saes.org

Director, The Center for Transformative Teaching and Learning
“What is learning?”
I have struggled answering that question ever since I began my teaching career. That seemingly simple question always leads to a second one:
“Where does learning happen for each individual student?”
The initial response by educators to the second question might be the classroom. One colleague responded “Everywhere?”
Regardless of where students learn, it is impossible to do so without the organ of learning, the brain.
Connecting the science of learning—how the brain works—to instructional practices for all students—needs to be part of class, students and their teachers enter into a learning partnership. Far too often teachers blame the students for poor attention and effort in memorizing information. However, as Parker Palmer once declared in The Courage to Teach, “When I ask teachers to name the biggest obstacle to good teaching, the answer I most often hear is ‘my students’…Criticizing the client is the conventional defense in any embattled profession and these stereotypes conveniently relieve us of any responsibility for our student’s problems or their resolution.”

Fortunately, St. Andrew’s teachers take personal responsibility to collaborate with their students to address their learning strengths and weaknesses. So what strategies do teachers use to enhance student attention and memory?
Critical to maintaining student attention, what Dr. Hardiman calls, “The portal to learning,” is how a teacher designs his or her class period. As research shows, students’ brains have peaks and valleys over a typical class (in the case of St. Andrew’s, classes are either 40 or 80 minutes long).
What students will remember most is what is introduced first in a class period followed by what is introduced last. How one times a learning episode is called the primacy-reasoning effect.

Dr. David Sousa points out in many of his books, including How the Brain Learns, that novelty is key to student attention, as is the ability for students to make an emotional connection to the curriculum and to find meaning of what they are studying to their own lives. Merely changing a room’s set up and decorations has implications for student attention. As pointed out in The Brain Targeted Teaching Model, “Children exposed to bland, unchanging environments become stimulus adapted and appear to seek out their own novel stimulation, often leading to nonoptimal behavior.” Lighting, smell, order and beauty have also been shown to correlate to attention. For years this has been the intuition of exceptional teachers. Now, research confirms that intuition.

The “Attention + Memory = Learning” equation also provides insight into why students who cram for assessments, and even earn As after an “all-nighter,” cannot derive answers to those same test questions a week or two later. Dr. Tokuhama-Espinosa points out, “While the students managed to keep enough dates, facts, and formulas in their head to pass the test, this knowledge never made it to long-term declarative memory, it was never truly learned at all (only memorized in the short term).”

Regarding memory, practice is key. St. Andrew’s teachers recognize that students need more frequent opportunities to practice recalling what they know while recognizing what they have yet to learn. The challenge for all teachers is how to help students to get foundational knowledge and skills to “stick.” At St. Andrew’s, the increased use of formative assessments is a direct result of our teacher’s training in educational neuroscience. Providing students more opportunities to design projects or to integrate the arts into knowledge or a skill demonstration is happening in the Lower, Intermediate, Middle and Upper Schools. One of my favorite recall tasks for students are “Exit Tickets” that can be a single question on the content of the day or a meta-cognition (reflection) moment at the close of class. This provides teachers instant data on student learning while students mine their memory for information.

The work of Dr. Hardiman and Tokuhama-Espinosa affirm the mission of the CTTL for St. Andrew’s teachers and students: To promote innovative, research-driven teaching that develops each student’s potential as a learner. Their work also highlights one of the challenges those individuals and groups who are committed to this work face. Too often work that falls under the various titles of “brain-based,” “brain-informed,” and “brain-targeted” is believed to be of greatest benefit to struggling learners, those who historically might be called “learning disabled,” “learning challenged,” or “learning vulnerable.”

Such thinking is short sighted and fails to recognize the importance of research in educational neuroscience for ALL students.

It seems that too many parents do not want to believe what teachers intuitively know, that every student needs help and guidance to meet their peak potential. A parent of an Advanced Placement History student once said to me, “What can the CTTL do for my child, he is already getting all A’s?” This question came at a time in the school year when hundreds of thousands of students are gearing up for AP exams or for final exams in their courses. These cumulative assessments of learning place intense demands on each individual’s mind and a large amount of stress that research shows inhibits optimal learning.

My response to this AP student’s parent came in the form of a question. “What if I told you that research in educational neuroscience could potentially reduce the number of hours your son spends studying?” This question would peak any parents interest. I quickly shared research into multi-tasking and how the research challenges the current way most students study. Additionally, we talked about the importance of active versus passive study.

So as you observe your child studying for AP exams, or any other form of assessment, you too can support him or her by providing research-backed advice. When I ask high school students to describe their study environments, I learn that they are often at their desks within arm’s length of the ability to access their e-mail, Facebook, or phone. In addition, they are often listening to music. Intuitively we all believe that this is not a constructive learning environment though students always conclude that they learn better by listening to music.

Research in educational neuroscience challenges the assumptions of the students and reinforces what our parental intuition tells us. Task-switching, checking e-mail, Twitter and Facebook, increases study time and limits a student’s ability to imbibe material into their long-term memory. So instruct your son or daughter to disconnect and find or establish a study location away from a computer. Turn their cell phone off. If they insist on listening to music, tell them it has to be music without words (such as classical music).

The field of educational neuroscience is young as it converges developmental psychology, cognitive science and education.” While some of its initial findings merely support what educators intuitively have believed, or that which can be proved by behavioral science, it is also challenging many assumptions and providing new insight into best educational practices.

21st Century teachers have to be smarter, more agile, willing to change, and have a vastly enhanced growth mindset relative to even just a few years ago. Moreover, they must have an understanding of how the brain learns in order to maximize the potential of every student.

This is the focus of the work of the Center for Transformative Teaching and Learning and the chief beneficiaries of this work are St. Andrew’s students.

WEB EXTRA! See an AP and final exam studying resource created for SAES students.

Glenn Whitman (gwhitman@saes.org) is the Dean of Studies and Director of the Center for Transformative Teaching and Learning (www.thecttl.org).
Innovation is creativity with a purpose. A basic human impulse is a desire to shape our world in new ways—to serve our needs and give back to the world in which we live.

The St. Andrew’s science program is explicitly designed to enhance innovative thought. As Tony Wagner says in his book of the same name, we are Creating Innovators. We do this by teaching design: human-centered problem identifying and problem solving. As we design and innovate, the human brain can become engaged and energized to understand what we can’t see, build what we haven’t seen, and conceive of what we will one day see. It is one of the mindful journeys that our students are on. Innovation, Wagner argues, is a skill that can be taught, must be taught, but sadly is a rare unicorn. So what does it look like when it happens?

For St. Andrew’s students, imaginative thinking is freedom.

The challenge given the class is to create an electric board game that includes a buzzer. To start his game, Bobby used an ROGSODVWLFYDVHDQGKDQGGULOOHGRYHUķIW\ holes to accommodate sticks. The sticks supported marbles on top. During play, as sticks are removed, marbles fall into the vase, hitting a pressure pad at the bottom made of foil and a spring. This triggered a buzzer in a circuit that Bobby wired. The game sits atop a board where students advance their playing pieces depending on their success at avoiding falling marbles. Bobby used graphic design skills that he learned earlier in the year to create the engaging, sophisticated looking board.

Think of all the skills Bobby used to be successful. Think beyond the obvious application of science and art. Think about what it was in this project that really challenged a talented, straight A student? And what made him happily put in the time to get it right?

Bobby was reveling in a world of innovation. Design thinking, the means by which we get to innovation, creates powerful experiences. The larger question is, “Why does it create those powerful experiences?”

Students use a relevant toolkit of “21st century skills” to solve problems that at
first may have seemed insurmountable. Creativity, collaboration, critical thinking, communication in diverse media, agility, grit—this is just the beginning of the list. We can imagine a graduate of St. Andrew’s one day in the working world, part of a multidisciplinary team, collaborating to find creative solutions to problems that span traditional academic boundaries. Does that sound familiar? What skills would they need to be successful? It is the mission of St. Andrew’s to prepare them with these skills, but also to instill a mindset and confidence to relish this future. Design work does this.

Tiering the design program, from kindergarten to twelfth grade, gives the students a succession of small successes that grows their confidence, that builds and bolsters their toolkit of skills. And even better, this work is fun.

The problems St. Andrew’s students tackle are relevant, clever, intriguing, sometimes whimsical—they are wonderful hooks that draw students in, and this helps too. By creating novel contexts for solving problems, fun has been put firmly into the heart of the project, a proud banner in the sea of “Road to Nowhere” schooling that seems to dominate contemporary US education.

Don’t be misled, design projects are hard work, but they are an intellectual adventure full of passion and joy. Students delight in the wonder of new ideas and they take risks because that is part of the fun. As teachers we often know the answer to the problem we are asking to be solved. On the next level down, we don’t know the answer to the problem. In design thinking, we don’t even know what the actual question we need to pose is, let alone what the answer is.

Transformative experiences occur when we respect the student’s talents enough to begin a project like this. This is hard work. But it is empowering work. Coupled to the toolkit of 21st century skills is a mindset that they can identify problems, that they can solve problems. And they will. This becomes part of who they are. Innovation can be taught. Creativity can be taught. It takes scaffolding—a simple, flexible, powerful design thinking process that students see again and again as they progress through St. Andrew’s. This is a transformative mindset.

The act of innovation crosses academic boundaries and allows leaps in creativity. Think about Bobby’s project. Or take students in fifth grade, designing and constructing air rockets. They learn about trajectory, compression, output of energy, scale, and momentum. Instead of learning being disjointed, concepts are combined and thereby completed. Is the subject mathematics or space science? Educational neuroscience tells us that students benefit from instruction that does not restrict ideas to conceptual deserts stranded by textbooks and standardized tests. And science is nourished and animated by the expressive side that the arts, humanities and mathematics complete. Design work provides this rich environment for learning.

So design work is challenging and engaging and powerful and transformative. This sounds good. But the beautiful thing is that it is also supported by the latest research on the learning mind. For example, all students learn best when the learning is in multiple ways. The diversity and differentness of mind skills involved in design thinking means that every student gets challenged in unexpected ways and every student finds a way to leverage their personal, unique set of skills against novel challenges. A sense of play, rapid feedback—feedback that doesn’t give the students the answer but rather prompts the students to find the solution themselves, problems that intrigue and engage, environments and activities that inspire a sense of novelty. These are all ways that current mind science tells us help students learn, and are all genuinely and passionately at the heart of design work.

What did Bobby learn in his science class? Communication, interpersonal skills, materials management, time planning, creativity, problem solving, resiliency, tenacity, grit—the set of mind skills demanded to be successful in design work reads more like those needed to be successful in real-world employment than those demanded by fill in the bubble multiple choice tests.

So we talk about these skills with the students. We help them realize that they have these skills; we help them realize they are important, things to be nurtured and celebrated. A structured design and innovation program which tiers skills and demands from grade to grade gives students a succession of small successes—building their confidence so they see themselves as creative problem solvers. The cumulative effect, year on year, is that having this skill set, being able to confidently tackle problems where the answer, or maybe even the real question, is unknown, just feels normal to them. It is a remarkable talent to instill in students, but it doesn’t feel remarkable to them. They have a toolbox to tackle the world. It is immensely empowering. It is transformative teaching.
Play is critical to the social, emotional and intellectual development of every child. When children play, they are engaged in the “purest expression of their humanity, the truest expression of their individuality.” Roam the halls and playgrounds of St. Andrew’s Lower School and realize that when you see children together creating and imagining, they are not just playing, they are learning.

At a time when so many school are reducing opportunities for play and recess, St. Andrew’s is doing just the opposite for its preschool through 3rd grade students. Play is an integral part of the curriculum because we have intuitively known for years that play sparks learning.

Now research supports that intuition.

When we talk about play, we are describing those moments when the control of learning transfers from the teacher to the students. When children are role-playing different occupations or playing games to help their numeracy, the children’s interactions, language and thinking are being observed by the teacher. Playtime is safe, yet unstructured time, in which students get to develop both their intellectual quotient (IQ) but more importantly, what Daniel Goleman calls, their emotional quotient (EQ).

“Let’s Play!” are magic words when a young child hears them. To a child it says, “You are fun,” “You are my friend,” “You are interested in me,” and “I like you.” Play promotes key 21st century skills including collaboration, critical thinking, and problem solving.

Ask any parent and they will agree that children need to play. Few adults would disagree that when we are at play is when our brains are most alive. “Neuroscientists and developmental psychologists, from every point of the compass know that play is a profound biological process... and lies at the core of creativity and innovation.”

Research by Gwen Dewar Ph.D., found that play and exploration trigger the secretion of brain-derived neurotrophic factor, or BDNF, a substance that is essential for the growth of brain cells. Her studies show that play opportunities improve memory and stimulate the growth of the cerebral cortex. Several studies revealed that children pay more attention to academics after they have had recess. When playing, their interest is self-directed, and they are motivated to solve problems.

“Let’s Play!” are magic words when a young child hears them. To a child it says, “You are fun,” “You are my friend,” “You are interested in me,” and “I like you.”
from the social and physical world that are important to them. Imagination and social play also supports the development of attention, self-control and cooperative learning skills.

From our observations as preschool and 3rd grade teachers, the benefits of play are many.

When children play, they are more concerned with the process than the product. They experiment and become more flexible in thinking and problem solving.

When children play, they free themselves from external rules and may generate rules of their own, many times leading them to negotiation.

When children play, their own unique learning profile is developed and valued. One of the best ways for children to express themselves is through creative play. Play is vital to learning, as shown in the research of Kathy Hirsh-Pasek. In observing Pre-K children while building a bridge with blocks, they were engaged, paying attention, and controlling themselves as they collaborated, thus developing their focus and self-control.

As they used blocks to represent a truck or car, they created symbolic representations, thus developing their ability to make cognitive connections. When the bridge fell down, they needed to rebuild it so it would not collapse thus developing their critical thinking and resiliency.

According to Stuart Brown, the founder of National Institute for Play (www.nifplay.org), play is the child’s way of coming to terms with personal experiences in, and knowledge of, the world. Researchers, such as Daniel Willingham, acknowledge that when children become emotionally connected to learning events, such as play, it is beneficial to memory.

So what does play look like at St. Andrew’s?

Play is integral in all aspects of early education. In the Responsive Classroom (RC) setting (see Chapter IV), educators strive to meet student’s need for a sense of belonging, significance and fun—the guiding principles of the program. Inside the classroom, elementary-aged children find the fun in academic choice and game playing.

In parallel, outside play at recess and break time also cultivates a child’s desire for free choice, personal responsibility and relationship building. Educational theorist Lev Vygotsky developed the “zone of proximal development,” a level of cognitive development that is influenced by adults and other children’s interactions with a specific child. According to Vygotsky, “In play the child always behaves beyond his average age, above his daily behavior; in play it is as though he were a head taller than himself. As in the focus of magnifying glass, play contains all developmental tendencies in a condensed form and in itself a major source of development.”

Vygotsky followers believe that a child’s developmental growth is directly influenced by those around him or her. Educators are seen more as facilitators, and the greatest growth comes from the “give and take” of everyday academic and social interactions with peers. Student’s views and abilities are stretched from observing, copying and integrating the social, emotional and academic skills of their classmates.

When you ask a typical elementary-aged student his or her favorite part of the day, often the answer is “lunch” or “recess.” While many educators may lament that response, the response actually highlights the paramount importance of unstructured time and play in a child’s day.

So, as educators, and for you as the reader, what does this all mean?

What it means for us is a desire to “get out of your child’s way,” so children can play with ideas as well as each other. At St. Andrew’s we offer choice in academics, to allow children a chance to play and have fun. We also recognize that homework should be limited so that your child can rest, regroup and get ready to tackle the social, emotional and academic work planned for the next day.

But only after they played their hearts out at home.

WEB EXTRA!
See how research is informing teaching and learning at St. Andrew’s Lower School.

Peggy Best (pbest@saes.org) teaches Pre-Kindergarten and is Preschool Curriculum Coordinator and Dale Kynoch (dkynoch@saes.org) teaches 3rd grade and is Elementary Curriculum Coordinator.
Feeling valued socially. Feeling emotionally connected. A student who experiences both those feelings is better able to use his or her whole mind to maximize learning potential. That raises one very important question:

How does your child’s school care for his or her social and emotional needs?

The Responsive Classroom® approach to teaching and learning is used at St. Andrew’s from preschool through sixth grade, and it has transformed how students feel about themselves as individuals and as members of our community.

Several years ago, a father of one of my students made it clear to me that the only thing he cared about was his child’s academic standing. He put no stock in whether his child had any friends or could function as a contributing member of the class. At the time, I had only recently been introduced to the Responsive Classroom approach and while I believed on an intuitive level that academic and social success are interconnected, I was not able to articulate the research that supported the important role social and emotional skills played in the ongoing academic success of a developing child.

What I would have directed this parent to is the Responsive Classroom Efficacy Study that shows when the Responsive Classroom is “faithfully implemented, the approach correlated with a substantial rise—a roughly 20-point gain on average—on state standardized test scores in reading and math.”

Many years later, I often think of that conversation and wish that I could have the opportunity to share with that father the clarity I have obtained, through experience and study, in this important area of teaching and learning.

Responsive teaching practices are built on the fundamental belief that along with a child’s need for shelter, food, sleep, and familial love, each growing person is also driven by the need to belong, to feel that their presence is important, and to participate in playful, engaging experiences. Responsive teachers also believe that social skills are like any of the other content areas, such as reading, math, and the arts, and as such, need to be explicitly taught, learned and practiced for children to reach their full potential.

Walking into a responsive classroom on any given day, you will see the direct effect of these central principles in a myriad of ways. From the teacher’s choice of words, to active modeling of expectations, to collaborative grouping, to options for academic choice, and the obviously student-owned approach to classroom rules of conduct.

Responsive teachers begin each day with a community meeting with the intention of developing a strong sense of belonging and significance. This is accomplished by ensuring that every student’s voice is heard and honored within the first few moments of each school day through opportunities to share his or her ideas and experiences with their learning community.
An Intermediate School Perspective

Natalie Adams

**Many of Us Responsive Classroom** believers have known for years that children are happy and successful when they participate in classrooms using Responsive Classroom; classrooms with daily Morning Meetings, Academic Choice, and teachers who use conscious and careful Teacher Language. Now there is data to support these observations.

For the past three years, Professor Sara Rimm Kaufman from the University of Virginia’s Curry School of Education has been studying the efficacy of Responsive Classroom. The research focused on a correlation between the Responsive Classroom programs’ impact on student-teacher interactions as well as math test gains. This study, which found that “frequent use of the approach’s strategies was correlated with higher math achievement” gave us data that confidently supports the link between academic and social-emotional learning.

When I first learned about Professor Rimm Kaufman’s study, one of the parts that I found the most intriguing is how she evaluated the degree to which Responsive Classroom practices were used within schools and classrooms. After talking with her at a conference, Professor Rimm Kaufman shared with me the survey manual that she used to measure fidelity to the Responsive Classroom approach.

One major focus of the survey, and one I really love, is how it encourages teachers to self-evaluate and incorporate that self-reflection, along with classroom observation, to measure teacher’s use of Responsive Classroom. I am planning this year to bring in elements of the study for my own observation and evaluation of our teachers in the Intermediate School division.

Since St. Andrew’s Episcopal School values reflection in conjunction with observation, these new measures are a natural extension of the work that we already do. In my mind, this is a case of research informing practice in the most fluid and natural way (see Chapter XI).

Perhaps one of the most tangible outcomes from this approach came during the 2011-2012 school year when our fourth-grade class had a difficult mid-year change; twins who had both been key members of our classroom community were moving away. You might be asking, “How would such a move impact the learning environment for the students who remained in the class?”

Using the routine of sharing in our morning meeting, children talked about their wishes for the twins in such a way that both the twins and their classmates felt better about the change. The structure of sharing allowed children to find connections with others while sharing things that concerned them. This is not something that fourth-graders would typically feel comfortable doing!

Another central purpose of our social and emotional curriculum is the creation of self-regulation in children. Establishing a democratic classroom that addresses the developmental social and emotional needs of our students is fundamental to the Responsive Classroom CARES approach. Cooperation, Assertion, Responsibility, Empathy, and Self-Regulation are the core qualities that we actively seek to nurture within our students every day of school. It is truly inspiring to observe our children offer an authentic apology for action in a clear, calm, and empathetic manner after having discussed the impact of hurtful actions and brainstormed ways we can fix someone’s hurt feelings. These human skills may seem far removed from the execution of algebra; however, in order to achieve the complicated abstract mental processes necessary for success in math, or indeed any academic discipline, a growing child requires healthy social connection, a belief that their presence matters, and confidence in their own ability to manage the emotional ups and downs that we all experience when exploring new territory.

Reflection is also a key element in a responsive classroom; the end of each day is celebrated with a short community gathering where we actively think back over our day together. These moments of acknowledgement have a profoundly positive influence to support our children in their efforts to understand their own strengths and challenges as learners. It also serves to reinforce strategies for regulating their own behavioral responses. A favorite of mine is the “Compliment Circle,” where students randomly take a card saying “You helped someone today” or “You took a learning risk today” and choose someone within their class to give it to. I saw the power of this activity in the life of a child who worked daily on impulse control challenges when a classmate gave him a card that said “You showed kindness today.” The child receiving the card was so taken aback by a classmate noticing his kind act that he began to view himself differently and found new motivation to redirect his energy in positive ways. The results were not short-lived but continued to fuel his efforts toward self-control throughout the year. This is valuable work not only for the well-being of our students, but also because we know that the ability to exercise self-control is a strong predictor of academic success.

The Responsive classroom approach reaches far beyond the old perception of social and emotional curriculums producing ‘nice’ kids in a warm and fuzzy environment. It allows us to build intelligent guidelines for school and to develop classroom practices that are informed by current neuroscience and are relevant to the children of the 21st Century.

The teachers and administration at St. Andrew’s understand. Suffice it to say that the teachers and administration at St. Andrew’s understand the importance of social cognition as integral to the process of learning for every child. The commitment to this truth has enriched the relationships within the faculty, powered the direction of administrative decisions, and led to happy, self-directing children, who relish their academic successes and believe in their ability to overcome their academic challenges.

**WEB EXTRA!**
See Responsive Classroom in action during an Opening meeting.

Natalie Adams (nadams@saes.org) is Head of the Intermediate School and Christine Lewis is a 1st grade teacher and a Responsive Classroom® facilitator.
At St. Andrew’s, arts integration operates on a continuum. At one end of the spectrum, arts education makes connections in the brain, profoundly affecting learning ability in all other areas. On the other end, the arts promote creativity and expression, and when integrated into academic disciplines, create deeper, more meaningful learning experiences.

“Without music, life would not be fair.” — Unknown graffiti artist

He came for a “shadow visit” as a potential incoming ninth grader. St. Andrew’s is known for its award-winning Jazz Band and the incorporation of pop styles into the music program, so it seemed like a good fit for this young guitarist. He was quiet, and almost sullen, but I offered him a guitar. He didn’t read music, and looked fidgety and uncomfortable during that part of Guitar class. However, when we began working on improvisation, he perked up and agreed to take a turn. He played a blues solo with such depth of expression and musical virtuosity that everyone noticed. I shook his hand after class and said that I hoped he would choose St. Andrew’s. He did.

At first, he struggled with reading music. He partnered with another guitarist and they took turns, one playing while the other moved a finger along the page in time with the music. He practiced reading music, and his ear told him when he was getting it right. Eventually, he was interpreting the notes with such great expression that he became one of the most respected musicians in the school.

Despite his popularity, he always made time for practice, and this required him to be disciplined about his time. He was rewarded for his practice by playing well, and truly enjoying Jazz Band rehearsals. He was always early for Jazz Band and it is no coincidence that he began to enjoy getting assignments for other classes done early.

Four years later, when he graduated with honors, having been accepted to every college to which he applied, I received a heartfelt letter from his mother expressing how much music had transformed his life and contributed to his improved academic performance and happiness.

What is it that helped this boy succeed? What is the magical element in music education that unlocked his potential?

Play. We play music.
I challenge you to go an entire 24 hours without encountering music. Music is a core fiber that connects everything around us, and touches us on a deeply human level. In the last decade, there has been an explosion of research indicating that musical training connects everything in the human brain, making us smarter in all areas, and even raising measurable IQ.1 There are several explanations for this, including music’s direct connection to both math and language,2 its use of memory, its social elements, and perhaps the most ephemeral, but important element: pleasure.3 Children learn better when they are having fun.4

Playing music, especially including musical literacy and improvisation as we do at St. Andrew’s, has the unique effect of “lighting up” most areas of the brain more than any other activity. It is this whole brain effect, combined with the element of “play,” that accounts for the magical music advantage for students like ours at St. Andrew’s.

— AMY WOOLEY

"Art is a way for me to use my imagination and create a whole new world, however I want.”

— St. Andrew’s Student

Arts education, whether in a performing art (as described by Dr. Wooley), or in the visual arts, is a vital component in our work to provide enriching and fulfilling experiences for every child at St. Andrew’s. Recent science confirms what art teachers have long observed—every student can improve their critical thinking and learning skills through art and studio-based experiences.5 Better yet, these skills not only make for more meaningful and satisfying art, but are transferrable to all kinds of disciplines and educational challenges.

Our visual arts faculty designs units of studio based art that tap the special visual and spatial aptitudes described in Howard Gardner’s groundbreaking work Frames of Mind.6 The units are also designed to nurture specific age-appropriate capacities of our students, both cognitive and emotional. Were you to peek in on any of our classes, you might see examples of the following types of learning in action:

- Kindergarteners at morning meetings discussing if the illustrator of The Hungry Caterpillar really liked bugs; or painting students comparing their own work to an impressionist master during class. Some even return to their paintings to add dabs of acrylic, improving on their work. These students are developing empathy and appreciation for diverse viewpoints, making new connections and experiencing why reflection matters in learning and creativity.
- A first grader realizing his brush must be cleaned in water before choosing a new paint color; or an 11th grader planning her first, second and third prints for the etching press. These are examples of lessons that reinforce vital procedural knowledge and skills.
- A third grader asking permission to use purple for his robot drawing; a sixth grader discussing her decision to use a warm or cool color scheme for her self portrait; or an Upper School student doing multiple story boards for a public service video. These are examples of growth toward open-ended inquiry that rewards multiple approaches to problem-solving and draws on personal creativity and voice.
- A ceramics student pulling a wheel-thrown pot up high and beyond its material capacity to stand, watching it collapse into “failure” before her, and immediately gathering up the clay for another try. This is an example of the power of studio-based learning, where the student is encouraged to take informed risks with materials and processes, directly interact with new media and to persist until she reaches her studio goal.

Perhaps most significant, strong art education doesn’t just allow for, but requires students to personally invest in their work. Students are asked to identify and develop their “personal voice” in uniquely creative ways. Once again, new research has been confirming what art teachers have long known—personal and emotional connections to one’s studio work makes for deeper learning and better art. This applies to every student, from early childhood through the rest of his or her life.

But much more is happening through art at St. Andrew’s. Every week students come charging into my studio classroom, bursting with ideas about an art project they are doing for one of their academic courses. Imagine two young hands gesturing energetically in this memorable, and typical encounter:

“I want to use really bright colors because American settlers going west had big hopes and dreams for a new start. Or maybe I could paint myself on the wagon and a sunrise—a sunrise would be good to show a new beginning. But if I was a settler I would have to be strong, very strong to survive all those challenges, so I’ll use thick strong lines. Ms. Cook, do you have any glue? I want to start right now. What do you think?”

These students are highly-motivated learners because their teachers are inviting them to make creative and personally meaningful choices in how they express these ideas.

Dr. Wooley notes connections to math and language skills. Studies now not only confirm that arts-infused curriculum helps the brain consolidate information, but it also helps embed knowledge into the long-term memory, making it easier to retrieve and apply.7

The arts open more cognitive windows through which students can see and explore, retain, recall, and finally, apply ideas and knowledge on any subject. The art faculty at St. Andrew’s is re-inspired as educational neuroscience confirms and continues to reveal the power of a strong visual arts education, and of integrating all the arts in every classroom.

— LAUREN COOK

WEB EXTRA!
Listen to students talk about being artists.

Lauren Cook (lcook@saes.org) is Head of the Visual Arts Department and Dr. Amy Wooley (awooley@saes.org) teaches Intermediate, Middle and Upper School music.
From intelligence and cognitive processing effects to social intelligence and empathy, research shows that learning a second language has a positive impact on the brain. Not only does it expand a student’s understanding of the world but it makes their brain more plastic and flexible and more capable of processing information and conceptualizing learning. The question that we pose at St. Andrew’s and that guides our practice and professional conversations is then: “How can we best teach to the developing brain so that our students benefit from research in linguistic and neuroscience?”

World Languages (French, Latin, and Spanish) at St. Andrew’s are taught with a communicative-based curriculum that emphasizes the three modes of communication. Our students learn to interpret what they read and hear, to connect and exchange ideas with others, and to present their own point of view. They do all three in their second language and in a culturally responsible way. We are preparing young people to enter a social and professional world where they will be ready to function, fluently and respectfully, in one of several foreign languages.

At the instructional level, language units are organized around a final product. Students are challenged to engage in a task that mimics real life. The task provides a social context in which the learner has to use the studied language. These contextualized tasks go from basic functions, like making a puppet character in the Lower School. In the Middle School, students select a movie and purchase a theater ticket. Eventually, there are more complex projects with multiple steps, such as producing a public service announcement on a specific topic in the Upper School.

Why do we think this is the best approach to teaching languages in school? Because this approach recognizes and honors recent research in linguistics, developmental psychology and neuroscience by creating a brain-compatible environment that provides relevance and authenticity to the learning process.

Both Dr. Tracey Tokuhama-Espinosa...
and Dr. David Sousa, in their work on brain-compatible classrooms, highlight the following equation: **Attention + Memory = Learning.** Sousa goes on to explain that it is “sense and meaning that appear to be the primary criteria the brain uses in deciding what to encode to long-term memory.” When students learn a language by realizing an act, by completing a task, they are engaged in something that makes sense, that is meaningful to them. In fact, students can explain what they are doing in language class in such a way that is understood by non-language teachers! They might say: *In French we are designing our dream bedroom and telling everyone about it!* The learning that occurs under these premises is identifiable and significant. Retention occurs because the learning is relevant to the student needs. Furthermore, this approach promotes engagement, curiosity, and especially attention: this is not boring. Our students understand where they are heading in the instruction sequence; they get it!

You might be wondering at this point about the role of grammar in our language classes. Don’t we need it? What happened to the subjunctive? To the prepositions?

Grammar, in fact, is a crucial component of our classrooms, but it has ceded its protagonist role as the goal of instruction, to meaning and communication. It remains essential because accuracy in the way we express ourselves guarantees communication and transfer of meaning. But how do we teach grammar in this different paradigm?

We map a task to elicit the use of the grammar concept while focusing on meaning and form. If the project’s final product is to produce a weather report, we pose the following question: what are the language points that the students need to master in order to accomplish this task? Grammar is to the service of authentic, real world communication.

This last point leads us to contemplate the ways in which we assess our language students. At St. Andrew’s we do not give traditional final exams in languages. We organize instead performance assessments, which are real indicators of what our students will be asked to do in their lives outside school. They are, at their essence, problems or scenarios that mimic situations from the real world. Students and teachers, in partnership, remark and discuss the observable level of proficiency; or better said, “What is the student able to do in the foreign language and with what degree of accuracy and complexity?” Throughout the year, our students are asked to consider their own progress and map out their resulting objectives in an exercise of reflection that facilitates their own learning.

The following ways to present curricula constitute brain-compatible practices: performances, authentic problems, simulations, using technology, projects, scenarios, and concept building, among others. Our program endorses these practices while it engages students in the discovery of another language. At the same time, it grows the self-awareness and empowerment of those who are capable of functioning in another cultural context that they understand and respect.

**WEB EXTRA**

Listen to students and teachers reflect on their performance assessments in Foreign Language.

Maria Diaz (mdiaz@saes.org) is Head of the Language Department.
How would you recognize a school that assigns great homework? Would you choose the one that kept students busy for the most hours at night? That seems ridiculous, doesn’t it? And yet families and schools in the Washington, D.C., area seem to falsely equate hours of homework with academic rigor.

What we should all be focusing on instead is this question: What is great homework? First, let’s address the question of whether we should have homework at all. As a professional learning community, the St. Andrew’s faculty read The End of Homework by Etta Kralovec and John Buell a few years ago. The research on the instructional value of homework is still unfolding. There is reasonable agreement that in elementary grades reading is the best assignment. Older students appear to gain some benefit for the first hour or two and then additional time yields little result. But we also know, from our research into how minds learn best, that the type of work teachers assign really matters, too.

At St. Andrew’s the students have homework. Several teachers have conducted action research of their own to discover if students benefit. By teaching without assigning homework and then teaching while assigning a reasonable amount of reflective or reinforcing questions, we noted a positive correlation with homework. But we need to get the type of homework right.

Do so and we give our students the means and motivation to focus on their academics beyond the school day. Give great homework and we get engagement that extends learning; do homework wrong and disengagement reigns supreme and performance spirals downward. Engagement is key to effective learning; with true engagement anything is possible.

Do you remember ever getting that assignment that so engrossed you that you suddenly noticed it was late at night and you had no idea how all those hours flew by? What inspired you? Did you ever get a packet of fill-in-the-blank worksheets that made your heart sink? Meaning, relevancy or novelty lead to assignments that, even if they don’t inspire that night-owl fervor, create engagement and thus learning. For example, an upper school philosophy teacher uses a short paragraph by Nietzsche with a brief paragraph response that starts...
with the students feeling comfortable but which ultimately shocks them—this is the hook; a 15 minute assignment that takes the class to a higher level of discussion and thought. But this is just part of the story at St. Andrew’s. We can dig deeper; what is great homework?

It begins with understanding how student minds learn best—a little research in this area makes you realize that teachers can both reduce the time students spend on homework AND increase student learning.

Some strategies are teacher driven. For example, research shows that tasks that involve synopsis and recall—like a five-minute summary essay of the day’s class—help students consolidate material in their memory. The same is true of metacognitive tasks that demand students to reflect on how they are learning. Students also work to refine assignments that they have received carefully structured teacher feedback on—just enough to help them step forward, not too much to give the game away. Getting this scaffolding right creates real engagement with the ideas and research shows, helps student performance.

Another example involves chunking. The latest brain research tells us that most teenagers can hold, and this may surprise you, just three things in their active working memory at once. People get around this by chunking—we group bits of information into larger chunks so the brain thinks they are processing just one thing.

Creating great homework includes crafting assignments that deliberately create the chunking you want. This includes memorizing factual knowledge because it frees up limited space in a student’s active working memory for higher order thinking. This is an effective, time-efficient way of increasing student performance, using time outside of class, to increase what a student can do in class.

The goal with all these assignments is quality of work, not quantity of time spent. Students recognize when they are being given quality tasks for homework—they are good at distinguishing real work from busy work. And it does so by “easier” you mean that it reduces the amount of task switching students have to do. Students feel they do better work on the assignments they have, and this positive feedback also helps as it fosters engagement and confidence. St. Andrew’s also makes sure that the conversation of what is great homework is an ongoing research topic that teachers are driving forward through the sharing of best practices based on brain research (see Chapter XI). One outcome of such research is that students who are not enrolled in Advanced Placement classes will not have homework over extended school breaks.

One important strategy is training students how to do homework. For example, research tells us that task switching (going from the 10th math problem to Facebook or Twitter then returning to the homework) inhibits memory consolidation. Research also suggests that music at the right beat with no words, might help some tasks—but not things related to memory storage. We often coach our students to avoid listening to music when studying so that their whole brain can be engaged in what they are trying to have “stick” in their memory. Getting students to resist these behaviors is not an easy task, it goes against habit for many. To help with this, we make sure it is part of a much larger ongoing discussion with students about metacognition and self reflection. Middle and Upper School students read articles such as, “What You Should Know About Your Brain.” Why do this? Because as the article’s author, Dr. Judy Willis states, “Teaching students the mechanism behind how the brain operates, and teaching them approaches they can use to work that mechanism more effectively, helps students believe they can create a more intelligent, creative, and powerful brain.” Students should know, and be honest about, what works for them as the individual learner they are. Metacognition, self-reflection and exploring strategies are deeply ingrained parts of the St. Andrew’s student experience. It is how we do school.

The best thing is, this works for all students. Everyone, no matter how strong a student, benefits from the St. Andrew’s faculty’s attention to great homework. Better assignments lead to better learning. A stronger set of study skills enhance student performance and potentially allow them to sleep more. And we know from research that sleep is critical to learning as it aids in memory consolidation as well as playing a critical role in immune function, metabolism, and attitude.

Think of Sisyphus—the figure from Greek Mythology condemned to roll the boulder to the top of a hill only to see it roll back down—as a metaphor for more traditional approaches to homework. And as he climbs, he calls out, “academic rigor equates with the size of the homework pile.” So at St. Andrew’s we proudly say, yes, our homework is indeed easier—if by “easier” you mean that it reduces the Sisyphus mindset, where students feel doomed to spend eternity pushing a boulder of disinterest up a mountain of worksheets and busy work. And it does so precisely because it is anything but trivial. It is purposeful; it is thoughtful; it is based on how we know minds learn. But it goes beyond this, we are also training habits of mind, habits that our students will take with them to whatever college they attend or profession they choose. This is the heart of St. Andrew’s desire to assign great homework: a mindfulness towards work that advances learning.
“Learning is not only a cognitive and social experience, but also an identity experience.”

Every student is on an identity journey, one that has significant implications for an individual’s learning. It is often an intense journey full of emotion and resilience building, which taps into brain function in myriad ways.

E.J., a senior at St. Andrew’s, thinks huge thoughts every day. He loves to analyze the U.S. military-industrial complex from all sides, using evidence and reason from his diligent reading. E.J. has deep levels of cognitive reasoning, but at times gets slightly derailed in his ability to capture those meaty ideas in writing. He is also an African-American student of some out his place in a predominately white, affluent independent school. While he is trying to organize his writing, his brain is also working on some big questions: “Who am I? Who can I be in this school? Who is having an experience similar to mine? Am I different, and does it matter?” Despite being affable and charismatic, his journey to understand the many components of his identity, as a learner and a social being, can be challenging.

Those who work in education know the importance of doing right by students whose identity journeys are particularly challenging. Diversity programs at schools often center on those students whose identities need shoring up, and building awareness in the community about the richness a diverse community can bring to the learning experience. At St. Andrew’s, we strive to do that and more by systematically considering the impact of identity formation on learning, leadership, and community building.

A few years ago, teachers at St. Andrew’s underwent training in educational neuroscience. Many of our colleagues at St. Andrew’s thought, “this is a great diversity tool! We can now more precisely describe each child’s strengths and weaknesses and work to maximize their potential. We can avoid falling into racial, class or other stereotypes to describe a student’s learning or excuse low teacher expectations.” But we also questioned, “should a student’s identity matter in the context of learning potential?”

Brain research actually confirms our hypothesis that it ALL matters. We know there is an interdependence of cognition and emotion in the brain. Our ability to bring information into the thinking areas of the brain can be derailed by emotional stress. A near constant flow to the brain of stress-produced cortisol causes the brain to focus solely on physical survival, rather than higher order cognition. Educational institutions should recognize this important cognitive phenomenon and work to mitigate the effects. Similarly, knowing the power of emotion in learning, we as educators should look for ways to maximize students’ emotional connection to academic content.

We are a very diverse campus at St. Andrew’s, but like most independent...
also references affective dissonance, or the concept that minority group members who decide to participate in activities or behaviors that are perceived to be associated primarily with the dominant group experience an emotional push and pull between their native and their target cultures, often manifesting in feelings of betrayal or duplicity.¹ At St. Andrew’s, we aim to lessen the affective dissonance that could occur for students whose home cultures may not be as closely aligned with the perceived culture at our school.

Through our advisor program, we solidify the partnership between school and home, thereby chipping away at the feeling that school culture and home culture are mutually exclusive or worlds apart. The more that we bring the whole family into our efforts to educate young people, the tighter the web of support that children need to be successful. Our student affinity groups, the Jewish Culture Club, Black Student Alliance, the Gay Straight Alliance (GSA), Arabic Culture Club, Diversity Club, and Gospel Choir provide a space at school where home culture can be nurtured. Affinity groups offer a break from integration fatigue while providing a strong message to students that we support the internal integration of their full selves into our community.

We know through research that cognition and emotion are firm partners. Why does that compel us to create inclusive school environments? Because, when we don’t feel safe, or supported, when our brains are dealing with processing the complicated (and often survivalist) reactions that can come from a heightened sense of emotion, there is simply less brain power available to lay the track for learning and retention.

The presence of our GSA stands as an example of our understanding of this important relationship. The Gay, Lesbian and Straight Education Network (GLSEN) 2009 National School Climate Survey reports that nearly 30% of LGBT students missed either a class or an entire day of school in a given month and that students who were victims of homophobic harassment in schools underperformed compared to those who were not victimized.⁴ GLSEN also offers that schools with an anti-bullying policy that explicitly admonishes against homophobic and sexist words and actions leads to a more proactively safe environment for LGBT students.

St. Andrew’s has such a policy that stands alongside our day-to-day work on anti-homophobia. The safe space of the GSA, and the inclusivity modeled in our policies and practices, allow our LGBT students and their allies to come to class with a mind more focused on the classroom than the hallways, giving them a more level cognitive playing field.

What we have always done well at St. Andrew’s is to know our students from every angle. Since we incorporated a research-based approach to teaching and learning, we now factor in a student’s identity journey into our analysis and strategies to help him or her reach their learning potential. We are able to pinpoint the most critical areas of cognitive weakness in children, and mobilize efforts to address those vulnerabilities. Our PS-12th grade level discussions about a student involve teachers describing a child’s active working memory along with observations about how issues of identity may be impacting their learning. Teachers in every division find ways of “providing connection, safety, and an understanding of social norms,” as explained by Christine Lewis in Chapter Four.

Resilience is another interesting component of brain activity and identity. The ability to bounce back from setbacks is essential to many biological and well-functioning social systems. Resilience is the key to biological evolution, successful government leadership, as well as profit-driven companies. The key to sustaining such organisms and institutions, is their ability to withstand the “inevitable shocks to the system.”⁵ Similarly, the human brain is wired for, and seeks out resilience.

When asked how we summarize the work we do at St. Andrew’s around identity and diversity, we like to refer to Beverly Tatum’s research around creating inclusive environments in her book, Can We Talk About Race?.⁶ An institution must affirm identity, cultivate leadership, and build community to become truly inclusive. At St. Andrew’s, we take that framework one step further to argue that an inclusive school must support every child’s important journey toward understanding themselves as learners and people.

WEB EXTRA!
Listen to teachers and students talk about diversity at St. Andrew’s.

Rodney Glasgow (rglasgow@saes.org) is Head of Middle School and Stacy Kincaid (skincaid@saes.org) is Director of Diversity.
The Roots of Student Success

CAROLYN FORD (CLASS OF 2002) AND NICOLE HAUSPURG (CLASS OF 2005)

In 2002, I graduated from St. Andrew’s and went to Duke University on a soccer scholarship. The majority of people who attend Duke come from schools like St. Andrews. However, in my freshman year writing seminar I was paired with a girl who was not as fortunate. We had to turn in a paper as a pair. We each took a stab at different sections. When she sent me her part, it was immediately clear to me that she did not experience the rigor and instruction that I had from attending St. Andrew’s in middle and high school.

Her sentences were run-ons, her writing was unclear; there was no structure. She was not able to write clearly and logically, a skill that I learned early on and completely took for granted. It was at this moment, that I realized the exceptional quality of the education I received in those formative 7-12 grade years. Essentially, St. Andrews gave me the foundation to be successful at Duke academically by providing me with an exceptional education and teaching me how I learn best.

St. Andrew’s allowed me to discover my learning strengths, and allowed my friends to do the same. It is a place where all types of learners can develop. I left high school as a successful learner and with the knowledge of how I learn best. That resulted in a continuous desire to learn and develop. This is a desire I still have today, and has been at the forefront of my career decisions.

The quality of my high school education motivated me to join Teach For America after getting my undergraduate degree. In college, I realized how important education is to a person’s success. Some of my peers, who were not as fortunate as I was, were at an academic disadvantage at Duke. Despite that, they were likely going to be successful in their chosen careers because they earned a college degree from an exceptional university. It really troubled me that some children would be at a disadvantage in high school if they didn’t have a good middle school education, and behind in middle school if they didn’t have a good elementary school education.

Would these children ever even make it to college? It didn’t seem right that because my parents were financially able to send me to an academically rigorous school, and others’ parents are not, I got a better education that allowed me to get into Duke and thrive. I joined Teach For America because
I believe that a great education is a civil right, and an equalizer.

After teaching I continued my education and earned an MBA. In my post-MBA position, I learn and develop each day—something that is necessary for my career—a mindset that I first developed while at St. Andrew’s.

—CAROLYN FORD ’02

I remember what I hear. This type of learning is rare. Studies show that people remember only 10% of what they hear, 30% of what they read, but 80% of what they see.1 I fall into that first category. Specifically, I remember voices. These voices are a common thread connecting each step of my educational journey.

It was at St. Andrew’s that I began to truly listen to these voices and in doing so learned that the critical difference between a degree and an education is measured by how we act upon what we learn. I continue to benefit from St. Andrew’s mission to “know and inspire” each child, for it helped cultivate, support and encourage my own unique learning style. This learning style of listening to the voices around me can be summarized in an education equation of sorts: knowledge + inspiration = positive change.

The first voices I encountered at St. Andrew’s were inside the classroom. Confronted by a break to my dominant arm in middle school, one of my teachers suggested I take notes and tests with a tape recorder. He quelled my fears of receiving special treatment by explaining that my education was not just for me, but for those I would impact in the future. In contrast to an anticipated decline in grades, my newly acquired auditory study skills propelled me into a new place academically. I not only learned how I learned best, but I came to love what I learned. Compounded with this newfound understanding of my learning style, I was encouraged by my teachers to listen closely, think critically, and respond creatively to issues and questions that arose in the classroom. In classes that I gravitated towards, as well as those I struggled in, I found my teachers patient and willing to help me better understand. I am grateful to those voices, for now I recognize how the St. Andrew’s faculty used theirs to inspire students to better understand the world around us.

The second type of voices St. Andrew’s encouraged me to listen to were those outside the classroom. My most memorable classes were those that bridged the lessons in my books with people and events outside of the classroom. The Oral History Project encouraged me to absorb the words of civil rights activists and social justice trailblazers—the voices of Americans who had lived lives of knowledge translated into action. The Race & Culture class featured service learning and exchange between students of not only different schools, but different continents, and broadened my perspective by introducing me to voices of courage, social change and hope that I carry with me to this day. Service opportunities, such as the Senior Project, helped humanize issues and tools I learned about in class and put them in a modern day context. This way of learning continually emphasized that knowing is not enough – but coupled with inspiration, it is a catalyst to contribute positively to the wider community.

Above all, St. Andrew’s taught me how to listen. While the auditory learner in me prefers listening to speaking, beginning at St. Andrew’s, listening to voices galvanized me to find and use my own. In doing so, St. Andrew’s bridged the gap between knowledge and action, through inspiration.

Finally, St. Andrew’s encouraged me to listen to voices beyond the classroom. In college, I was well prepared to listen critically and respond constructively to the voices around me – through classes, extracurricular activities and direct service. On a volunteer trip for Hurricane relief my freshman year in college, a classmate and I were motivated by the voices of survivors. We put together a campus organization providing women students a space to add their voice to the political dialogue. After graduation, at an international non-profit, I learned to listen to and advocate for the voices of women human rights survivors and activists from around the world.

Now in law school, I am determined to become a better advocate—to use my voice to amplify the voices of those who can only whisper.

Above all, St. Andrew’s taught me how to listen. While the auditory learner in me prefers listening to speaking, beginning at St. Andrew’s, listening to voices galvanized me to find and use my own. In doing so, St. Andrew’s bridged the gap between knowledge and action, through inspiration. In this way, I learned that the substance of what I learn and process through which I learn it is inextricably connected; knowing is about the substance of what I learn, and being inspired is how I seek to translate this knowledge into positive change.

—NICOLE HAUSPURG ’05

WEB EXTRA!
Read more St. Andrew’s alumni success stories.

Carolyn Ford ’02 earned an undergraduate degree from Duke, and after serving in Teach For America, has earned an M.B.A. from Duke’s Fuqua School of Business. She now works for The Boston Consulting Group. Nicole Hauspurg ’05 earned an undergraduate degree from Georgetown University, and after working for the nonprofit Vital Voices Global Partnership, is now a student at Boston College Law School.
As an Episcopal school, service to others is encoded in St. Andrew’s DNA. It is part and parcel of who we are, included in our mission statement, and incorporated into curriculum and community life alike.

In keeping with the teachings of most major religious traditions, we understand ourselves to be called by God to love our neighbors—which is to say, the neighbors we know and the neighbors we have yet to meet. This means genuinely caring for and about other people, providing for their needs as appropriate, and offering a compassionate, empathetic ear whenever possible. While a life shaped by service is life-changing.

In addition to contributing to our Episcopal identity, service is essential to St. Andrew’s mission because it leads to growth. We all know this intuitively. At its core, service invites us to redirect our gaze—even if only briefly—away from our own interests and desires. This, in turn, cannot help but expand our worldview. We understand this at St. Andrew’s, which is why, from our youngest children raising money to buy goats for our sister school in Haiti, to our 12th graders devoting 60 hours to in-depth community service before graduation, every student has multiple opportunities over the course of his or her school career to grow through serving others.

What is particularly exciting for us as educators is to hear students articulate their experiences with service—including both the joys and the challenges. Upon returning from a service trip in downtown Washington, an eighth grader offered the following reflection in Chapel:

Unlike the other service sites I had worked at previously, I was interacting face-to-face with the needy community of the D.C. area. Originally I had wanted to work in the kitchen. I had purposely intended not to interact with these people. Luckily for me, though I didn’t know it at the time, the opportunity passed for me to participate in the food preparation. Instead I got to experience something that many people never get to do. I got to meet and talk directly with people in need.

This student’s shift, from concern over contact with “these people” to embracing the opportunity to meet and talk with folks in need, points to a fairly dramatic sea-change in relatively short order. These connections are transformative. As they start to imagine themselves in the shoes of the other, students flex their empathy and compassion muscles in new—and perhaps altogether surprising—ways.

But what does all of this have to do with neuroscience? How does serving others shape not only students’ character but also their malleable brains?

It turns out that the effects of service on brain development are myriad. Renowned psychologist Daniel Goleman, who is perhaps best known for his work with “emotional intelligence,” has collaborated in recent years with the Dalai Lama, him-
What Service Looks Like in the 9th Grade Classroom

GINER COBB

FOR THE PAST SEVEN YEARS, St. Andrew’s 9th grade Service Learning students have discovered first hand the issues of homelessness. By having a meal and a conversation at Loaves and Fishes with local homeless men, women, and children; by selling newspapers for their assigned vendor from Street Sense; by chopping carrots at DC Central Kitchen; by boxing canned goods for Capital Area Food Bank; and by gleaning food for local shelters.

One student in the Service Learning class remarked, “I wasn’t sure what to expect from our first service learning trip, but I knew I needed to be open-minded and step out of my comfort zone. Going into the Samaritan Ministry’s office helped me see how helpful and effective they can really be. I also benefitted from hearing the real, true-life stories of some of the participants. It’s amazing to me to see how much Samaritan Ministry can do for the homeless.”

Another student said “the first thing I think of when I see a homeless person is odd. I don’t want to talk to them. When we went to Loaves and Fishes, I talked to a man who was homeless, but he acted like a normal person, just like me.”

In Mary Helen Immordino-Yang and Antonio Damasio’s article, “We Feel, Therefore We Learn: The Relevance of Affective and Social Neuroscience to Education,” the authors state, “As recent advances in the neurobiology of emotions reveal, in the real world, cognition functions in the service of life-regulating goals, implemented by emotional machinery. As educators have long known, it is simply not enough for students to master knowledge and logical reasoning skills in the traditional academic sense. They must be able to choose among and recruit these skills and knowledge usefully outside of the structured context of a school or laboratory.”

At St. Andrew’s, we believe that our service learning program provides our students with the crucial opportunities to go outside of the structured environment of the classroom and learn about themselves and others in meaningful and powerful ways.

self a dedicated student of neuroscience. By studying the brain scans of Buddhist monks during meditations designed to promote feelings of compassion, Goleman discovered what he refers to as a “brain shift” when compassion is generated. Goleman concludes that, “The very act of concern for others’ well-being...creates a greater state of well-being within oneself.”

Clearly Goleman’s findings have important implications for schools, where students regularly do battle with feelings of stress and fear. When the amygdala, the emotional center in the brain, is assaulted by fear or stress, both short-term memory retention and higher-order cognition are impacted negatively. But studies show that the converse is also true: When the anterior cingulate, the structure in the brain associated with empathy, is active, “attention, working memory, motivation, and many other executive functions” are improved. This underscores the value of placing students in situations in which they have an opportunity to experience feelings of empathy and compassion for others. By developing caring relationships through service, students reap significant neuroeducational benefits that impact their own learning.

In addition to shaping students’ ability to empathize with others, service learning also has been shown to stimulate the brain simply by virtue of its nature and design. We know that exposure to novel conditions and stimuli—such as the student who couldn’t hide in the kitchen—helps the brain to grow in new ways. As well, service learning provides a context in which students can make connections between content learned in the classroom and its application in “real-life.”

So how do we, as parents and educators, leverage these many brain-beneficial effects of service learning for our own students? To begin, we can support our young people’s enthusiasm for service by providing opportunities to participate in up-close-and-personal, face-to-face experiences that will enable them to build up their compassion muscles. In addition, and perhaps even more importantly, we must give students a chance to reflect on their experiences in order to mine them for what they’ve learned. Research literature bears out the importance of reflection as “the transformative link between the action of serving and the ideas and understanding of learning.”

At St. Andrew’s, faculty offer such meta-cognitive moments in which students are asked to think about what and how they learn, all the time. Whether it is through journal exercises or class discussions, informal bus ride conversations or Chapel talks, students are challenged regularly to interpret and extract meaning from their service of others. This provides an opportunity to acknowledge any preconceived stereotypes or reservations they might have harbored, as well as to claim their own struggles to make peace with a world still marked by social and economic disparity.

St. Andrew’s students are groomed for service from a very young age, and they love it. The fact that it also helps to improve their sense of well-being, their social cognition, their higher-order cognition, and their problem-solving skills is icing on the cake. Perhaps we need not let them know how “good it is for them,” lest it somehow diminish the appeal. The brain-based benefits of service can remain our little secret!

WEB EXTRA! Listen to St. Andrew’s students and teachers talk about their service work in Haiti at the National Association of Episcopal Schools Conference.

Patricia Alexander (palexander@saes.org) is Chaplain to the Middle and Upper Schools and Head of the Philosophy and Religion Department. Ginger Cobb (gcobb@saes.org) is Assistant Head of the Upper School and Co-Director of Service Learning.
Teacher research—research that teachers perform in their classrooms and with their students—has always been a problematic concept in academic circles. Many believe that you can choose to be a teacher or a researcher, but not both. No Child Left Behind has reinforced this dichotomy, with high-stakes, standards-based testing determining funding and defining academic achievement.

At St. Andrew’s, we believe that such educational trends make what we do every day with students and teachers that much more essential. Teachers here do not merely consume the knowledge that researchers such as Mariale Hardiman, Daniel Willingham, and dd Tracey Tokuhama-Espinosa produce, but instead actively construct their own. The best teachers, whether they work with preschoolers or AP students, define themselves in this way. Their thinking is predicated on the principle that teachers are researchers, constantly looking for ways to improve the learning environment they design for their students.

With the recent emphasis on educational neuroscience—of developmental psychology, neuroscience, and cognitive science—the idea of teacher as researcher has become an even more reciprocal one at St. Andrew’s. The more a teacher researches how the mind works, the better she is able to implement strategies to enhance teaching and learning in the classroom. This, in turn, compels the teacher also to be researching within his classroom, testing hypotheses in current research, and building theories of his own through application and analysis. Thus the tension between teacher and researcher becomes one of symbiotic partnership.

This reflective attitude is the hallmark of exceptional teaching and learning at St. Andrew’s. Decisions we make about how and what to teach are generated organically from current research and from classroom experiences. We know that our teachers are the authorities on their classrooms and with their students—and should be valued and encouraged to see themselves as such.

But how does this happen? We are constantly using research to validate, inform, and enhance our program and curriculum to fit our students and classrooms. This reflects our belief that what makes teaching and learning “exceptional” is that it embraces research as a means by which to further professionalize our educational practice. From afternoon sessions to week-long national conferences, teachers are constantly seeking opportunities to learn beyond the walls of St. Andrew’s. This also includes our burgeoning association with The Johns Hopkins School of Education and partnership with Teach For America, wherein we have had the opportunity to train, mentor and partner with hundreds of local public school teachers and develop our “exceptional school visits” program. Additionally, many teachers use their summer months to deepen their professional practice through our grant programs and through summer reading. All of this fortifies a
Finding the Right Recipe: How to Cook for Every Student

AMY HELMS

IT HAS BECOME A Cliché TO SAY that in the information age, students must learn to express themselves in order to be successful. We know kids need foundational writing skills but, year after year, students struggle with writing. That was exactly the case last year in my fifth-grade class.

My students’ parents and I were concerned that, despite the time students were putting into research and writing, their ideas lacked focus. More disconcerting, they saw writing as a challenge and a chore.

Like most educators, my initial response was that these children would require more. More time. More help on assignments. More tutoring.

But what exactly was I going to do with all that more? I could sit down with them and help them revise our current assignment—but that was not going to give them the tools in the short or long-term to become more proficient writers.

What actual techniques could I share that would help them develop the critical written expression skills they needed? I spoke with fellow teachers, researched professional texts for instructional strategies, and came up with a laundry list of ideas. They needed better outlines. They needed to use technology. Better still, they could learn revision strategies. In essence, I had a spice cabinet of options.

But what was the right kind of seasoning? In order to move forward, I had to pull something off the shelf and try it.

I began by teaching them how to use an organizational flow chart to sequence their work. This worked for some, but not for everyone. Some students needed a little more seasoning.

Like a researcher (and chef), I observed what was happening and tested possible solutions. I looked over their work and saw they were missing transition words. I pulled a group together and taught them how to revise by adding transitions. Their pieces now had a lot of “Therefores” and “In additions,” but the writing still did not flow smoothly. I turned to colleagues for ideas. Our librarian suggested I incorporate the use of the learning software, Kidspiration, which, with the click of a button, transfers a child’s outline into a Word document.

This resource helped, as their paragraphs were now sequenced logically and their ideas were clearly reflected in their writing. However, their paragraphs remained sparse. For some, I had found just the right set of ingredients, for others, I would need to keep trying. If there is one thing students hate to do most, it is to revise their work. Once students are done, they rarely want to go back and change words, add and subtract lines, or—worst of all—add detail. So I introduced the process of oral rehearsal whereby students can say what they are going to write out loud to a partner before committing it to paper.

Looking back, no one of these strategies was the magic bullet. I did not pull out the ideal spice in perfect proportion on the first try. Instead, teacher and students worked in concert with one another. Some students needed one or two strategies, and others needed them all. Through each trial, I learned how each of my fifth graders approached the writing process, observing what they were doing and hypothesizing, theorizing, and testing solutions. Every trial was closer to the right fit. And, pretty soon, I realized that the right tools were going to be different for each child.

What I have learned as a teacher through processes like this one is that there are no neat and simple solutions when students encounter difficulty in the classroom. More time. More practice. More technology. Those are quick and easy answers to complex problems. The real work of helping each child achieve his potential is messy and requires many false starts—but that is the work, and joy, of teaching.

SLPs illuminate our institutional belief that the research we perform as teachers should not happen in classroom silos but instead through thinking and learning together. We have a professional responsibility to collaborate in myriad ways. From our in-service days to our opening and closing employee meetings to weekly divisional meetings, we constantly learn from each other, troubleshoot together, and adapt strategies to strengthen learning across classrooms, grade levels, and disciplines. And who benefits from all of this? The answer is simple: our students do.

Thus, as St. Andrew’s teachers, we have become even more metacognitive about how we teach and learn and, in so doing, better support our students and each other. It’s the same goal we instill in our students: to understand themselves as learners so that they are their own best advocates moving forward. St. Andrew’s commitment to the belief of teacher as researcher thus encourages “the possibility of transformation and renewal” for every teacher, just as it does for every student.

WEB EXTRA! See how research informs and transforms teaching and learning at St. Andrew’s Lower School.

Amy Helms (ahelms@saes.org) teaches 4th grade and Dresden Koons (dkoons@saes.org) is Head of Lower School.
Smart use of technology deepens learning. It allows students to design, study, research, communicate, and self-direct their learning in ways only 21st century technologies allow. How do we know this? Begin by asking a teacher. In the words of Judy Kee, our 5th grade teacher, “Brain research shows that positive interest and appeal really helps learning. And I think laptops actually bring a lot of appeal to the students for their learning.” Next, pop into any St. Andrew’s classroom. You’re likely to hear snippets of tech jargon floating by. With a laptop in the hands of every student, technology use has evolved from a special event to a natural part of the learning process. Teachers are assuming new roles in the classroom, moving away from the lectern and allowing students an equal footing to share their expertise with technology tools and skills, in a learning partnership.

On the Postoak campus (grades 4-12), on the second floor of the main building, you’ll reach the 7th Grade Life Science classroom. In the far back corner of a bright-windowed classroom, Josh is adjusting the camera focus as his partner makes a tiny move of the cardboard pieces of the cell cycle they have both helped to design (see Chapter II). For their stop-motion animation project, they have shared the roles of researcher, writer, producer, director, set designer, camera operator and editor. The final movie is all their creation, to be shared with classmates, teacher, family, and if they choose, a larger community through YouTube. When the credits role, the students take bows for the fun and comprehensive animated movie they produced. They are virtually unaware that they now understand the process of mitosis well enough to teach it to others. For assessment purposes, their teacher has an immediate window into their level of understanding for this unit.

With professional-level technology tools to explore, collaborate and create with, students experience learning on a more personalized level. Brain research tells us that emotion acts as a lubricant for learning as well as a glue to help new ideas stick. The more a student can recognize the real-world relevance of classroom content and make it meaningful personally, the more deeply engaged that student becomes, both emotionally and intellectually.

Textbooks and lectures have their purpose and their place, but alongside these traditional teaching tools, we now find student-created tools of learning—podcasts, stop-motion animations, blogs, glogs, digital books and music. The list goes on. Technology is fueling this transformation where teachers are allowing students the responsibility to be co-creators of their own learning, just as they are encouraged and guided to understand how they learn best. Placing this responsibility and trust in students as learning partners raises the expectation that they will take advantage of the professional tools to make connections.

Having used stop-motion in his middle school science project, Josh had a highly personal experience of learning. Based on the positive emotion connected with this,

The iSchool: Smart Technology for Every Student

ANNE MACDONELL
he is more likely to take the risk to choose increasingly creative means to express his learning through high school, encouraged by his teachers. Through engagement in meaningful, collaborative learning, Josh becomes more confident in applying critical thinking to knowledge and presenting projects in varied media using 21st century tools.

The power of putting a laptop into the hands of every student comes from a combination of teacher willingness to transform the traditional classroom roles and student initiative to meet the challenge of being a partner in learning.

Still, questions remain about how much technology enhances student learning as well as what are some of the drawbacks to deeper technology integration. Cathy Davidson writes in her book, Now You See It: How Technology and Brain Science Will Transform Schools and Businesses for the 21st Century, “Many of our anxieties about how the new digital technologies of today are ‘damaging’ our children are based on the old idea of neural development as fixed, or ‘hardwired,’” and on notions of distraction and disruption as hindrances instead of opportunities for learning.

Davidson believes that concerns about attention and multi-tasking do not account for Donald Hebb’s theory of learning that affirms brain plasticity, or what can be summarized as “What fires together, wires together.” Davidson maintains that the many items clamoring for our attention represent opportunities for the brain to form new and more efficient patterns, which do not accumulate on top of previously learned routines but replace them. This new theory has replaced the previously accepted educational theory that knowledge accumulates in a linear fashion.

At St. Andrew’s, our work on understanding the impact of the latest neuroscience research on teaching and learning has already transformed our classrooms and our pedagogy. In recent years, as a result of training, we have moved well out of our comfort zone as the ‘sage on the stage’ to assume new roles facilitating discovery, creation, critical and independent thinking.

Teaching at St. Andrew’s is a process of continuous renewal in a community of lifelong learners. With the arrival of our one-to-one laptop program in 2012, our teachers are collaborating to re-examine, expand and update their approach in the classroom. They are blending new digital tools into a curriculum that supports the latest in what we know about how the brain learns best. As they explore new possibilities for integrating technology, faculty members share what they have learned across grade levels. The encouragement and inspiration they derive from working with supportive colleagues offer teachers a safe environment to take risks with new teaching methodologies and technologies.

A teacher who understands the neuroscience behind the learning process is key to achieving authentic and measurable results when it comes to utilizing technology. It is also crucial that a teacher establish learning goals. At St. Andrew’s, our faculty are informed by this process to determine essential questions for each course, and often for each unit in a course, as well as effective assessment methods.

As they recreate their courses continually, teachers will each develop a personalized technology toolkit comprised of software, websites, and resources that are used, to varying degrees, to enhance learning. Some of these tech tools will be used across the curriculum and others on an infrequent or specialized basis.

At St. Andrew’s, faculty in all divisions just as the brain rewires itself for greater edge, so our teachers are transforming their methods to create new opportunities and pathways for learning engagement.

With professional-level technology tools to explore, collaborate and create with, students experience learning on a more personalized level. Brain research tells us that emotion acts as a lubricant for learning as well as a glue to help new ideas stick.

WEB EXTRA!

Listen to Intermediate School teachers talk about St. Andrew’s 1-to-1 laptop program.

Anne Macdonell (amacdonell@saes.org) is Director of Academic Technology.
For years we have been trying to help soccer players understand the proper technique for passing the ball using the inside of their foot. We would declare, “Heel down, toe up” or even go so far as to hold a player’s foot and ask them to lock their ankle as we attempted to press it down. In the past, it might take weeks or longer for them to finally understand and implement what we had been trying to teach them.

Today, that same exercise takes days, sometimes even less. That same athlete gets visual confirmation of their technique—good or bad—as we record their passing during a practice using an iPad and play it back for them on the spot for immediate feedback. The use of this technology is transformative in that it creates a more brain friendly learning environment on the field. It is a result of how much more we know about how student athletes learn.

One of the great opportunities afforded to teachers is the ability to work with students both in the classroom and on the athletic field. At St. Andrew’s, a high school student-athlete spends nearly three and a half hours per week in the classroom of each of his or her subjects. A junior varsity or varsity athlete spends approximately ten hours training or competing in their specific sport.

The responsibilities and skill set of a coach are similar to those of a teacher. They nobly pursue providing each of their student-athletes with the knowledge, skills and confidence necessary to meet their potential on the field, court, or track. Assessments come in the form of games, matches, practices, competitions, and relevant statistics. Thus, like teachers, how coaches deliver technical and tactical information to the team or individual has strong implications for personal and collective growth and success. Unfortunately, most coaches teach their sports in one predominate, traditional way.

Similar to the classroom, students bring their unique learning strengths and weaknesses to the sport in which they play. More importantly, sports, with their increased neuromotor demands, provide a different arena for talents that may lie dormant in the classroom. But a student who struggles understanding concepts delivered orally in class will have the same problem on the athletic field.

As recreational, club, and high school coaches, we have observed that lecture, model, and drill remain the prevailing way high school athletes are taught. Don’t just take our word for it. Observe how coaches interact with their players at halftime of almost any game and you will see the predominate coaching style in action. Certainly, the magnetic board and chalkboard, as well as technology, can also be found in many coaches toolbox. We also believe strongly, that knowledge of how the brain learns needs to also be part of every coach’s training and communication if he or she truly wants to get the best from each student-athlete.

The Center for Transformative Teaching and Learning is helping St. Andrew’s coaches recognize that whole class and
As coaches, we need to find each player's motivation so they will not only see the need, but also actually put in the hard work to reach his or her potential.

Deep athletic practice of the kind mentioned in recent social commentary (such as The Talent Code) places large demands on each student's mind including, but not limited to the eight neurodevelopmental constructs that St. Andrew's teachers and coaches have intensive training in: Attention, Temporal Sequential and Spatial Ordering, Memory, Language, Neuromotor Functions, Social Cognition and Higher Order Cognition.

As a result, some coaching strategies that take into account how the brain learns include:

- Coaches help their athletes understand the language of their sport by having them write out and define key terms and quizzesing their athletes on them. Thus, coach and player can have a common language in which to learn the game.
- Coaches provide a visual picture of what they are trying to articulate orally. A significant “game-changer” in the classroom has been technology. This tool is already shown to be having the same transformative effect on how students acquire the skills and knowledge of each of their sports.
- Coaches test their athletes as to whether they heard and understand a set of directions through immediate recall, especially after a half-time speech.
- Coaches have players repeat potential patterns of play so athletes can understand how time and space are used.
- Coaches refrain from communicating during a scrimmage or game in order to let the athletes figure things out. (This is similar to what Peggy Best and Dale Kynoch describe in Chapter III.)
- Coaches provide athletes opportunity to evaluate their performance and write reflections after each game.

The social and emotional brain is also particularly important to student-athletes. Teachers see what stress, anxiety, and pressure does to student performance on tests. The amygdala, when it senses fear, freezes a student-athlete's ability to engage their prefrontal cortex in the higher order thinking that both the classroom and the playing field demand. If you have ever watched a sporting event, you have witnessed firsthand what supreme confidence (e.g. Usain Bolt in the 2012 Olympics), stress or fear can do to athletic performance.

So what should all this emerging science and theory mean for your son or daughter who is a student-athlete? It means that 21st century coaches recognize that every athlete brings a brain that receives, processes, and stores information differently. Therefore, the design of practices and the communication of strategy must take into account the cognitive demands associated with competitive athletics. Such mindful coaching is a dramatic departure from how coaches traditionally develop each of their athletes, but reflects how much more we know about how the athlete's mind learns.

As former high school and collegiate athletes, we recognize that competitive athletics teach skills and provide experiences that cannot be replicated in other areas of school life. Playing competitive athletics at St. Andrew’s is not only about performance, wins and losses, it is also about learning. Considering the number of hours coaches dedicate to challenging and supporting each of their players, a commitment to better knowing the mind of an athlete becomes equally important to knowing the sport in which they coach.

WEB EXTRA!
Watch St. Andrew’s students talk about their athletic experiences.

Kevin McShane (koachkevin@gmail.com) teaches middle school math at St. Alban’s and Glenn Whitman (gwhitman@saes.org) is the Dean of Studies and Director of the Center for Transformative Teaching and Learning.
“The new Effort Grade rubric shows me how to be a student.”
—St. Andrew’s Upper School Student

“How can I improve in your class?” This is one of the most welcomed questions a student, at any grade level, can pose to their teacher. Such a question ignites the teacher-student learning partnership and affirms the idea that learning happens best in collaboration.

At St. Andrew’s, teachers will often frame their response around a student’s effort. But why emphasize effort?

Since its inception, St. Andrew’s has recognized the importance of rewarding our students’ engagement as active learners. Research in educational neuroscience highlights the importance of praising effort rather than intelligence. Cognitive science has shown that offering students specific praise for their work and effort alters their view of themselves as learners, giving them hope and confidence that intelligence and growth are malleable. As educators, we are keenly aware that helping students make the connection between effort and achievement is critical. Effort translates into growth, and at St. Andrew’s we see continued growth as an achievement.

Focusing on effort allows students to own their learning. It also allows students to be resilient and forward looking, even in the face of setbacks such as a low grade on a test or paper.

One of the most important things St. Andrew’s teachers strive to teach each of their students is that their effort is something they can control. As teachers, it is our responsibility to provide clarity of the behaviors and mindsets a student needs to reach their learning potential.

As a result, our honors assemblies and awards are centered on both academic and effort honors. Stanford University psychology professor Carol Dweck, author of Mindset: The New Psychology of Success said, “Students...
with learning goals have a growth mindset about intelligence, believing it can be developed as opposed to students with performance goals who think intelligence is fixed from birth."

So, how do we as educators, truly know and measure a student’s effort? How can we reward students for something as intangible as effort? How can we be sure that our effort system is informed by the most relevant research on how students best learn?

In 2011, a task force of St. Andrew’s faculty in partnership with the CTTL tackled these tough questions. Our goal was to improve St. Andrew’s effort grade system, and to give students a tool that they could use to better understand themselves as learners.

Armed with years of professional development work, including from researcher Dweck and professional writers such as Po Bronson, New York Times best-selling author of Nurture Shock, this task force was well positioned to answer these tough questions. The task force began its work with surveys of students, parents, and faculty. Emerging themes were quickly obvious. We needed to create a system with: (1) observable, measurable standards, (2) specific benchmarks by which to measure growth and improvement, and (3) ample opportunity for student reflection.

In 2012, the new Effort Grade Rubric was born. This meta-cognitive tool is based on eight learning standards that focus on making each student an active learner: Participation, Note-Taking, Materials Management, Self-advocacy, Day-to-day learning, Collaborative work, Promptness and readiness to work, and Absences. Within each standard, students earn effort grades of:

- E=Exceeding Expectations
- M=Meeting Expectations
- P=Progressing Toward Expectations
- N=Not Meeting Expectations

So what does this new system mean for each student? The Effort Grade Rubric provides students, in collaboration with their teachers, opportunity and direction to set specific, attainable learning goals. This tool also encourages regular, open dialogue between teachers and students about a student’s progress and growth as a learner. Teachers use this rubric at interim and trimester grading periods throughout the year, with the students to help them reflect on and develop learning strategies. Such strategies include: Submitting early drafts of papers for teacher feedback, regularly seeking out extra help, organizing materials better, contributing to class discussion more frequently, and arriving to class with homework completed as well as with questions.

As the Assistant Head of School John Holden often reminds students, “The only person you can control is yourself.” Students need to be explicitly taught about the correlation between effort and academic performance, and that effort is something they can improve. As Carol Dweck said, “Emphasizing effort gives a child a variable that they can control. They come to see themselves as in control of their success.”

Thus “The greatest gift teachers can give each of their students is to love challenges, be intrigued by mistakes, enjoy effort and keep on learning.”

### Standards

#### Self Advocacy
- Consistently communicates with teacher to schedule extra help, if needed.
- Arrives prepared with specific questions, concerns or review topics.
- Asks thoughtful questions, demonstrating that he/she knows exactly what help is needed.

#### Social Cognition

#### Language

#### Cognition

#### Social

#### Attention

#### Temporal

#### Sequential

#### Ordering

- Consistently completes homework assignments thoroughly and on time.
- Consistently demonstrates relevant and thoughtful observations on homework, linking it to previous learning.
- Volunteers comments throughout a class period showing he/she is connecting current information with previously learned material.
- Consistently communicates through words or actions effective time management of both short-term and long-term workload.

This rubric is designed to help you better understand yourself as a learner. Working toward these standards enhances your ability to meet your potential. This is a reflection tool that should be used throughout the year both independently and in collaboration with your teachers and advisor.

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**The Effort Grade Rubric provides students, in collaboration with their teachers, opportunity and direction to set specific, attainable learning goals. This tool also encourages regular, open dialogue between teachers and students about a student’s progress and growth as a learner.**
If you really want to see how innovative a school is, inquire about its thinking and practices regarding assessments.

What images and emotions does the word assessment conjure up in your mind? How many of these are negative? Stress, fear, late-night cramming, number 2 pencils and multiple-choice questions? These are all associated with the traditional ways individuals have been and continue to be assessed for knowledge and skills. Don’t get me wrong, there is still a place for such traditional assessments of student learning in preparation for standardized tests such as ERBs, AP exams, SATs and college mid-term exams. Fortunately, one of the values of an independent school education such as St. Andrew’s is that it is not constrained by the drill and kill assessment strategy of other learning environments.

Assessment happens every day at St. Andrew’s, and research on assessment is particularly strong. It has led St. Andrew’s teachers to further expand the types of assessments students take at all grade levels and recognize that every assessment is a learning opportunity. In fact, if you were to explore St. Andrew’s curriculum maps (available at www.saes.org/academics) you will see nearly 100 assessment types listed from the preschool through 12th grade. They are authentic to their academic discipline and rich in 21st century skills.

But research has also led to a more holistic look at assessment in order to help provide students the opportunity to truly demonstrate what they have mastered or still need to learn. The research also reinforces some foundational thinking at St. Andrew’s: families do not need to choose between an academically rigorous learning environment and a nurturing and supportive program for their children. They can have both.

At St. Andrew’s, our thinking about assessment is actually rooted in neuro-mythology-busting. A neuromyth is “an imaginary or unverifiable claim about the brain.” Three of the most perpetuated neuromyths that directly relate to assessment center around Multiple Intelligences (MI) Theory, learning styles, and right versus left brain thinking.

Despite a lack of verifiable scientific research at this point, the theory of multiple intelligences and learning styles, and right versus left brain thinking, has led to the belief that children should be tested according to their preferential “intelligence” or learning style. That is, a visual

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We recognize that students have areas of evolving strength and weakness, passion and disinterest. When we get the richness right, all brains are challenged and supported.
learner should receive and demonstrate their knowledge through visual representation or an auditory learner should receive test questions orally. This is a neuromyth. Such thinking ignores the complexity and interconnectedness of brain functions.

What research shows is that both hemispheres of the brain, left and right, are engaged in nearly all thinking activities. One of my favorite educational researchers, Paul Howard-Jones’ own work concludes that, “the general processing complexity of the brain makes it unlikely that a theory resembling MI [or learning styles] will ever emerge from it.”

So how does this research impact assessment at St. Andrew’s? Think of this as a challenge to teachers to embed richness in assessments, to think about the whole brain when designing assessments for their class or individual students. We recognize that students have areas of evolving strength and weakness, passion and disinterest. When we get the richness right, all brains are challenged and supported. What is great about the human brain is its ability to change, a process often referred to as plasticity. When teachers create rich assessments, we are agents of change.

Every year, every student will be assessed in multiple ways that are developmentally appropriate. This is what differentiated assessment means at St. Andrew’s. For example, in my own history class, students are assessed via what might be considered traditional means, such as a scholarly research paper or timed, multiple-choice-test. But alternative assessments are also critical for developing multiple mind skills and enhancing student engagement. Such alternative assessments include a student-facilitated class discussion, a scored debate, video documentary project, geography quiz, active reading of primary sources, document analysis, online quiz or discussion and poster design project. Some of these assessments will play to a student’s strength while others will pose significant challenges; some assessments will, wonderfully, do both.

There is another value to providing students with a range of assessment types. They call for students to learn the essential skills for success in today’s world, such as critical thinking, problem solving, communication, collaboration, resiliency, and grit. These skills are best developed through alternative assessments, in particular project-based learning.

Projects enhance student engagement. We also know that when students can own their learning choices, and make an emotional connection to the material, then learning is enhanced. Moreover, when students are challenged to demonstrate their learning in a more authentic, purposeful way, such as performance-based final exams in languages or the nationally recognized American Century Oral History Project, they become more engaged and actually learn more. As Daniel Willingham points out, “A teacher’s goal should always be to get students to think about meaning.” Alternative assessments do just that.

What does this different approach to assessment mean for the high achieving student? I would go so far as to suggest that St. Andrew’s approach to assessment makes earning an A even more prestigious and valuable. As an example, one of St. Andrew’s most accomplished students was taken out of his comfort zone of success on traditional tests when challenged to conduct a chemistry lab practical exam. This produced good stress for this student because it challenged him to apply knowledge and use skills in ways that more traditional assessments do not demand. It engaged this student to work really hard outside of his comfort zone.

So what have been the most important, research-informed, changes in how teachers think about assessment for their students?

- Teachers use more formative assessments, a self-reflective process in which feedback is used by the learner for improvement, such as ungraded (thus low stress) surprise quizzes. Frequent formative assessments, both in class and on-line, allow students to practice recalling knowledge from their long and short-term memory. Frequent retrieval of information significantly enhances recall ability. This is called the “testing effect.”
- Teachers make returning assessments at a faster rate a priority because research shows that “when grades are expected soon the threat of disappointment is more salient.” As a result, students strive to perform better on each assessment.
- Teachers provide students a range of assessments. A noticeable difference is the opportunities for students to visually demonstrate knowledge whether through two and three-dimensional art work or other forms of digital and social media.
- Teachers provide student test correction opportunities. Delaying or scaffolding feedback, and having students struggle with finding the correct answer, leads to better retention than does simply providing correct answers.
- Teachers recognize that periodically providing a student a chance to choose an assessment type enhances the student’s investment and motivation in their learning. For example, students taking United States/European History to 1860 year-end final exam can choose between a more traditional, 2-hour final exam, or the more visual Historical Head project. As one student said, “it’s not easier, its just hard in a different way.”

- Teachers ask students to reflect on what neurodevelopmental demands—Attention, Memory, Spatial or Temporal Sequential Ordering, Language, Neuromotor Function, Social or Higher Order Cognition—a particular assessment might be placing on their brains in order to decide the appropriate study strategies. This includes providing students an opportunity to reflect on their assessment performance, how well their study strategies worked and how they might study differently next time.
- Teachers differentiate for their students between active studying versus passive, “traditional” studying, and why the former enhances long-term memory retention. Teacher’s also help students find active studying strategies that work for them. Remember, we are building skills for their future—what skills can we equip a student with that will enhance their ability to be successful with the memory demands of law school or med school?

As the designers of each of their classes, it is the teacher that decides the appropriate assessment for a certain body of knowledge or skill. That is why it is so critical that at St. Andrew’s, the entire faculty and academic leadership, has training in how the mind learns and how research informs decisions around assessment. Such research means that the ways in which a student’s knowledge, skills and understanding are measured today are a lot broader than the majority of those who are reading this article experienced in their own academic journey.

And that is a good thing.
Last year, our kindergarten teacher asked me if our preschool classroom would like to have their play kitchen. Our well-loved kitchen had seen better days, so I happily accepted her offer. As I moved our newly upgraded kitchen (with refrigerator and microwave!) into its spot in our classroom, it suddenly occurred to me how much kindergarten has changed since I was in school.

In 1972, I attended a half-day program where the curriculum consisted primarily of unstructured free play, naptime, and crafting, with a little formal instruction thrown in for good measure. Today, most kindergarteners attend a full-day program, and while it is still fun and exciting with plenty of crafts, story time, and free play, it is also much more challenging academically with more classroom time devoted to formal instruction in reading, math, science, social studies, and the arts. I don’t point out these differences to be critical of what kindergarten has become over the years, but it does serve as a reminder of how important it is for me and other preschool teachers to help prepare our young students for the rigors of academic life.

As a teacher of two- and three-year olds, I am often asked, “Why send a two-year old to preschool?” Well, if you take a look at the recent research on brain development, which states that the brain’s foundations for all later learning are established in the first three years of life, it’s easy to argue the benefits of sending a child as young as two to school. Before birth, the prenatal brain creates the 100 billion neurons, or brain cells, that make up the brain. In the first few years of life, 700 neural connections, or synapses, between these brain cells are established every second, and each of these synapses contain bits of learned information. Scientists have discovered that these synapses are affected by genetic makeup, the environment, and most importantly, by a child’s early relationships with parents, teachers, and other caregivers. If these relationships, also referred to as “serve and return” relationships, are not nurturing and loving in nature and do not support the tremendous amount of learning that occurs in the first three years of life, the synapses could be disrupted. As a result, a child might child might suffer learning or behavioral disparities later in life that might be difficult to overcome.

Given the information we know about healthy brain development, it is clear that a loving, nurturing preschool program that encourages children to safely explore and learn in developmentally appropriate ways, will help a child establish a strong foundation for learning that will support more formal instruction later in life.

The four domains of child development are cognitive, language, movement, and social-emotional. The foundations for future learning in these four domains are established in infancy; however there are other skills that cross all four domains. These skills, which are referred to as foundations of learning, or approaches to learning, are the way we use our brains for learning throughout our lives. Children
are not born with these skills but are born with the ability to acquire them through relationships with loving, caring adults who support a child’s ability to become a learner who is curious, focuses attention, remembers earlier experiences, gathers information, solves problems, and is persistent when challenged by a difficult task. As preschool teachers we have a responsibility to provide a learning environment that supports and encourages our students to develop these important skills so they can be successful in school and beyond.

Curiosity
Two-year olds are naturally curious individuals. In preschool, we strive to make our classrooms a place where our students can safely explore and learn. We provide a variety of toys and activities that encourage a child’s natural curiosity and desire to explore the world around them (see Chapter III). Children learn primarily through play, and as teachers, we can encourage curiosity in our students by making classroom materials easily accessible and by offering support without interfering with a child’s natural curiosity. This curiosity is evident when we watch a student play with a classroom material such as Play-Doh. The child may squeeze and manipulate the Play-Doh or use tools to cut the Play-Doh into different shapes. He may continue to further explore the Play-Doh by touching and smelling it. The teacher may step in when he begins to explore the Play-Doh by trying to taste it.

Memory
When an infant or toddler uses memory to recall past information or experiences, it helps him see the world as a familiar place so that they he can begin to form a more intricate understanding of the world. One way preschool teachers help students expand memory is by establishing classroom schedules and routines. In our classroom, we frequently model expected behaviors and prompt children to try and predict what comes next so that they can practice retrieving previously learned information and begin to commit that information to their long-term memory. For example, when it is time for snack, the children are expected to wash their hands before finding a place to sit at the table. Many of the children go right to the table when they see us getting ready for snack. Instead of telling them to go wash their hands, we might ask them, “What should we do before sitting down for snack?” In addition, frequent repetition of songs, rhymes, and stories also helps children expand their memory, not only of these familiar rhymes but also of information in general. Finger plays, songs, and rhymes are a main component of our daily meeting time in preschool.

Attention
Focused attention is a fundamental element in cognitive development. It is well known that a toddler has a limited attention span, but there are developmentally appropriate methods that will help young children stay focused on a particular task or learning experience. In our classroom, we try and pay attention to a child’s individual strengths and interests so that we may incorporate these interests into other areas of learning. For example, if a child loves to pretend to whip up meals in housekeeping, we might use that time to introduce colors, numbers, and sorting activities. As the child places food on the table, we might ask, “How many cookies are on this plate?” or “What color is this apple?” Taking advantage of these teachable moments while the student is engaged in a favorite activity may extend the amount of time he or she stays focused on the task.

Information Gathering
Young children use observation and their senses to gather and process information. The way young children learn new information is through independent play and meaningful interactions with caring adults. Preschool teachers encourage their young students to learn new information through exploration and play while also interacting with them using meaningful language to describe feelings, objects, and actions. An example of this kind of interaction might be when a student is playing with a magnetic toy. The teacher sitting nearby says, “You are playing with magnets. What happens when you put them together?” After the child puts them together, the teacher responds by saying, “Look, they stick together!” By interacting with the student and using meaningful language, the teacher has expanded the child’s learning experience.

Problem Solving
Children learn a tremendous amount of information in the first three years of life, and they encounter many challenges along the way. While it’s not always easy, it is important to give children the freedom to try and find a solution on their own before stepping in and solving the problem for them. In the preschool classroom, we witness many instances where a child is faced with a problem, particularly when they are participating in play with another child. For instance, when a child has a toy taken away from them by another child, it is tempting to step in and give the toy back, but it is actually more advantageous if the teacher observes from a distance so that the child may have the opportunity to find an appropriate solution on his own. If the child does need help, the teacher steps in and gives just enough assistance so that he can move on to the next step in trying to solve the problem. Encouraging children to solve their own problems helps to build independence and feelings of self-confidence that will assist them in tackling challenging academic problems later in life.

Persistence Through Frustration
Trying to persist through the many challenges presented in the first three years of life can certainly cause some feelings of frustration in a toddler. Many do not yet possess the ability to manage their feelings when faced with a challenge and give up before completing the task. Preschool teachers must gauge a child’s ability to regulate their feelings and provide appropriate activities that challenge a child without causing feelings of frustration. This is evident on the playground when a child attempts to climb a challenging structure or in the classroom when a student attempts to complete a puzzle. Teachers should always be available to offer words of encouragement to limit feelings of frustration and to help the child persevere and to complete the challenging task.

Since brain research tells us that the foundation for all learning is set in the first three years of a child’s life, a preschool teacher must play a vital role in the development of a healthy, well-constructed brain that is able to successfully navigate the challenges of academic life. It is imperative that preschool teachers establish loving, nurturing relationships with their students so that they are able to learn the appropriate social and emotional skills such as curiosity, memory, focused attention, information gathering, problem solving, and persistence through frustration that are necessary for a child’s future academic success. They must also offer a safe environment with developmentally appropriate activities and experiences that encourage their students to learn and grow.

Preschool teachers should embrace the important role they play in helping to develop school readiness and academic success in a young child’s life. I do!
There’s nothing more essential or seemingly more elusive than great teaching. Every parent wants it, every student deserves it, and nearly every school promises it. Great teaching should happen every day in every school for every child.

But what does great teaching look like? How do schools create and sustain it? And how has great teaching changed over time? These may seem like debatable or even unanswerable questions, but I assure you that they are not. Great schools—with teachers who study the research and hone their skills with passion and perseverance—build exceptional faculties because they understand what makes teachers and teaching great.

Great teaching emphasizes the key points of any lesson so that students can and supporting evidence. In that spirit, here is a quick look at three aspects of exceptional teaching, and three qualities of communities in which exceptional teaching thrives.

Three Things Every Great Teacher Knows

- **Relationships are Essential**
  Students perform better when their teachers truly know them and care for them as people and learners. Every great teacher—and everyone who works well in schools—is a connector with a strong sense of service. Students meet and even exceed high expectations when their intellectual potential. Teachers provide the environment for personal and academic success when they have deep emotional intelligence and equally deep mastery of teaching techniques.

- **Challenge + Support = Excellence and Joy**
  Too often schools suggest that families must choose between rigor and a happy learning environment. Current research makes clear that this choice shortchanges students. Students shouldn’t be miserable or coddled in school, because happy, motivated children simply learn best. Children need schools where they are encouraged to risk failure by trying hard, because the worst kind of failure is the failure to "try and try again." Effort must be concretely recognized and rewarded, because over time, persistence—perhaps the most crucial habit of mind for adult success—increases intelligence as well as performance.

The best teachers are also the hungriest for continual improvement, and their drive is motivating and inspiring to their students.
Great Teachers Understand How Learning Happens
No one would go to a doctor who proudly practices medicine the exact same way she did 40 years ago. So why should any school or family accept a teacher who doesn’t improve her teaching every year? Great teachers don’t accept that teaching is a purely a product of experience or personality. Instead, they innovate their teaching practices based on current science on how students learn and what teaching methods produce the best results. Many traditional teaching styles have merit, but a teacher who doesn’t understand the basics of neuroscience can’t consistently help his students—from the strongest to the struggling—flourish academically.

Building a Culture of Educational Excellence
- Hire for EQ and IQ
Since relationships are essential for learning, teachers must have both excellent interpersonal skills and significant intellectual horsepower. Great faculties are diverse in their individual experiences and identities, but they are united in their zest for new knowledge and their enjoyment of their students and their colleagues.

School is for Student-Centered People
Most educators have had the dispiriting experience of walking into a faculty lounge at a low-morale school. In such places, a listener will hear adults describe students as problems, rather than possibilities. Great schools hire student-centered people, for whom students are fun puzzles to solve. Such educators love finding new areas in which every student shines, and equally love naming areas in which every student shines, and equally love finding new areas for growth for “top” students (e.g., encouraging a quiet “A” student to speak more in class or run for student government to improve his leadership and communication skills). Ultimately, every educator should answer the question: “Why do you work here?” by saying, “I love working with students and people who care for them.”

If You’re Not Getting Better, Neither are Your Students
Traditions are important for schools and students, and it’s right that some things don’t change year after year. But in the classroom, complacency is bad for students and teachers. Great schools construct and fund professional development programs that include every teacher and focus on a simple question: “How can we challenge and support every student even better?” The best teachers are also the hungriest for continual improvement, and their drive is motivating and inspiring to their students. Great schools recognize and applaud their teachers’ excellence, and then support those teachers’ drive to get even better.

A Final Word
I am blessed to work with teachers and staff members who exemplify these qualities of educational excellence. I hope that you have found their thoughts as illuminating and their passion as inspiring as I do each day.
Endnotes

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II. Why Educational Neuroscience and the CTTL Matter for Your Child
Page 10-11
III. Let Them Play
2. Brown, 4-5.
Page 12-13
IV. The Connected and Valued Child: Targeting the Social and Emotional Brain
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V. The Centrality of Arts Education

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VI. Developing Global Citizens: Bringing Purpose to Foreign Language Learning

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VII. What Does Great Homework Look Like?
2. Khan Academy (http://www.khanacademy.org/)

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VIII. Great Minds Do Not Think Alike: How Diversity Impacts the Learning Environment

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IX. The Roots of Student Success

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X. Brain Changes: How Service Enhances Learning
5. Brian Kinloch and Joan L. Liptrot, Making the Journey Meaningful: Why Our Brains LOVE Service Learning! (Austin, Texas; Texas Summer Institute, 2010).

Sidebar
What Service Looks Like in the 9th Grade Classroom
1. M.H. Immordino-Yang and A. Damasio, “We Feel, Therefore We Learn: The Relevance of Affect and Social Neuroscience to Education,” Learning Landscapes: Mind, Brain, and Education. Implications for Educators 5 (Autumn 2011). See also Elaine B. Johnson, Service Learning Stimulates the Brain (The World and I Online) 146+.
The Center for Transformative Teaching and Learning promotes innovative, research-driven teaching that develops each student’s potential as a learner.