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VASCD Board members welcome questions, feedback, and other communication from our members. To contact any of our officers, committee chairs, or regional representatives, direct your email to vasceded@gmail.com and note the person to whom you wish it sent.
The VASCD Board of Directors includes eight regional representatives, one for each of the Commonwealth’s Superintendents’ Regions. These representatives are elected by our members to serve a two year-term. They help determine the direction of our organization, and work with our Programs and Services Committee to determine the professional development needs of educators in their regions.

Regional representatives also:

- share information about VASCD and ASCD events and activities with colleagues in their regions.
- help members who have questions about membership, events, or ways to become involved.
- assist in organizing regional professional development opportunities that can help you and your school division.

Regional Representatives

Region I  Anthony Washington  awashing@rvaschools.net  
Region II  Heather Tuck  htuck@iwcs.k12.va.us  
Region III  Emma Coombs  ecoombs@cityschools.com  
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Region V  Kate Dougherty  kdougherty@harrisonburg.k12.va.us  
Region VI  Alan Seibert  aseibert@salem.k12.va.us  
Region VII  Kristie Legg  kristielegg@galaxschools.com  
Region VIII  Amy Griffin  agriffin@cucps.k12.va.us

They would love to hear from you!

Not sure which is your region? Check the map and region-by-region list HERE
This year, VASCD offered a free one-year membership to the Commonwealth’s new teachers. Over 450 signed up to be part of our network and receive member benefits especially designed for new teachers!

We value the talent new teachers bring to Virginia’s students, and are offering support through ASCD resources, online discussions, and face-to-face forums.
From the Editor’s Desk

Eric Carbaugh, Ph.D.
Associate Professor in the Department of Middle, Secondary and Math Education, James Madison University
• Dozens of concurrent sessions on innovative practices by Virginia educators.

• Exhibitors with a great mix of instructional resources and fun products to share.

• MOVIE NIGHT on the eve of the conference with a screening of the documentary *RE: Thinking*. Watch the trailer [HERE](#).

• Social and networking opportunities through the VASCD2017 app and in person!
Be sure to include our “Invent to Learn” Preconference Session with Gary Stager in your plans. Stager, often called the “Father of the Maker Movement” will lead a hands-on workshop where you will be a maker, a tinkerer, and an engineer! You will leave with lesson and project-based ideas as well as tools and apps you can use!

Keynotes by:
- **George Couros**, author of *The Innovator’s Mindset*. Watch George’s TEDx talk [HERE](#).
- **Kaleb Rashad**, adjunct faculty member at the High Tech High Graduate School of Education and the Director of High Tech High.
- **Dylan Wiliam**, Emeritus Professor of Educational Assessment at University College London and expert on assessment to support learning.
- **Consuelo Kickbusch**, Retired Army Lieutenant Colonel and advocate for American youth.

Day-long pre-conference Master Class with **Gary Stager**, *Author of Invent to Learn and champion of the Maker movement.*

2017 ANNUAL CONFERENCE

NOV. 29 - DEC. 1

at the Williamsburg Doubletree by Hilton
### RE:Thinking
VASC 2017 Annual Conference Schedule

**Wednesday November 29**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 3:00</td>
<td>INVENT TO LEARN MASTER CLASS WITH GARY STAGER (Preconference)</td>
</tr>
<tr>
<td>8:00</td>
<td>Free Movie Night: Screening of RE:Thinking</td>
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**Thursday November 30 – RE:Thinking (Conference Day 1)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>7:00</td>
<td>Registration and continental breakfast</td>
</tr>
<tr>
<td>8:15-10:00</td>
<td>General Session with Dylan William: <strong>Assessment: The Bridge Between Teaching and Learning</strong></td>
</tr>
<tr>
<td>10:00 - 10:30</td>
<td>Break and Exhibit Visits</td>
</tr>
<tr>
<td>10:35 - 11:45</td>
<td>Concurrent session 1</td>
</tr>
<tr>
<td>11:45 - 12:40</td>
<td>Lunch</td>
</tr>
<tr>
<td>12:40 - 1:15</td>
<td>Exhibit Visits</td>
</tr>
<tr>
<td>1:15 - 2:30</td>
<td>Concurrent session 2</td>
</tr>
<tr>
<td>2:45 - 4:00</td>
<td>General Session with Kaleb Rashad: <strong>Love+Disruption: Culture, People, and Projects</strong></td>
</tr>
<tr>
<td>8:00</td>
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**Friday December 1 – RE:Thinking (Conference Day 2)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 - 8:15</td>
<td>Breakfast and annual meeting</td>
</tr>
<tr>
<td>8:15 - 9:30</td>
<td>General Session with Consuelo Kickbusch: <strong>Living a Legacy</strong></td>
</tr>
<tr>
<td>9:30 - 10:00</td>
<td>Break and Exhibit Visits</td>
</tr>
<tr>
<td>10:00 - 11:15</td>
<td>Concurrent session 3</td>
</tr>
<tr>
<td>11:30 - 12:45</td>
<td>General Session with George Couros: <strong>The Innovator’s Mindset</strong></td>
</tr>
</tbody>
</table>

*Note: Bookstore open 7:45-4:30.*

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2017 Annual Conference

NOV. 29 - DEC. 1

at the Williamsburg Doubletree by Hilton
WE’RE OPEN. COME ON IN.

VASCD has been a provider of high-quality professional learning for many years. Our Annual Conferences, Whole Child Institutes, Early Childhood Conferences, and other professional learning events have helped our members stay on the leading edge of educational practice. But we know that these events alone, as robust and beneficial as they are, can’t change instruction for students. Only teachers and leaders can do that, and it requires much more than hearing great speakers. Once the conferences end and we return to our schools and offices, new ideas fall by the wayside if they are not kept alive through collaboration and networking.

So what can a statewide organization do? We have some ideas.

We have begun a two-year initiative aimed at discovering how VASCD can serve as a catalyst for building professional learning networks around innovative ideas. We know that our members have valued colleagues in their school divisions who help them to learn and reflect on their practice. We also know that exchanging ideas across larger networks opens new doors to learning.
We want to help grow Virginia’s learning network, and we need your help.

We have over 500 members who are brand new teachers! With help from ASCD, we will provide them with valuable content this year, but they also need opportunities to connect with each other and with experienced educators. If you have experience as a teacher leader or mentor and would like to help lead this initiative, we welcome your participation.

We hope to bring together educators with common interests in each region of the state this year in discussion forums for sharing innovative practice. What’s on your mind? High school redesign? Internships and apprenticeships? New assessment formats? Social-emotional learning? If you’re interested in helping to organize or host a forum either in person or virtually, we would love to hear from you.

VASCD is shifting away from a traditional structure in which programming is planned by a small group and “pushed out” to our members. We are striving for a flatter organization with many more opportunities for interaction and leadership. We’re open. Come on in.

Each region of the Commonwealth has a VASCD Regional Representative. They are listed with their contact information on page 3.

If you are interested in being a leader in VASCD’s learning network, please contact your regional representative or our Executive Director, Laurie McCullough at vascded@gmail.com. There’s exciting work to be done.

We look forward to hearing from you!

Joe Douglas, President
Laurie McCullough, Executive Director
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Call for Journal Articles!

The next issue of the VASCD Journal, our online publication, will be published in the fall of 2018.

Do you have anything interesting or exciting about your work as a teacher or leader that you’d like to share with other educators around the state? If so, then please consider writing for the VASCD Journal!

Some suggested topics include, but are not limited to, curriculum and instruction, assessment, professional development, technology use in the classroom, and other policies that grow our students. Some questions to get your thinking started:

• What are some examples of successful professional development implementations meaningful collaborations, or other positive transformations?

• How have you implemented elements of recent policy changes into your schools and districts?

• What school and classroom practices help students transfer their learning to new or unique situations?

• Have you conducted any action research that has positively impacted student learning?

• How has technology truly transformed student learning in your classroom or school?

Because this journal is published in an online format - authors please consider adding embedded videos, hyperlinks, podcasts, audio or animations to enhance your article.

The deadline for submission of materials for the next issue is August 1, 2018

Manuscripts should follow format and reference guidelines outlined in the Publication Manual of the American Psychology Association (APA). Include your professional title(s), workplace(s), email address(es), and a one to three sentence summary. If accepted, we will request author photos and brief biographies to be submitted. All manuscripts, book reviews, or other items should be emailed to:

VASCD Journal
Eric Carbaugh, Editor carbauem@jmu.edu
Recent societal events suggest that we have a moral imperative to develop not only the academic but social emotional needs of students throughout the Commonwealth. With a nation struggling to bridge the divide and come together, many schools are finding that Social Emotional Learning (SEL) helps build the competencies necessary to collaborate, communicate and connect peers to create a classroom learning community that works for ALL students.

Mary Tavegia
Mary Tavegia is a Professional Learning Lead with Center for the Collaborative Classroom. She has 40 years’ experience as a teacher, elementary school principal, and facilitator of professional learning. Mary works with teachers and administrators on integrating social emotional strategies and skill development into the classroom literacy curriculum and throughout the entire school community.
Email: mtavegia@collaborativeclassroom.org

Elizabeth W. English, Ph.D.
Elizabeth W. English, PhD, is an education consultant at Center for the Collaborative Classroom. She has experience as a classroom teacher, reading specialist, and Reading Recovery teacher. In addition, she has held both building-level and central-office leadership positions as a Title I director, early literacy specialist, intervention specialist, and elementary school principal. She has presented at numerous professional conferences and taught graduate courses in literacy for four universities in Virginia. She holds a BS is in Elementary Education, an MEd in Reading, and a PhD in Psycholinguistics.
Email: eenglish@collaborativeclassroom.org
The Challenge
This past summer, the Commonwealth of Virginia witnessed three major incidents that have taken their toll on the lives of every resident, the most recent of which has impacted every citizen of the United States. In May, Steve Scalise, a US Congressman, was shot while practicing for a bipartisan fundraising baseball game with colleagues at a community field Alexandria. Then, Nabra Hassanen, 17, was with a group of friends near the All Dulles Area Muslim Society Center Mosque following Ramadan prayers when they got into a dispute with a man driving a red car; she was assaulted and later killed. Finally, in the second weekend of August, Heather Heyer, a 32 year-old resident, lost her life while demonstrating against the hate-filled Unite the Right Rally demonstrators who had come to Charlottesville to protest the removal of a statue of Robert E. Lee, a Confederate monument.

The time has come to confront the need for all Virginians to come together and begin to address how we, as members of a society, are going to live together in peace and acceptance. The word “Society” by definition means, “people in general living together in organized communities, with laws and traditions controlling the way that they behave toward one another” (Macmillan, n.d.). Historically, public schools have been the place where citizens have learned these ways of living, laws, and traditions. Public schools continue to hold that responsibility and, given the changes and challenges that we are now facing, it is time to consider an approach to

“... given the changes and challenges that we are now facing, it is time to consider an approach to education that has a greater potential to develop citizens who are committed to creating a world that works for all.”
education that has a greater potential to develop citizens who are committed to creating a world that works for all.

Fortunately, more and more schools in Virginia and across the country have been looking to the growing field of Social Emotional Learning (SEL) to address this need for creating schools that are focused on the development of self-awareness, social awareness, self-management, relationship skills, and responsible decision-making. These are the five competencies the Collaborative for Academic and Social Emotional Learning (CASEL) has determined can be taught in classrooms, schools, homes and communities. CASEL defines SEL as, “the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions” (Collaborative for Academic, Social, and Emotional Learning, 2017). Everyone can grow and
change to develop the competencies necessary to successfully participate in and cultivate a fair, democratic society.

There is a strong and growing body of evidence to support the benefits of Social Emotional Learning. A meta-analysis of 213 studies of schools that implemented evidence-based SEL programming found student gains in social-emotional skill development; improved attitudes about themselves, others, and about school; more positive classroom behavior; and an 11 percentile-point gain on standardized achievement tests. (Durlak et al. 2011). This compelling data justifies the classroom investment in time needed to implement SEL programs and structures.

Beyond increasing the capacity to learn, social emotional skills help students develop a deeper understanding about themselves. Those with **self-awareness** can identify and name their own emotions and to know what triggers them. As they learn about themselves, they also build a sense of social awareness, so they can recognize how their emotions might affect others. Through **social awareness**, students develop an understanding of and appreciation for the similarities and differences that are inherent in a diverse community. At this time in our country, many are struggling to understand or even acknowledge the ideas and opinions of others. By intentionally teaching students to listen deeply and respond respectfully, even in disagreement, the tone of the classroom, and hopefully society, will become one that is more open, empathetic, and accepting.

**Self-management**, the ability to regulate emotions and manage personal stress, is often considered a learning need for young children, but now it is a need for both children and adults. It is difficult to be optimistic considering the recent headlines from Virginia. Learning to talk to one another, to take the view of others into consideration, and to make plans for change together may bring the change
we hope to see in the world. Listen in by clicking the image below as partners in a class meeting discuss the impact that teasing has on others and hear how they plan to make things right when they have hurt a classmate's feelings.

Inside the Collaborative Classroom

Positive, caring relationships between and among the teachers and students in the classroom are at the heart of learning. These relationships, when developed and maintained with intention and care, enhance the school climate and culture, build connection to the school, and can serve as a model for future relationships. Learning the skills necessary to develop and maintain relationships, particularly when there is conflict, needs to be a focus in every classroom. As we see all around us, the need to bridge understanding and appreciation for differences, to build collaboration over competition, and to build communication skills that
allow for multiple viewpoints is a vast and growing need. Classrooms that are designed around developing relationship skills become learning environments that will build both academic and social skills.

In the video below, two students who had no connection to one another were partnered for a collaborative learning task. Their insights about learning from each other were probably more important than the academic skills they gained, although both were significant.

According to Dr. Joel Hoomans (2015), an adult makes 35,000 decisions every day. Many decisions are small in scope (Shall I wear the white shirt or the blue one?). While others may carry great consequences (Shall I accept that job offer?). How do we decide? Responsible decision-making usually involves self-reflection, a weighing of alternatives, and a consideration of how this decision
will impact others. Hoomans also reports a child makes 3,000 decisions every day. How do we help children learn to be effective decision-makers now so they are ready to handle ten times the decisions when they become adults?

We need to help children learn to **self-reflect**, to look at decisions from **multiple viewpoints**. We must help children understand that decisions have **consequences** and that they need to consider the **ethics and impact** of their choices. Some schools address this by offering students more opportunities to take developmentally appropriate control of their classroom, by giving students the autonomy to set goals and plan how to achieve them, and by broadening their understanding of how their decisions affect their peers, their school and their community. Approaches to developing the process of responsible decision-making may take the form of class meetings, sessions on mindfulness, or social studies lessons that evaluate the effect of decisions.

The class meeting video on the following page demonstrates how students plan decisions regarding their actions with an upcoming class with a substitute teacher. The teacher allows the students to take the lead as they think about what this guest teacher will need to know and what will make their class function effectively.

Students should be engaged in learning throughout their day. Lessons should meet academic standards and keep students engaged in learning. Considering
the social emotional needs of students, lessons can be planned that will blend the academic and social learning that students need to become bright, active citizens. These citizens will know how to collaborate respectfully, to accept new ideas, and to develop a better understanding of themselves and their peers. Have children lead the discussion of what makes a good partner before a lab experiment followed by a reflection at the end to bring deeper understanding and real change to the next lab session. Allow children to think critically by explaining their thinking to a partner after being asked an open-ended question which will deepen learning and build relationships. By fostering a community of learners in schools within the Commonwealth of Virginia who can openly share their thinking, embrace differences as learning opportunities, and express divergent opinions with respect for the ideas of others, teachers can directly affect the future of our state and ultimately our country.
References


Center for the Collaborative Classroom (Producer) Increasing Student Talk: Think, Pair, Share (video file). Retrieved from https://inside.collaborativeclassroom.org/video/751/increasing-student-talk-think-pair-share


Center for the Collaborative Classroom (Producer) Class Meeting: Preparing for a substitute (video file). Retrieved from https://www.youtube.com/embed/71ntP4Bfl9w?autoplay=1

Lee Ann Jung, PhD, provides support internationally to schools in inclusion, standards-based grading, intervention planning, and progress monitoring. She has authored five books and has worked in special education since 1994 as teacher, administrator, consultant, and university professor.

jung@studentgrowth.org
@leeannjung

Register at https://tinyurl.com/y7qk9l5n

PROFESSIONAL LEARNING WORKSHOP

November 8th, 2017 @ 9:00 am - 3:00 pm
Attendance Fee: $140 per person (includes parking, internet and meals)
Contact: Laurie McCullough, Executive Director/VASCD (vascded@gmail.com)
Location: The Hotel Roanoke & Conference Center
110 Shenandoah Avenue, Roanoke, VA 24016

Supporting & Measuring the Growth of Students with Learning Differences

The curricular rigor in education poses real challenges for schools aiming to meaningfully include students with disabilities and developmental delays. Where do we find time to “pause” the hectic schedule and use evidence-based practices to teach the critical skills these students need for long-term success?

In this workshop, participants learn a new way to plan intervention and measure progress. We take curriculum standards and define measurable goals, individualize intervention strategies, and set up progress records using goal attainment scaling. The resulting growth plan streamlines intervention and data collection into a natural part of everyday routines.

This session will prepare participants to:
- Write measurable goals for students who need support
- Develop evidence-based strategies for growth
- Make data-based decisions to accelerate growth
- Measure and display progress easily
Using a Reflective Dialogue Model to Uncover Barriers to Sustained Transformations within Instructional Practices of Inquiry-based Science

Within current research, there has been no clear way identified to support all teachers; a one-size fits all approach to professional development does not address the needs of all learners (Capps et al., 2012; Gusky & Yoon, 2009). The findings from this study suggest a need to generate ways to break down the complex charge placed on science teachers to implement inquiry-based instruction. Assisting practitioners in analyzing their practice in order to identify areas of deficiency is a multi-step process that includes accounting for personal dispositions, external factors, teacher background and training. Reflective dialogue can provide teacher-specific scaffolding as practitioners attempt to modify their practice (Downey et al., 2004). By establishing a safe, supportive rapport with the teachers, they can be more willing to work through the identified barriers and make substantial process in transforming their practice.

Robbie L. Higdon
Robbie Higdon is an assistant professor in the Middle, Secondary, and Mathematics Education department within the College of Education at James Madison University. She holds a Ph.D. in Curriculum and Instruction from Clemson University, a master’s degree in Secondary Education from James Madison University, and a bachelor’s Degree in history from Furman University. She teaches undergraduate courses in general instructional methods for grades 6-12, graduate level courses within the MAT program, and supervises secondary science education students during field experiences and student teaching.

As practitioners, educators become very adept at implementing their instructional methods without much cognitive demand. Therefore, they often continue to utilize practices that are ineffective or unsuccessful and are unable to recognize a need for modification (Downey, et al., 2004; Schon, 1983). The first step in transforming
one’s practice is to recognize there is a problem in current practice (Marshall & Horton, 2010). Engaging in models of reflective practice can serve as a vehicle through which teachers can enhance skills and address ineffective practices (Rebore, 2012). The goal is not to directly change teacher behavior but to influence teacher conceptions resulting in the teacher’s recognition and acceptance of those currently held conceptions in order to change one’s behaviors.

Two science teachers engaged in a multi-year professional development initiative were demonstrating inconsistent progress in their implementation of inquiry-based methods as compared with the other participants. Although, these two teachers consistently expressed strongly held beliefs about the use and implementation of inquiry-based methods that aligned with the conceptual model presented within the professional development initiative, their observed instructional practice was inconsistent with these beliefs.

**Literature Review**

In their examination of the history of science education reforms within the United States, Abd-El-Khalick et al. (2004) found that when envisioned conceptions of inquiry meet the limitations of schools and classroom instruction, they are often transformed into “insufficient curricula and then translated into incongruent enactments or classroom practices” (p. 398). These inconsistent levels of implementation can be regarded as barriers for the full implementation of inquiry-based methods. Fletcher and Luft (2011) performed a three-year longitudinal study on evolving teacher beliefs of early career teachers and found that although teachers maintain beliefs about using inquiry-based methods, they typically reverted to more didactic methods upon entering the secondary science classroom. Assisting teachers in identifying and evaluating their currently-held beliefs can better enable them to acknowledge and modify their conceptions about inquiry-based instruction.
Changing one’s knowledge, learning, and teaching involves persons who have a desire, are actively engaged, and have the resources to change (Cohen, 1990). As learners, teachers will only consider changing their ideas if the plausibility of the new concept or strategy is increased more than the existing conception (Eylon & Linn, 1988; Johnson, 2007). Being exposed to new information, however, is not the same as understanding or integrating that information into what one already knows. As one’s professional practice becomes more repetitive and routine, it is difficult for the practitioner to recognize opportunities in which to contemplate one’s habitual actions. Educators continuing to use ineffective practices for longer periods of time usually will not transform their actions into high quality ones as they typically are unable to merge these research-based practices with their instructional practice (Guskey & Yoon, 2009; Schmitt, 2004). According to Johnson (2007), “it takes time to process what is learned in a professional development experience and to internalize it in order to assimilate it into practice, especially if the new concept or strategy challenges the teachers’ current beliefs about how science should be taught” (p. 657). Reflective dialogue is a process by which educators can be supported in making sense of their practice through a process of deliberative examination (Camburn, 2010; Raines & Shadiow, 1995; Schon, 1983).

**Using Reflective Dialogues Models within Professional Development Initiatives**

Many teachers in the United States have little time within the school day to engage in professional dialogues about teaching and learning (Nelson, Deuel, Slavit, & Kennedy, 2010). Even when engaged in professional conversations, established norms within public schools limit meaningful, in-depth dialogue (Nelson et al., 2010). Teachers are often reluctant to share noted limitations within their practice as they perceive these remarks as promoting weakness or incompetency with their practice. This reluctance often keeps teachers from
identifying and using evidence from lesson plans or student work in reflecting on their practice (Nelson et al., 2010).

Participating in one-on-one dialogues with a peer or instructional expert can support teachers in the adoption of new instructional methods (Downey et al., 2004). Spending time in dialoguing with an instructional expert can increase the likelihood a teacher will engage in reflective practice and can expose teachers to implementing a new teaching strategy (Camburn, 2010). In addition, the use of a reflective practice model guides the practitioner to uncover both explicit and implicit knowledge (Schon, 1983). Identifying one’s implicit knowledge increases a practitioner’s awareness of “hidden” knowledge that influences one’s held conceptions that informs decisions about instructional practice (Knight, 1996).

Having teachers engage in reflective dialogue can assist in overcoming superficial understandings about their perceptions of inquiry-based instruction as well as identifying the internal and external factors influencing one’s ability to use more effective strategies in science education (Downey et al., 2004; Johnson, 2007). The dialogues can engage the learner in identifying prior knowledge, noting any expressed or unexpressed anxiety or fear regarding the new information, and helping the learner form a bridge between held conceptions and the reform message or new information. (Camburn, 2010; Downey et al., 2004).
and helping the learner form a bridge between held conceptions and the reform message or new information. (Camburn, 2010; Downey et al., 2004).

Guskey and Yoon (2009) argue that educators need job-embedded assistance and considerable amounts of structured and sustained follow-up as they struggle to adopt new instructional practices within their unique classroom context while overcoming feelings of insecurity in their explorations. Using reflective dialogue will enable teachers to question their practice within a current, established comfort zone to make meaning of their experiences (Downey et al., 2004). As teachers are supported in being reflective about their practice, they will engage in an ongoing process of reflection, renewal and growth (Downey et al., 2004). The use of reflective dialogue to engage teachers in the identification of existing misconceptions may lead to the accommodation of the concepts of inquiry-based instruction (Ebert & Crippen, 2010).

**Downey Walk-Through and Reflective Practice Approach**

The overarching purpose of the Downey model (Downey et al., 2004) is to engage teachers in reflective dialogue about past decision-making processes in order to guide future practice. By utilizing this reflective approach, teachers are placed in a growth mindset environment and begin to self-monitor their decision-making processes and their resulting impact on student learning. The use of this particular reflective dialogue model provides the vital support for teachers to engage in the careful analysis of held conceptions while promoting the dissonance needed to bring about the reorganization of one’s held conceptions. Without encountering dissonance to one’s held conceptions, the full accommodation of new concepts cannot occur (Posner, Strike, Hewson, & Gertzog, 1982). This approach starts with the observer conducting frequent, such as eight to ten, brief classroom visits of approximately two-three minutes in duration. During this time, observers are not to evaluate the teacher. Instead, the
purpose of these brief walk-throughs is to “gather information about curricular and instructional teaching practices and decisions teachers are making” (Downey et al., 2004, p. 2). The end goal of using this approach is to impact student achievement through the identification, analysis, and reflection of the teacher’s actions. In this study, each teacher was asked to reflect on the way in which she approached instructional planning based on her conceptions about inquiry-based instruction and articulate her reasoning in support of the decisions she made to implement inquiry-based practices.

**Key Findings**
Teacher responses from these reflective dialogues indicated that both participants held conceptions that echoed identified best practices within inquiry-based instruction, such as giving students opportunities to explore the content before constructing an explanation, the teacher facilitating instruction rather than favoring direct instruction, and planning curriculum around the big ideas in science as opposed to discrete facts. However, for these teachers, their held conceptions were not being transferred into observed practice. The use of reflective dialogue allowed for the discovery of concealed barriers that were impeding the consistent, proficient implementation of inquiry-based methods. These two teachers held conceptions regarding perceived levels of student motivation and cognitive ability as based solely on the identified academic level of students. Within each of these themes, several key factors were identified that served to block these teachers’ acceptance and full implementation of the reform message presented within the professional development initiative.

**Student Motivation**
Teacher #1 revealed held conceptions that influenced her perceptions regarding the motivation of students identified as gifted and talented (G/T) as compared...
with students in her grade-level classes. From the analysis of her reflection, it appeared that she wanted to blame student actions on a perceived lack of motivation without trying to question her own decision making process. First, she assumed that G/T students were motivated to complete assigned work at home, and students in her grade-level classes were unmotivated. However, actual underlying factors could be that G/T students were more in tune with classroom norms and had better developed skills in navigating the classroom culture. For students in the grade-level classes, many of whom are reluctant learners, the challenges within their home environments may be outweighing any motivation these students have to achieve. However, this does not necessarily mean that the G/T students are making a deliberate effort to complete assignments at home nor does it indicate that students in grade-level classes are not motivated to not complete work at home. It could be the grade-level students are lacking the needed resources, support, and appropriate environment within their home to successfully complete their work.

This misconception could also be masking her recognition to provide an appropriate level of support for all students to be successful. As evidenced through observed lessons and responses during reflective dialogues, Teacher #1 failed to see how her negative comments as influenced by her conceptions of her grade level students being unmotivated had an impact on student behaviors within the classroom. In addition, her negative reactions to the grade-level students who did not meet her expectations of student behavior exacerbated situations within the classrooms thereby reinforcing student perceptions of her lack of caring. In turn, the students’ behaviors re-affirmed her conceptions about the lack student motivation. From the analysis of her reflections, it appeared that she wanted to blame student actions on a perceived lack of motivation without trying to question her own decision making process. Her actions appeared to be contributing to an ongoing cycle of student apathy and teacher frustration.
Teacher #2 also revealed held conceptions that shaped her perceptions regarding the motivation of G/T students. From the analysis of her reflections, it appeared that external factors had a strong influence over her decision making process. Throughout the study, she often remarked about feeling pressured to “cover the standards” and “move quickly through the material” in order to meet the demands of teaching the content of two grade levels within one school year. This context served to reinforce misconceptions about the role of standardized testing on designing instruction. Furthermore, Teacher #2 appeared to view G/T students as being able to learn a quantity of knowledge at a faster pace than grade-level students. Her comments indicated a held conception that the students would gain the limited mastery needed to perform on the state-mandated test with just a cursory presentation of the concepts. This reflection reinforced her understanding of how best to implement the accelerated curriculum as the students were grasping the material with her brief, teacher-centered lessons. However, she was not able to recognize how this perception did not align with a proficient level of inquiry-based practice. In fact, these G/T students probably entered her classroom with a great deal of prior knowledge and could have scored well on these tests before receiving instruction. Her held conception about the motivation of G/T students to learn vast amounts of material influenced her decisions to disregard student prior knowledge and utilize teacher-centered methods that supported rote memorization of content rather than student conceptual understanding.

**Student Cognitive Ability**

Teacher #1’s misconception regarding student cognitive ability appeared to emerge from her perceptions about the home environments of G/T students as compared to grade-level students. She stated, “I’ve found that the G/T kids can noodle through the higher level thinking more easily than the regular ed
kids. I don’t think it’s so much ability so much as it is the lack of exposure. They
don’t have the base knowledge that a lot of the G/T kids do. That might be
limited from home environment.” Here, she did acknowledge that the home
environment does have an influence on student behaviors within the classroom,
yet she did not intentionally plan to adapt her instructional practice to address
this misconception. As the study progressed, she was very reluctant to let go of
this conception, especially as she experienced frustration when implementing
changes to her instruction within her grade-level classes. As she became
discouraged when attempting to implement formative assessment strategies
presented within the professional development initiative, she tended to place
blame on the grade-level students’ backgrounds rather than scaffold the use of
the strategy to allow every student to be successful.

Teacher #2 held an expectation of having her G/T students exceed the standard
while learning content beyond what was being tested. She noted, “I’m the
only one in the district doing the fast-paced science and I’m concerned. I don’t
want my kids to miss something important or not do well on the standardized
test because I’m going so fast.” This misconception appeared to contribute an
inconsistent implementation of inquiry-based practice. This perceived pressure
from external factors appeared to exacerbate her use of teacher-centered
methods in an attempt to maintain control over her instructional practice.

**Implications**

Traditionally, teachers have used more direct instructional methods to teach
science and math although recent research (Marshall & Alston, 2014; Sinatra,
Kienhues, & Hofer, 2014) has emphasized the positive student outcomes
associated with the use of inquiry-based methods. Inquiry-based instruction
echoes the practices and dispositions of scientists, however, this approach
does not necessarily connect with expectations set forth within a culture of
Rather than designing instruction to align with best practices, many science teachers have turned to implementing instructional methods that support teaching to the test such as providing large amounts of content through lecture.

accountability and high-stakes testing. Rather than designing instruction to align with best practices, many science teachers have turned to implementing instructional methods that support teaching to the test such as providing large amounts of content through lecture.

As noted in the findings of this study, these participants had a difficult time in identifying held conceptions about their instructional practice. The examination of when and how teachers make shifts in practice or dispositions based on personal reflections can inform professional development models and theoretical models for the learning professional. As conceptual change theory explains, one's constructed understandings of the phenomena encountered in the surrounding environment are more easily accommodated as one repeatedly engages with the concepts (Posner et al., 1982). Hence, practitioners who have collected a great deal of experience and interaction with held conceptions can have difficulty in identifying those conceptions as those understandings have melded into their established practice. This was evidenced in the multi-year professional development initiative as the two participants in this study were observed inconsistently implementing the elements of effective inquiry-based instruction.

Overall, the use of reflective dialogue provided a way to uncover barriers and serve as a means to address potential bottlenecks to the implementation of
inquiry-based practice. Within current research, there has been no clear way identified to support all teachers; a one-size fits all approach to professional development does not address the needs of all learners (Capps, Crawford, & Constas, 2012; Gusky & Yoon, 2009). The findings from this study suggest a need to generate ways to break down the complex charge placed on science teachers to implement inquiry-based instruction. Engaging science teachers in collaborative, reflective dialogue about their use of inquiry-based practices is one way for them to undertake a critique of the tacit understandings that have developed around repetitive experiences of their practice (Schön, 1983). Assisting practitioners in analyzing their practice in order to identify areas of deficiency is a multi-step process that includes accounting for personal dispositions, external factors, teacher background and training. Reflective dialogue can provide teacher-specific scaffolding as practitioners attempt to modify their practice (Downey et al., 2004). By establishing a safe, supportive rapport with the teachers, they can be more willing to work through the identified barriers and make substantial process in transforming their practice.

**Conclusion**

Designing effective professional development experiences for teachers is a complex process. By including an element of reflectivity within a professional development initiative, specific barriers to the full implementation can be identified and accommodated. Short of doing this, overall success in the implementation of the intervention cannot be achieved or sustained. Some barriers are easier to identify and remove; however, those barriers being influenced by strongly held conceptions are harder to identify from only observing teacher practice. The use of a reflective practice model can enable professional development providers to more clearly understand and articulate potential roadblocks to a successful implementation.
For many practitioners who have been forced to accept one new intervention after another without receiving the appropriate support and scaffolding, professional development initiatives are seen as “this too shall pass,” as they are frequently abandoned after a brief period of trial. Many interventions are abandoned due to the lack of identification of those barriers, whether visible or invisible. By utilizing a reflective practice model, professional development providers and practitioners can better understand the needed support for a sustained transformation in practice. In turn, the overall impact on instruction can lead to a deeper level of understanding for students (Downey et al., 2004).

References


• **RETHINKING HOW WE PROVIDE EMOTIONAL SUPPORT:** Social media is ubiquitous, particularly among our students. One of the byproducts of social media is that many of our relationships exist both online and face-to-face. One study found that even online relationships can provide students with emotional support—that just because students might interact in a virtual setting, this doesn’t seem to minimize the fulfillment of our emotional needs. One potential implication of this finding is to expand traditional notions of how we can support the social emotional needs of our students. Specifically, as educators seek to foster a community of learners in the classroom, they should increasingly look to capitalize on these online interactions to continue to build relationships and support the needs of students. [http://blogs.edweek.org/edweek/DigitalEducation/2017/10/teenagers_friendships_online_provide_emotional_support.html](http://blogs.edweek.org/edweek/DigitalEducation/2017/10/teenagers_friendships_online_provide_emotional_support.html)

• **EQUAL ACCESS TO EFFECTIVE PROFESSIONAL DEVELOPMENT?** A recently published report from the Southwest Regional Education Laboratory (@RELSouthwest) examined some of the challenges to professional development access for rural schools in Oklahoma. Specifically, the authors found that fewer rural schools offered the kind of professional development that research has shown to be most effective: collaborative, job embedded, continuous, and locally planned. A key question to consider: If you teach or lead a rural school in Virginia, what steps might you take to ensure your teachers have access to effective professional development? The PISTEM article on page 39 includes some suggestions for how online learning in the form of webinars can be used to provide remote professional develop opportunities for teachers. [https://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=4518](https://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=4518)
Problem-Based Interdisciplinary STEM Learning (PISTEM) with Hummingbird Robotics

Problem-based Interdisciplinary STEM Learning (PISTEM) is a professional development program implemented in 19 Virginia school divisions, many rural, that incorporates problem-based learning, robotics and coding, and inquiry-based learning. The program was developed to help teachers foster creativity and innovation through the integration of Hummingbird robotics. Through this integration, students gained experience with computer science and engineering concepts, while using core content subjects to provide the context for learning. Forty-nine teachers participated in PISTEM over the two-year implementation. Middle and high school teachers were exposed to new technologies not commonly available in their schools, and in return, enabled their students to experience the technologies. Through this opportunity, pedagogies changed to include learning experiences that fostered creativity and innovation through computer science and engineering concepts connected to real-life context, allowing teachers and students to begin thinking about technology in a different manner. Participating teachers were from the following school divisions: Bedford, Brunswick, Charles City, Charlotte, Chesterfield, Colonial Heights, Cumberland, Dinwiddie, Franklin City, Halifax, Lunenburg, Mecklenburg, Nottoway, Patrick, Pittsylvania, Prince George, Rockingham, Williamsburg-James City, and York.

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Introduction

Educators at Longwood University's Institute for Teaching through Technology and Innovative Practices (ITTIP) worked with teachers in rural Virginia for two years (2014-2016) in a professional development program that incorporated problem-based learning, robotics and coding, and inquiry-based learning. The program, Problem-based Interdisciplinary STEM Learning (PISTEM), was developed to help teachers foster creativity and innovation in the classroom through the integration of Hummingbird robotics (http://www.hummingbirdkit.com). Through this integration, students gained experience with computer science and engineering concepts, while using core content subjects to provide the context for learning. Twenty-eight teachers participated in year one of PISTEM and 21 teachers participated in year two.

Program

Elements of effective professional development, particularly opportunities for immersion and collaborative work, were integrated into the design of the program. The three program goals for the professional learning were to:

• Develop and implement high-quality professional development activities through the integration of problem-based learning practices through a summer workshop, online collaboration, and after-school webinars to change the instructional practices and foster an electronic community of STEM teachers;

• Provide engaged learning experiences for students in language arts, math, science, and CTE classrooms by integrating 21st century skills including open education and technology resources; and

• Improve and enhance collaboration among the participating teachers through building a professional learning community (PLC) and assist the participants with creating their own personal learning network (PLN) and online portfolio for personal and professional growth.
Year one of PISTEM provided professional development to teachers of rural schools with the instructional practices, technology tools and support to integrate STEM learning opportunities for grades 6-12. Teachers from a range of content areas, including language arts, mathematics, social studies, science, Career Technical Education (CTE), and world languages, joined as vertical teams from multiple school divisions and explored research-based instructional strategies and resources in an effort to facilitate the development of interdisciplinary problem-based learning STEM lessons and activities. The learning experience included the following:

- Five face-to-face meeting days in the summer;
- Four webinars throughout the school year (with follow-up activities);
- Participation in an online professional learning community; and
- Contribution to an electronic portfolio consisting of lesson plans, assessment tools, student artifacts, and reflection videos from a problem-based interdisciplinary STEM experience at a spring summit.

The year-long learning experience began in the summer for teachers and ended in the spring. The second year cohort followed the same model, but included teachers in grades four through eight. Table 1 in the Appendix describes each of the learning components.

**Pedagogy**

In developing PISTEM, the program leaders built on knowledge gained from past professional development with teachers in STEM, creativity and innovation, and problem-based learning, as well as current research on pedagogy relating to these factors. While inquiry-based learning supports student-centered hands-on applications, a more specific inquiry-based teaching and learning technique, problem-based learning (PBL), actively facilitates and supports the learning
process while expecting learners to be resilient in their own thinking. Problem-based learning has successfully been used for over 30 years, and is more frequently used through interdisciplinary experiences and connections (Savery, 2006). It supports the idea of students approaching relevant and meaningful local, national, and global “problems” through optimistic eyes that practice critical thinking, collaboration, and problem solving.

A PBL environment engages all students in solving interdisciplinary real-world problems, thus encouraging them to invoke concepts and ideas drawn from multiple disciplines and foster creativity and innovation. It is argued that students who engage in rich cross-disciplinary experiences will have a deeper conceptual understanding of content (Frykholm & Glasson, 2005; Zeidler, 2002), which will improve their achievement in each of the disciplines (Berry, Johnson, & Montgomery 2005). Further, interdisciplinary learning can foster an understanding of STEM concepts in their application to real world problems, problems that by their very nature are interdisciplinary. Integrated STEM learning, where students are involved in an engineering design process, creative thinking, and art, naturally lends itself to PBL, a way to motivate and integrate authentic STEM learning -- making problem-based learning a great fit for the design of PISTEM.

Technology Tools
Using Hummingbird robotics added a unique dimension for interdisciplinary learning in PISTEM and supported the importance of the integration of subjects like language arts and social studies, into science and mathematics, while providing participants with the appropriate support needed to be successful in using the technology tools integrated into a program. Even in school or division based professional development technology workshops, teachers tend to experience anxieties and organizational issues that hinder their technology
use (Harvey & Purnell 1995). Primarily, these issues involved accommodating the diversity among multiple school systems’ infrastructure and connectivity capabilities. This emphasized the need for ITTIP to develop a program that supported teaching and learning with technology tools that included minimal software and hardware technology requirements to alleviate apprehensiveness and school infrastructure issues.

Integrating on and offline technology tools in school systems can be daunting, especially across rural school divisions in PISTEM with minimal broadband connectivity. In order to minimize software needs, PISTEM participation required only the download of one open-source application to computers for all the technology tools that would be used. Consideration of grade level, cost, and subject area integrations were considered in the decision for the STEM tools to use for PISTEM (Leach, Playton, & Talaiver, 2014). Plug and play STEM hardware options (like a USB) were a valuable asset to PISTEM in limiting the amount of software needed to utilize it in the classrooms immediately. The Hummingbird Robotics kit fit the needed requirements and provided a coding and robotics aspect. Students can use common materials to design a robotics creation that can be programmed with the Hummingbird robotics microcontroller to read inputs (i.e. light, sound,
and temperature sensors) and control outputs (i.e. servos, motors, lights). The Finch robot and Makey Makey were also introduced to teachers as added resources, with Hummingbird robotics being the main focus.

Open educational resources (OERs) were used in PISTEM to model tools that could be integrated at low or no cost options for educators and their school divisions. Although only one programming language would be thoroughly learned, the tools chosen for the program would include open educational resources. Online tools for the development of teachers’ ePortfolios were provided through an OER to promote and model 21st century skills and practices. Webinars were also conducted as part of the professional learning experience.

Teacher Impact

Both quantitative and qualitative data sources were used in the evaluation process of PISTEM. Surveys were developed to measure teachers’ changes in pedagogical knowledge, and changes in STEM-related pedagogical practice in the classroom. Table 2 in the Appendix lists the measurement and data collection tools. The final survey data from cohort one and preliminary data from cohort two suggest:

- Teachers made gains related to their pedagogical content knowledge; and in all cases, there were significant shifts in the level of understanding between the pre- and post-workshop points;
- Significant growth from pre- to post-test was indicated in the percent of teachers expressing confidence in their ability to teach STEM; and
- Overall, teachers did make changes or adjustments to their practices throughout the school year based on their participation in PISTEM.

During focus groups, teachers discussed some of their favorite pieces of the program in greater detail. One mathematics teacher found the five days
during the summer on campus to be particularly helpful. He said, “For me, the most productive thing was last summer when we did the five days here at the university….I’ve always wanted to do interdisciplinary type of teaching but not really understanding how to…develop a unit…and how to work with the different learning standards and plan a unit around them.” Another teacher added, “The week last summer was really beneficial to me…because I was put into the position of the student which was helpful for me to know how the students feel when I presented this to them.” Several teachers found being immersed in the activity, just as their students would be, as very helpful.

Through these experiences, teachers’ content knowledge in STEM areas, as well as their pedagogical content knowledge concerning PBL in STEM, enhanced and positive perceptions about implementing the approach to problem-based interdisciplinary STEM experiences in their schools and school divisions to nurture problem-solving, engineering design, creativity and innovation.
Student Impact

Although student impact was not directly related to the program goals, much of the discussion during focus groups centered on the impact interdisciplinary STEM lessons had on students or on student reactions. Teachers commented on how teaching students to collaborate with one another was very valuable and something students do not really get a chance to learn through more traditional lessons. As for how their students reacted to a new teaching style, teachers had the following to say:

“We pretty much had 100% engagement with our activities and that was interesting… I think that [the wow factor of a new style] was the hook that some of the students were needing.”

STEM lessons had on students or on student reactions. Teachers commented on how teaching students to collaborate with one another was very valuable and something students do not really get a chance to learn through more traditional lessons. As for how their students reacted to a new teaching style, teachers had the following to say:

“It totally got them into the learning about robots and creativity I think was our biggest thing. That was a huge change…the difference in their creativity and their ability to critically think and understand what STEM is about.”

“We pretty much had 100% engagement with our activities and that was interesting…I think that [the wow factor of a new style] was the hook that some of the students were needing.”

“…Another thing I’ve noticed is that when you would ask students to write and use complete sentences they would be like ‘This is math, not English, why do I have to write?’ and I don’t hear that anymore…They’ve gotten this idea that it doesn’t have to be math and numbers.”
Student engagement was also discussed through evaluation measures, revealing that overall teachers could really see a change in student engagement during the lessons, which prompted teachers to think they should get their students engaged in these types of activities more often.

“I think seeing how excited the students were on using the [robotics] kits and using technology…I am thinking I need to get them more involved in hands-on activities…they really like this, I need to find more math stuff I can do using technology.”

While program leaders made classroom observations throughout the school, the excitement of students was always evident. In one classroom, students were challenged to “design a device that will solve a problem for an elderly person.”

They were delighted to share their projects that included a “flip-up home plate” for an umpire that could not quite bend over or the “hunter’s pulley” designed for a grandfather that might not be able to load his deer onto the truck. Projects were usually rooted in one content class for the building component, but other interdisciplinary aspects were done in the corresponding classes.
Lessons Learned

While teachers from cohort one showed significant gains from their participation in PISTEM, some changes were made in the design for cohort two based on observations and participant feedback. All five days of professional development were kept in the summer, however, instead of doing five consecutive days of learning, teachers met for two days in June and three days a month later. The two days in June allowed program leaders to focus on the technology usage, give the teachers time to use the technology through an assignment, and then come back and in July and be able to tie it in with PBL. The teachers were less frustrated in trying to do everything in one week and they had their own experience to use as a resource when seeing how to integrate the concepts. Cohort one indicated that they felt rushed in trying to learn everything in one week.

An unintentional change was in how the teachers implemented their planned activities at their schools. While the original intent of PISTEM was for teachers to use the technology in their core content classes, some of the cohort two teachers used Hummingbird robotics in after-school programs instead of during the school day. At first, this strategy concerned program leaders, however, it became evident that the teachers who had this extra time and “less pressure” seemed to really embrace the technology and the concepts and still showed growth in their pedagogical practices in the classroom. Those teachers then had more confidence to implement with students during the school day in the
following year. The after-school programs also provided an opportunity for PISTEM teachers to get other teachers involved and increased the overall interest in robotics at the school.

Summary
PISTEM has created a unique opportunity for teachers to collaborate across disciplines and integrate technology and computer science concepts into their classrooms. Teachers were exposed to new technologies not commonly available in their schools, and in return, enabled their students to experience something new. By offering this opportunity, pedagogies changed to include learning experiences that fostered creativity and innovation through computer science and engineering concepts connected to real-life context, allowing teachers and students to begin thinking about technology in a different manner. In addition, PISTEM provided effective professional development to many rural school teachers, helping to close the gap for many underrepresented students for STEM learning experiences.

Acknowledgements
We would like to acknowledge the following for their collaboration in PISTEM: Metropolitan Educational Research Consortium (MERC) at Virginia Commonwealth University for project evaluation; Longwood University Cook-Cole College of Arts and Science, and the Southside Virginia Regional Technology Consortium. Funding for PISTEM was made possible through a grant from the State Council for Higher Education in Virginia (SCHEV).

References


### Appendix

**Table 1: Quantitative and Qualitative Evaluation Measures**

<table>
<thead>
<tr>
<th>Measures</th>
<th>Data Collection</th>
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<tbody>
<tr>
<td>Pre/Post Test for Professional Development</td>
<td>Pre-Test (summer)/Post-Test(spring)</td>
</tr>
<tr>
<td>• Measured changes in participant content knowledge and pedagogical skill related to professional development objectives</td>
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<tr>
<td>Participant Surveys</td>
<td>Pre-Workshop, Post-Workshop, Post Program (spring)</td>
</tr>
<tr>
<td>• Measured self-reported impact related to the three program goals.</td>
<td></td>
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<tr>
<td>Semi - Structured Focus Groups</td>
<td>Spring Summit</td>
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<tr>
<td>• Measured/gauged the impact and success of the program from the teacher’s perspective</td>
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</tr>
</tbody>
</table>
Table 2: PISTEM Activities

<table>
<thead>
<tr>
<th>Pedagogy</th>
<th>• 5E Learning Cycle was used to introduce teachers to new material during the week</th>
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<tbody>
<tr>
<td></td>
<td>o Participants were immediately <em>engaged</em> with a STEM robotics kit (and worked in collaborative groups)</td>
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<tr>
<td></td>
<td>o They were given further time to <em>explore</em> without direct instruction from the program facilitators.</td>
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<tr>
<td></td>
<td>o The teachers were then given time to <em>explain</em> their understanding and connections to STEM concepts through the use of the robotics kit and programming.</td>
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<td></td>
<td>o Teachers further <em>elaborated</em> their understanding through a PBL activity, challenging them to apply what they learned.</td>
</tr>
<tr>
<td></td>
<td>o Through final group presentations, participants were able to <em>evaluate</em> various solutions to the problem, to demonstrate an understanding of the new concepts and skills, and assess their own knowledge and learning.</td>
</tr>
<tr>
<td>Technology</td>
<td>• Robotics Kit</td>
</tr>
<tr>
<td></td>
<td>• OER coding applications</td>
</tr>
<tr>
<td></td>
<td>• Online professional learning community to digitally document their year long learning</td>
</tr>
<tr>
<td></td>
<td>• Plug and play technologies</td>
</tr>
<tr>
<td>Assessment</td>
<td>While immersed in activities modeling classroom pedagogies, it was also important for participants to learn and experience authentic methods for assessing their students. Facilitators used:</td>
</tr>
<tr>
<td></td>
<td>• Performance tasks, self- and peer- evaluation, rubrics, and demonstrations, other assessment methods and resources were shared with the participants.</td>
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</tbody>
</table>
Table 2: PISTEM Activities *(Continued)*

<table>
<thead>
<tr>
<th>Webinars: Four During the School year</th>
<th></th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Topic: Integrating Reading &amp; Writing Into STEM learning</strong> This webinar series emphasized the idea that an understanding of STEM did not come solely from knowing science, technology, engineering, and mathematics content, but that critical thinking, reading, and writing skills are also a major component of STEM learning.</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>• Content involved discussion of various models of curriculum integration including connection content to themes or disciplines, prior knowledge, and collaboration.</td>
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<tr>
<td></td>
<td>• Instructional strategies with integration of reading and writing was modeled with participants.</td>
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<tr>
<td></td>
<td>• Effective strategies for integrating vocabulary and discussion on strategic teaching was communicated to the participants.</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td><strong>Topic: Mathematics and Engineering</strong> This series had the participants recruited together for the cohort in teams working at schools with real time, hands-on activities and face to face communication with their peers, although simultaneously having a virtual facilitator and audience. While teachers worked in groups, they actively went through the engineering design process through various activities and shared their outcomes and reflections. Connections were also made to the social sciences and to the importance of writing and presenting skills. Data collection, computation, and measurement was a prevalent mathematical theme in the series.</td>
</tr>
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Table 2: PISTEM Activities *(Continued)*

<table>
<thead>
<tr>
<th>Classroom Integrations</th>
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<tbody>
<tr>
<td><strong>Classroom</strong></td>
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<tr>
<td>• During the school year, participants were asked to work collaboratively with other teachers recruited from their school divisions that specialized in different subject areas. As part of this collaboration, school divisions were given classroom sets of robotic kits that could be reused, at the expense of any previously made projects. If possible, teachers would work as collaborative teams to implement problem-based learning across the curriculum with the kits.</td>
</tr>
<tr>
<td>• Digital documentation was collected through pictures and videos to help develop their end of the year ePortfolios.</td>
</tr>
<tr>
<td>• The teachers were additionally asked to contact program facilitators so that they could schedule and observe part(s) of the implementations and instructional practices, first hand. This also provided an understanding that the facilitators were to be considered a year-long support system for any questions, concerns, frustrations, or classroom needs.</td>
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<tr>
<th>End of Year Summit</th>
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<tbody>
<tr>
<td>• The year-long learning experience for teachers culminated during a springtime summit. Although many digital artifacts were collected using an online open educational resource, they are accessed through participant login credentials. However, the lesson plans, materials, and assessment tools can be found online.</td>
</tr>
<tr>
<td>o Teachers presented their lesson plans, digital artifact, and shared both their successes and challenges in facilitating their student’s experiences in learning STEM concepts through problem-based learning.</td>
</tr>
</tbody>
</table>
• **INCLUSION SETTINGS AND CTE COURSE ENROLLMENT HAVE POSITIVE IMPACTS FOR STUDENTS WITH DISABILITIES:** A study published in May 2017 found that students with disabilities who were placed in general education classrooms (for at least 80% of their school day) had improved outcomes regarding on-time graduation, college attendance, and employment when compared with students who spent less time in general education classrooms. Further, students who enrolled in four or more career and technical education (CTE) credits in high school were more likely to graduate on time and find jobs than their peers who did not take the same amount of CTE credits. These findings hold significance as schools consider both programs and course selection for students with disabilities. [http://blogs.edweek.org/edweek/speced/2017/06/inclusion_career_and_technical_education.html?cmp=eml-enl-eu-news2-RM](http://blogs.edweek.org/edweek/speced/2017/06/inclusion_career_and_technical_education.html?cmp=eml-enl-eu-news2-RM)

• **IMPACTS OF HEAD START PROGRAMS:** The debate over the impacts of pre-K programs is nothing new to the field of education. Two economics researchers examined the impacts of federally funded Head Start programs as a mechanism to improve outcomes for students from poverty. In this specific study, the researchers studied children of parents who participated in Head Start. They found intergenerational impacts in the form of increased educational attainment, reduced teen pregnancy, and reduced criminal engagement. In addition to more immediate impacts, policymakers should consider potential longer-term outcomes of these services when allocating funds to anti-poverty programs such as Head Start. [http://blogs.edweek.org/edweek/early_years/2017/09/head_startproduces_intergenerational_benefits_study_finds.html](http://blogs.edweek.org/edweek/early_years/2017/09/head_startproduces_intergenerational_benefits_study_finds.html)
It is this author’s contention that the prevalent and common use of keyword strategies when teaching elementary students to solve story problems encourages them to simply memorize a list of words, rather than build on their conceptual understanding of the mathematics asked in the problem. I write this article to share my personal experience working with elementary pre- and in-service teachers and children and my efforts to use problem solving strategies as opposed to keywords when solving story problems.

Ann Wallace
Ann Wallace is a former 5th-grade teacher. She currently teaches mathematics methods for Elementary Education majors at James Madison University. Her interests include promoting conceptual understanding in addition to procedural proficiency for elementary-aged children and their teachers.

Introduction
Story problems are often thought to be daunting by both elementary school children and their teachers. However, they play an important role in elementary school mathematics because they provide opportunities for real-world connections to the mathematics being studied; and they may help students to develop meaningful problem-solving skills. Unfortunately, story problems—as currently presented in mathematics textbooks—often do not accomplish these goals because they reinforce a procedural approach (using keywords) that undermines student development of a conceptual understanding. A keywords approach to problem-solving suggests which operation a student might use
to solve a problem. Using keywords to solve problems may be helpful in some instances, but they do not work in every situation. Further, students who are only taught the keyword approach often struggle with story problems that are more complex or semantically inconsistent with what they have learned (Van de Walle et al. 2013). For example, take the following story problem:

Freida the frog can jump 6 times her length. Freida is 8 centimeters long. How far can she jump?

The keyword ‘times’ implies a student multiply the numbers in the problem to reach the solution. Consider how a third-grade student solved the above frog problem.

Figure 1

The student circled the numbers in the problem, underlined the keyword, but proceeded to add as opposed to multiply to reach an incorrect solution. Good problem solvers look beneath the surface information (numbers and keywords) to the context of the problem (Rigelman, 2007). This example is consistent with the erroneous problem solving methods found by Sowder (1988, p. 228). Some of these strategies (from the mouths of students) are found in Table 1 at the top of the following page.

Sowder argues that students use these undeveloped strategies for at least three reasons. First, they work for the students, particularly for single-step problems with whole numbers (although they begin to fail for multi-step problems). Second, the emphasis on computation and the tendency to focus on correct answers encourages students to use whatever works. Finally, Sowder suggests
that students use these strategies because they are not taught, or have not learned, better strategies (and they may be unaware that they exist). In the end, he suggests giving students more complex problems that encourage the development of more mature problem-solving strategies.

With this in mind, I presented the following problem to elementary mathematics methods students as well as a group of upper elementary teachers. I chose the problem because I had observed numerous 4th and 5th grade students solve the problem incorrectly. I was interested to see if the pre- and in-service teachers would have similar misconceptions.

Simon’s bill was $17.48. That included 48¢ in tax. The rest was the cost of a DVD and an X-Box game rental. The DVD costs $11.00 more than the game rental. How much did it cost to rent the game?

The data I collected revealed that 81% of the pre- and in-service teachers solved the problem by focusing on the key word ‘more’ and subtracting $17.00 - $11.00 to get the incorrect answer $6.00 (See the Conclusion Section for correct solutions to the problem). In order to help elementary mathematics methods

<table>
<thead>
<tr>
<th>Table 1. Erroneous Problem Solving Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Addition usually works, since it is the easiest operation. Just pick out the numbers and add.</td>
</tr>
<tr>
<td>2. Guess at what operation to use. It will probably be the one you just used on the problem before.</td>
</tr>
<tr>
<td>3. Look for Keywords.</td>
</tr>
<tr>
<td>4. Go by how the numbers “look”. If there are two numbers about the same size, like 54 and 67, then you probably either add or subtract. If one number is big and the other is small, like 86 and 4, then you probably divide.</td>
</tr>
<tr>
<td>5. Try all four operations. Then choose the answer that makes the most sense.</td>
</tr>
</tbody>
</table>
Students teach their future students to solve story problems contextually, I realized I had to first teach them effective problem-solving strategies.

**Examples of Student Strategies**

To begin the discussion of students’ misconceptions and strategies during my math methods course, I ask my students to solve the following problem:

> The School’s Cafeteria serves 6 types of ice cream and 4 different kinds of toppings. An ice cream cup can only be made from 1 type of ice cream and 1 topping. How many different kinds of ice cream cups can the cafeteria serve?

My students are easily able to use mental math to reach the correct solution; however, I ask them to draw a diagram to represent their thinking. They commonly use tree diagrams or create organized lists (Figure 2).

**Figure 2**

We use the diagrams to initiate a discussion of how elementary children might solve the same problem. Next, I share a variety of methods one group of 4th-grade students used to solve the same problem. Table 2 on the following two pages displays 10 different students’ solutions (both correct and incorrect) as well as the reasoning behind their answers.
Table 2. Student strategies for solving the Cafeteria Problem

<table>
<thead>
<tr>
<th>Solution</th>
<th>Student Explanation/Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>‘How many different?’ means to subtract. (keywords)</td>
</tr>
<tr>
<td></td>
<td>That’s what you usually do with those numbers. (How the numbers ‘look’)</td>
</tr>
<tr>
<td>2</td>
<td>‘How many?’ means to add. (keywords)</td>
</tr>
<tr>
<td></td>
<td>‘6 different ice creams and 4 different toppings is 10 different cups.’ (addition usually works)</td>
</tr>
<tr>
<td>3</td>
<td>There are only 6 kinds. (Lacks understanding of the problem)</td>
</tr>
<tr>
<td>4</td>
<td>They could make 9 combinations. (Student takes the numbers in the problem and applies operations that do not make sense.)</td>
</tr>
<tr>
<td>5</td>
<td>I listed the flavors across the top and kept counting the toppings until I finished. (Uses an organized chart to correctly solve the problem.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IC1</th>
<th>IC2</th>
<th>IC3</th>
<th>IC4</th>
<th>IC5</th>
<th>IC6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>9</td>
<td>13</td>
<td>17</td>
<td>21</td>
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<tr>
<td>2</td>
<td>6</td>
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<td>7</td>
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<td>15</td>
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<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

Correct
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **6** | ![Diagram](image) | *I drew the ice creams then the toppings and counted them up.*  
(Uses a tree diagram to correctly solve the problem.) |
|   | Correct |   |
| **7** | 6\(\times\)4 = 1 | *I’m going to divide because I need to know how many small cups I can get from the big group.*  
(Lacks understanding of the problem) |
|   | Incorrect |   |
| **8** | 16 | *4\(\times\)4 = 16. That’s how you solve the problem.*  
(Lacks understanding of the problem) |
|   | Incorrect |   |
| **9** | 6\(\times\)4 = 24 + 1 = 25 | Correctly guessed what operation to use; but then thought he had to do something with the one so he just added it. |
|   | Incorrect |   |
| **10** | 6\(\times\)4 = 24 | *Four toppings for each flavor is like adding 4 six times.*  
Knew to multiply and could explain her reasoning. |
|   | Correct |   |

Sowder’s erroneous strategies (1988) are clearly seen in the responses provided by this group of fourth-grade students. To prevent flawed problem solving, it is important that educators focus on teaching students how to apply multiple
strategies in order to solve them. While exposing our students to different strategies, we also want them to have the knowledge and understanding to be able to choose an appropriate operation to use. I share these solutions with both pre- and in-service teachers to discuss misconceptions students may have, as well as strategies they might use when they lack a logical method to solve the problem. It is also important that the problems presented are challenging enough so that students are pressed to use strategies beyond merely guessing. You cannot merely provide a list and expect students to know how to use a strategy. You must give problems that can be solved by using them and encourage their use.

**Story Problems and Effective Problem Solving Strategies**

Many elementary textbooks provide a section on ‘Problem Solving Strategies’ that looks similar to the following:

**Figure 3**

Based on experience, I believe that students are often unable to use these strategies because they are not given appropriate problems to solve that allow for their use. The remainder of this article applies three of the problem-solving strategies represented in Figure 3 (Make a Model, Draw a Picture or Diagram, and Solve a Simpler Problem) to problems that would lend themselves to using the particular strategy.
1. MAKE A MODEL. This strategy suggests physically representing the problem with concrete materials (i.e. blocks, 2-color counters) to simulate the action in the problem. **Cognitively Guided Instruction (CGI)** (Carpenter, et. al. 2015) is a student-centered approach to teaching mathematics that builds on children’s intuitive ideas for solving problems or tasks. The CGI research team determined that children’s conception of the basic operations (+, -, ×, ÷) is different from that of adults. They determined this by having children model the actions in story problems. For example, consider the CGI problem type below. It is considered a ‘change unknown’ problem because the solution is neither found at the beginning nor the end of the problem, rather the change occurs somewhere in the middle.

*I have 13 baseball cards. Kristy gave me some more. Now I have 20 baseball cards. How many baseball cards did Kristy give me?*

An adult would likely solve the problem $20 - 13 = 7$. However, using concrete materials, CGI found that students would solve the problem $13 + ___ = 20$. The students would use a direct modeling strategy; start with 13 counters (representing baseball cards) and add counters (7) until they reach 20 counters (Table 3). Both operations (addition and subtraction) yield the correct solution; but we do not want to teach children to use one particular operation when they may see the problem differently.

![Modeling example](image)

Another CGI problem type (compare, difference unknown) follows:

*Travis has 6 toy cars. Georgina has 10 toy cars. Georgina has how many more toy cars than Travis?*
Again, an adult would likely solve the problem using subtraction, $10 - 6 = 4$. However, using concrete materials and modeling the problem, young children solve the problem as represented below:

The yellow chips represent Georgina’s toy cars and the red chips represent Travis’s. The student counts on from 4 to 10. The difference between 10 and 6 is 4. Both problems use direct modeling followed by counting on to reach the solution.

These examples not only demonstrate how concrete materials can be used to solve the problems; but also, how to clarify the difference between subtraction problem types (separate and compare). While concrete materials are not efficient for larger numbers, they are meaningful when helping students to understand why they are performing certain operations to solve a problem.

**2. DRAW A PICTURE OR DIAGRAM.** Using this strategy, students create mental images of the problem being solved and then represent the image in a picture or diagram. Representations can vary greatly. There are no right or wrong ways to represent a problem; and students usually enjoy seeing how others have represented the same problem (Bennett, Maier, & Nelson, 1988). Educators want to provide problems that make use of a picture or diagram to clarify a situation, or to help the student reach a reasonable conclusion. The previous problems were used to differentiate between the two subtraction problem types. This method can also be used to differentiate between the two types of division problems (grouping and sharing). The following problems lend themselves to drawing a diagram to solve.

*I have 20 students in my class and I want them to sit at tables for 4. How many tables do I need for all of my students?*
STORY PROBLEMS

Figure 4
Using the grouping method of division, the student begins with 20 squares (representing the students) and circles 4 at a time until he runs out of squares. This results in 5 groups of 4 students each. For this problem, we are given how many are in each group (4); we want to know how many groups (5) \(20 \div 4 = 5\).

I have 18 students in my class and I have 3 tables. If I want the same number of students to sit at each table, how many students will sit at each table?

Figure 5
Using the Sharing method of division, the student begins with 3 tables and draws one triangle at a time (representing students) at each table until she reaches 18. Six students would sit at each table. For this problem, we are given how many groups (3); we want to know how many students are in each group (6) \(18 \div 3 = 6\).

Students can draw a picture to represent the objects in a problem when they do not have concrete materials available (or the teacher is moving the students away from using concrete materials). Drawing a diagram is not only a useful problem-solving strategy, but it can also help students to distinguish between the two types of division problems (grouping and sharing).

3. WORK A SIMPLER PROBLEM. One way to make a problem more manageable,
and a strategy that usually yields good results, is to change the problem into an equivalent one that may be easier to solve. This may give insight into how to solve the original problem. The simpler problem uses numbers that are easier for the student to work with and may also be simplified by considering an easier case of the problem. Once students solve the easier version, they can proceed to the original, more complex problem (Wallace, 2007).

Given the first 3 arrangements of a growing tile pattern, how can we determine the number of tiles in the 20th arrangement?

We do not have enough tiles to build the 20th arrangement; and adding the columns or counting the tiles one at a time would be too time-consuming. How else can we determine the total number of tiles in the 20th arrangement?

One solution uses the 4th arrangement to generalize to the 20th arrangement. By adding tiles to the arrangement to make a square, the area can be determined by multiplying the length x width (4in x 4in = 16in²). If we take half of the area we get 8in², but must add 4 half squares back to get the total. The derived formula is \( \frac{s^2}{2} + \frac{s}{2} \) where \( s \) equals both the arrangement number as well as the length of one side of the figure. We can further use the formula to determine the number of tiles in the 20th arrangement:

\[ 200 + 10 = 210 \text{ tiles in the 20th arrangement}. \]

Another solution uses the third arrangement to generalize to the 20th arrangement.

The figure formed by combining 2 copies of the 3rd
arrangement (rotating one of them) is a rectangle. The dimensions of the rectangle become \( s \) (the arrangement number as well as the length of one side) and \( s + 1 \). To find the area of the rectangle, multiply \( s \times (s + 1) \). The rectangle was formed by doubling the size/area of the third figure, so the area of the rectangle must be divided in half to determine the number of tiles in the arrangement.

For the third figure, the solution can then be determined procedurally using the following equation: \( (s \times (s + 1)) \div 2 \). The same procedure can be generalized to determine the number of tiles in the 20th arrangement.

The previous problems were purposefully selected because they lend themselves to using particular strategies. Once I expose my mathematics methods students to these (and other) problem-solving strategies, we explore how to construct story problems that not only lend themselves to using particular methods, but also teach rich mathematical content.

**Conclusion**

The purpose of this article is two-fold: first, to identify why students struggle to solve some varieties of story problems, and second, to provide strategies for students to use to solve them more effectively. Let’s take a moment and revisit Simon’s problem from earlier to demonstrate strategies that can be used when solving the problem.

*Simon’s bill was $17.48. That included 48¢ in tax. The rest was the cost of a DVD and an X-Box game rental. The DVD costs $11.00 more than the game rental. How much did it cost to rent the game?*

A number line can be easily drawn to represent the ‘Draw a Picture or Diagram’ strategy. After subtracting the amount of tax, the total cost for both items is $17.00. The number line allows the problem solver to maintain the $11 difference, and to find the combination of numbers that also equals 17. Moving
chronologically from zero, the first pair of numbers to represent a difference of 11 and a sum of 17 are 3 and 14. Therefore, we can conclude the cost of the game rental is $3 and the cost of the DVD is $3 + $11 = $14 (or $14 - $11 = $3).

\[
\begin{array}{c|c}
0 & 17 \\
\hline
0 & 11 \quad \text{Difference} = 11 \quad \text{Sum} = 11 \\
1 & 12 \quad \text{Difference} = 11 \quad \text{Sum} = 13 \\
2 & 13 \quad \text{Difference} = 11 \quad \text{Sum} = 15 \\
3 & 14 \quad \text{Difference} = 11 \quad \text{Sum} = 17
\end{array}
\]

Similarly, the solution can be reached by representing the problem with concrete materials (‘Make a Model’).

\[
\begin{array}{cccccccccccccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 \\
\hline
\end{array}
\]

\[
\begin{array}{ccc}
3 & + & 11 \\
\hline
14
\end{array}
\]

Further, the problem may be solved by the ‘Working a Simpler Problem’ strategy using algebraic reasoning.

Let \( x \) represent the cost of the game.

Let \( y \) represent the cost of the DVD.
x + y = 17 (cost for both)
x + 11 = y
x + (x + 11) = 17
2x + 11 = 17
2x = 6
x = 3

The game rental costs $3. The DVD costs $3 + $11 = $14

Teachers must carefully and purposefully choose problems that can be solved using a range of strategies by different representations. Making connections among these strategies through problem solving supports students in understanding the relevance of each representation and deepens their understanding of mathematical concepts. Incorporating these strategies into instruction does not change the mathematical content. It supports the content by providing multiple avenues to reach the same destination. With these ideas in mind, teachers can design and pursue problems for effectively instructing competent problem solvers in their students.

References


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VASCDed@gmail.com
Engaging the Power of Peer Observation

“This experience has been amazing and should be a part of professional development each year,” said one participant.

What is “this experience” referenced above? It is the simple strategy of creating conversation, community, and reflection among teachers through informal, yet purposeful, peer observation. This is the story of one graduate school class’ experience with the power of peer observation.

Kate Cassada serves as Assistant Professor of Education and Assistant Chair of Graduate Education for Educational Leadership and Policy Studies for the University of Richmond’s School of Professional and Continuing Studies. For 14 years, Kate served as a public school classroom teacher, senior teacher, assistant principal and principal.

Julie Harris teaches eighth grade Algebra 1 in Chesterfield County Public Schools, where she is in her fourth year of teaching. Julie is a graduate of Longwood University and recently finished the Curriculum and Instruction master’s program at the University of Richmond.

Bobby Herting teaches U.S. History in the Chesterfield County Public School System. His first 17 years of teaching were at Clover Hill High School and he was part of the team that opened Cosby High School, where he has been teaching for the past 12 years. Bobby is a graduate of the University of Virginia and is enrolled in the Curriculum and Instruction Master of Education program at the University of Richmond.

Tara Warren is enrolled in the Curriculum and Instruction Master of Education program at the University of Richmond. Tara has worked for Richmond Public Schools for the last ten years.

DaMia Brown-Kidd is enrolled in the Curriculum and Instruction Master of Education program at the University of Richmond. DaMia is a fourth year elementary school teacher in Richmond Public Schools.
As a college professor, I have taught hundreds of graduate students in instructional leadership and reflective teaching courses. The overwhelmingly consistent report I hear from these active and engaged educators is that they rarely, if ever, have time to see each other teach. Teaching remains an isolated event—protected time for teachers to share their craft through thoughtful peer discussion and observation rarely exists. When time is devoted to these activities, it usually is prescribed by building or division-led professional development initiatives, experiences teachers say do not feel genuine, safe, and focused on true reflection and growth. As Daniels, Pirayoff, and Bessant state, “professional development experiences in K-12 education are often disconnected from what teachers actually want and need in order to authentically improve and/or strengthen their practice” (2013, p. 268).

From Early Career to Veteran: The Experience We Shared

A professor’s anxiety (Kate) Four teachers in the Central Virginia region came together to explore their own teaching and discover their reflective paths in a graduate level Reflective Teaching Seminar course. This class was led by me, an assistant professor with experience as a K-12 teacher and principal, and consisted of students representing diversity in gender, years of experience, and grade levels taught. The students were Bobby, a high school social studies teacher with 28 years of experience; Tara, a kindergarten/first grade special educator with six years of experience in the classroom; and two teachers with three years of experience each - Julie, a middle school math teacher, and DaMia, a third grade teacher. The schools in which these educators taught ranged from urban to suburban and low income to more affluent. I was anxious about my ability to facilitate meaningful reflection on the graduate students’ own practice. Developing the cohesion and trust to share deepest concerns about their own practice and support each other in instructional growth could have been difficult, but they embraced the challenge.
One of the primary assignments in our seminar is called the *Observation Rubric and Classroom Walkthroughs* activity. Based on the value of the research-based best practices of peer observation and reflection, this assignment asks teachers to identify one area that interests or challenges them regarding their own instructional skill. They create a brief rubric grounded in research and best practices that is used as a peer observation data-gathering tool. In addition, these graduate students video themselves instructing and use the created rubrics to focus their participation in small-group peer-video coaching. Each semester, there are varying levels of anxiety regarding serving as peer observers in their schools and videoing and sharing their own instruction with classmates. Reactions can range from “I’m pretty comfortable with this” to “I have to drop this class!”

We want you to know how valuable the peer observation experience was to us – and how valuable it could be to you.

Despite coming from different schools, within three weeks significant bonding was evident. By the middle of the semester, a true sense of trust and respect set the stage for remarkable self-study. At the close of semester, we realized that the experience of peer observation, reflection, and growth was so powerful that the five of us came together to write about it and share a call to action with other educators. We want you to know how valuable the peer observation experience was to us – and how valuable it could be to you. Here is our experience, as told through the lens of my students.

*Renewing a teacher’s soul (Bobby)* As a 28-year veteran, I felt that I had lost, on some level, the connection with my high school students. I was beginning
to feel as if my main concern was less about student learning and more about maintaining a disciplined classroom. As a result, I became overly focused on keeping students in line and lost sight of their individual needs and personal stories. I knew that some of my colleagues had well-managed classrooms, so I was quite eager to conduct a few informal peer drop-ins to see how they maintained those expectations to keep their classrooms running smoothly. With this in mind, I experienced my first epiphany. As Kate noted in class, “You can pick a fight with anyone about anything.” As I saw how other colleagues managed their rooms, without fights, I noticed that they were so relaxed. For example, one colleague spent time conversing with a student about a blocked website while another chatted with a student about a sudden discovery on her laptop. A third teacher’s students seemed very comfortable with beginning-of-class routines that still allowed for personal interactions.

Students beamed with delight to interact with their teachers and classmates in ways that were at once both flexible and rehearsed. In what may have been seen by others as off-task moments, I re-learned that connecting with students is an essential component to an effectively managed classroom. I realized I needed to stop being so firm with my expectations. Since abandoning my obsession with structuring every moment in my classroom, I have had a dramatically different feeling while teaching – especially with a talkative class that is actually very interested in asking questions constantly. Because I have relaxed, their numerous questions during direct instruction are now much more enriching. Student questioning tends to continue throughout the lesson, they may ask for an opinion from me or from each other, or share personal connections to the content. Such moments used to bother me, but now I see them as a way to personally connect with my students. This has transformed the room, and me as a teacher. By inviting more student contributions, I have learned about manga (a style of Japanese comics), about how to conceal a broken nose using makeup, or
about bad Mussolini historical puns. In doing so, I rediscovered the many great personal connections I thought I had lost. My more talkative class, which caused me anxiety, is the one that I now cannot wait to see. Other quieter classes are now on my radar as their silence is no longer “golden!”

Through visiting peer classrooms and talking about our practices, I have refreshed myself and have a more engaged and connected classroom as a result.

This assignment taught me that reflection about best practices must not only involve reading and discussing, but also seeing these practices in action. I am thrilled to have taken away so many ideas and to have applied them to my classroom without fear of losing some illusion of control that I was clinging to. Through visiting peer classrooms and talking about our practices, I have refreshed myself and have a more engaged and connected classroom as a result.

*Mirror mirror - a reflection of oneself* (DaMia) As a third-year teacher, my initial reaction to the *Observation Rubric and Classroom Walkthroughs* assignment was filled with doubt. I asked myself, “Who is going to let me come in their room and openly observe their instruction?” That was followed by, “How in the world am I going to find time to fit this activity into my already overflowing schedule?” I thought the peer observation process would be hard, time consuming, and definitely something outside of my comfort zone. I did not think that I would enjoy it at all. While some of my initial thoughts and concerns were very accurate, others would be challenged as soon as I began.
I chose to build my peer observation rubric on consistency in the classroom. I felt that my classroom management lacked consistency regarding my expectations for students. My biggest insight from this assignment came from when I was able to video myself teaching and analyze with others how I managed my classroom. Although I was able to see that I managed the class better than I thought, I was still able to identify areas in which I wasn’t consistent and immediately begin to brainstorm solutions. It was nice to hear feedback from colleagues to confirm my approaches. Overall, the assignment brought a sense of hope and comfort in knowing that I might not have everything right as of now, but I don’t have it all wrong.

**Overall, the assignment brought a sense of hope and comfort in knowing that I might not have everything right as of now, but I don’t have it all wrong.**

I managed my classroom. Although I was able to see that I managed the class better than I thought, I was still able to identify areas in which I wasn’t consistent and immediately begin to brainstorm solutions. It was nice to hear feedback from colleagues to confirm my approaches. Overall, the assignment brought a sense of hope and comfort in knowing that I might not have everything right as of now, but I don’t have it all wrong.

**Wow! The things we can learn from each other. (Tara)** For this assignment, I observed three veteran teachers and one who was in her second year. Mathematics and reading are the areas on which I chose to focus during my observations because I wanted to learn new strategies for teaching them. I appreciated that every observation was genuine, meaning I saw each teacher’s typical, authentic practice. I learned something new from all of the teachers; however, the veteran teachers taught me ways I could increase engagement in my own classroom. For example, one teacher used a version of the Twister game for math instruction. The students had math problems on a card and the teacher put numbers in the circles on the mat. When the students found the answer to
the problem, they put a body part on the mat. I thought this was an interactive and fun-filled way to learn.

At the conclusion of the observations, it surprised me when the teachers came to me asking for feedback, especially the veteran teachers. This assignment helped to further create a feeling of mutual respect and explore a method of professional learning from which we can continue to learn and grow together.

**Is what I am doing effective or should I be doing what everyone else is doing? (Julie)** As a third year teacher, I often find myself isolated in my own classroom having no idea what is going on throughout the school. Although I collaborate with other Algebra teachers regularly, I still do not have a sense of what their classes look like. Does their instruction look similar to mine? Are my practices as effective as they could be, or are there effective strategies we could be sharing?

I find it easy to walk into a classroom of a teacher I have a relationship with; however, I wanted to step out of my comfort zone with this *Observation Rubric and Classroom Walkthroughs* assignment so I sought teachers I was less familiar with. To say I was nervous about walking into these classrooms is a complete understatement! However, once each class began I quickly realized what I could gain from experiences such as this. For example, I witnessed a different style of warm up activities that I could incorporate into my teaching, collaborative activities that engaged students, and various new transition cues—there was so much to see and take away.
One struggle in my own classroom is ensuring that students are engaged and participating. I am not a fan of calling on students, so often times they volunteer to answer. I have always felt this has been a successful questioning strategy for me. However, within the last year I began to wonder if it really is working, or if I have the same confident students answering and participating while others sit back and observe. This was the foundation of my rubric and my peer observations. How do other people ensure students are participating equally in their classrooms?

I think we can all relate to that feeling when you are “in the zone” teaching in front of the classroom. With so many moving parts, it is hard to really know if all students understand or know the answer to a question, or even if all students are truly engaged. When I walked into my colleague’s seventh-grade English class the students were discussing a book that they had been reading as a class. The teacher was asking lots of questions. I saw that this teacher was not calling on students, but the majority of the class was fully engaged and responding. If they were not answering, they were looking in their books trying to find the answer. This gave me assurance to know that what I am doing is okay. Questioning doesn’t have to be heavily structured to ensure students are learning. Through this observation I was given affirmation that I don’t need popsicle sticks or tally marks next to names to ensure my students are participating and learning.

Colleagues can build collaborative relationships with each other by having open conversations that give and receive feedback, especially if they also visit each other’s classrooms. We can talk to our peers all day about what is going on in our classrooms but peer observation creates greater opportunities to gain new ideas, giving positive and constructive feedback to better both teachers’ instruction.

There is Always an Opportunity to Grow
When conversing about our experiences, we came to the conclusion that each
of us reached similar takeaways, despite variety in the number of years we have
been teaching and the grade levels we teach. Our reflective conversations were
cohesive in knowing that peer observation is eye-opening, thought provoking,
and can be a true learning experience for all educators. As our experiences
unfolded, we realized:

• The most powerful peer collaboration is driven by teachers who want to
  learn with and from others.

• Having other teachers observe us creates a culture of accepting and
giving feedback.

• Teachers need to reflect on their own practice. Peer observation helps us
to do this.

• As teachers we feel self-imposed pressure - we often don’t know if what
  we are doing is right or wrong.

• Interacting with colleagues can give teachers confirmation and validation.
  Teachers can see that what they are doing is not wrong, although they can
do things better.

• Self-reflection and self-realization can lead to giving yourself permission
to change. We were influenced by the power of seeing others teach.

• Seeing colleagues in action helps teachers to reevaluate and get unstuck,
  helping teachers realize, “I can be that person, too.”

• Observing trusted friends can help teachers realize that they, themselves,
  also are good at their craft.

• Stepping outside of your comfort zone and interacting with peers has
  value in forming a community among teachers.
• Teachers can work with others for 30 years and never see someone else teach. Transformation can be found in the peer observation experience.

• Teachers may be shocked by how welcoming and open their peers can be. This gave us comfort going into classes. We saw REAL teaching going on.

• Teachers genuinely care to know peers’ thoughts and receive feedback. Peer feedback can provide sorely needed validation and recognition (and has the power to lift spirits when revisited after a challenging day).

• There is value in establishing relationships early in the year. If a student issue or professional misunderstanding arises, it should not be the first and only time you have talked to that colleague.

• By observing our peers, teachers are constantly reminded that education is always changing. Other classrooms offer a view of different teaching and learning styles.

• Educators can’t even predict what this culture of collaboration can offer teachers - what it might do for learning and motivation. We know how powerful it was for us.

Grounded in Literature
Beginning this collaborative work, we knew that reflecting on practice, exploring research-based best practice to create personalized rubrics, building community and a culture of trust, and peer observations matter - but in recognizing the power of our experience and group learning, we see how deeply our experience is grounded in and affirmed by the literature of best instructional practices.

“Professional educators continually try to learn…They have internalized the idea that all good teaching can improve; they seek out other outstanding teachers and learn from, as well as teach, their colleagues” (Danielson, 2007,
Creating a collaborative environment that pairs peer observation with supportive, reflective discussion regarding practice can “support teachers as they work toward intentionally improving their pedagogical practices” (Daniels, Pirayoff, & Bessant, 2013, p. 268). Simply put, “observation and feedback are active ingredients of effective coaching” (Connor, 2017, p. 78). As Nolan and Hoover (2011) note, effective professional learning opportunities for teachers “can take many forms including enrollment in graduate courses...peer coaching, action research and collegial development groups” (p. 74). By actively participating in our graduate program Reflective Teaching Seminar, we have merged the ideas of seeking outstanding colleagues, engaging in purposeful professional development, and learning with and from each other through peer observation and reflection to improve our practice.

The peer observation assignment is grounded in Danielson’s assertion that “time is well spent when peers conduct self-assessments and then discuss areas of perceived weakness and strength with each other” (2007, p. 176). As Danielson worked with teachers to explore her Framework for Teaching, she recognized that “educators have (or make) little opportunity to discuss good teaching” in daily practice, but when they have the opportunity to collaborate and discuss with each other, quality conversation emerges. Danielson noticed that the “application of various criteria in different contexts” all represented good teaching. As they watched video of instruction, Danielson witnessed teachers participating in side conversations and reflecting on their own teaching. Teachers studied each other’s practice and “saw a teacher’s action that they could adopt or adapt to their own setting.” Participants reported being “changed” by the experience of viewing and discussing instruction in a “concrete and research-based” setting (p. viii).

Through our self-analysis, rubric creation, peer observations, and reflection activities, we found that our experience and conclusions strongly parallel
Danielson’s. As teachers across elementary, middle, and high school settings, we found striking similarities in what we learned from and saw in the classrooms of our professional peers and each other. We engaged in powerful conversations, we built a culture of community, we found commonalities of good teaching across all grade levels, we learned and borrowed from each other, and we are renewed and changed as teachers.

A Call to Action: Advice for Engaging Peers in Observation and Collaboration

The peer observation experience was very powerful for us as teachers who are eager to learn. Our common realizations came to us as a group representing all stages of a teacher’s career. Individually, we each found the importance of incorporating peer observations into teacher-led, informal professional development. We strongly agree with the concept that professional development activities should “serve the function of helping the teacher grow personally, renewing the teacher’s enthusiasm or helping the teacher become a better colleague and better member of the school community” (Nolan & Hoover, 2011, p. 74). We can and should be powerful resources for each other.

We encourage others to consider ways to engage in the power of peer collaboration and peer observation. On what areas are you focusing to improve your instruction? What worries you? Are you feeling stale? Are you questioning your skill? We are sending out a call to action. Set aside your preconceptions and your self-doubt. Assume others, like you, want to grow in their craft. Offer trust and approach a skillful peer and ask to step into his or her classroom - start the conversation. We are confident that you both will walk away with new insights and affirmations, and with the motivation to improve your practice. Take the risk!
References


Implemented Strategies for Earning Respect in the Elementary Classroom

Facilitating respect in the classroom is a challenge facing many teachers due to a variety of circumstances (Gersten, 2011; Miller & Pedro, 2006; Smyth, 2005). Although several categories of strategies for cultivating respect were identified in literature, this article describes specific actions teachers might take to foster a respectful environment through modeling and instruction, reflecting, building relationships, and positive reinforcement.

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Any discussion of successful, supportive classroom environments must include mutual respect between teachers and students (Beaudoin, 2011; Burns, 2010; Gersten, 2011; Miller & Pedro, 2006; Smyth, 2005). For the purposes of this article, respect is defined as the actions, language, and attitudes exchanged between students and teachers that convey deep appreciation and understanding of their respective roles in the learning process.

Introduction
Respect is important for teachers to establish in their classrooms because it plays a fundamental role in student success. When respect is present, teachers are able to effectively provide instruction with greater student attention and decreased behavioral interruptions (Ellerbrock, et al. 2015; Schussler, 2009; Smyth, 2005). Further, in classrooms where respect is evident, the environment is conducive to collaboration and discussion because students feel safe to express themselves (Miller & Pedro, 2006). However, in classrooms in which respect is lacking, a sense of community is not present and students feel less willing to participate. Research indicates that teachers do realize the importance of respect, but they do not know how to effectively develop it in their classroom in order to create that sense of community (e.g. Benninga et al., 2012; Bondy et al., 2007). This article will explore how teachers might build respectful communities in elementary classrooms by looking at what research has to say about respect,
and then citing interview evidence to provide illustrations of practical tools teachers might implement.

After investigating the literature on strategies to develop a classroom based on mutual respect, we were able to separate these strategies into four broad categories: modeling and instructing, reflecting, building relationships, and engaging in positive reinforcement. A description of each category is provided followed by quotes and observed strategies from six Virginia elementary who share their insights on how respect is fostered in their classrooms.

**Modeling and Instructing**

One strategy is the use of modeling (e.g. Caldwell & Sholtis, 2008; Moore, 2012; Sari & Doganay, 2009; Thornton & Romano, 2007). Students are constantly observing their teachers’ actions; how they interact with colleagues, other staff members, parents, and other learners. Therefore, teachers must be aware of how they speak to students and others. As Beaudoin (2011) states, “a teacher who continually shows that he or she is annoyed by a student gives the rest of the class permission to be annoyed by the student, too” (p. 42). When the behavior is modeled positively, students are able to learn by example (Miller & Pedro, 2006; Thornton & Romano, 2007). Students are able to see how teachers conduct themselves during interactions and are then able to understand what respect means and looks like (Caldwell & Sholtis, 2008). As a result of modeling respect in the classroom and throughout the school, students will begin to understand that respect is something that every individual deserves and has a right to as a human being (Moore, 2012).

Though modeling typically leads to improvements in classroom respect, issues can still arise. As a result, it is sometimes the case that students need explicit instruction on respect. We must teach students what is acceptable and what is not acceptable
in social situations. This way, “students are taught expected behaviors through the use of carefully selected examples and non-examples” (Langland et al., 1998, p. 247). When teachers implement lessons on respect, students have opportunities to practice their skills in a safe and structured environment.

**Modeling and Instructing in Action**

Many teachers interviewed stressed the importance of modeling in order to lay the foundation of respect in their classrooms. Teachers discussed how they model the procedures that will occur throughout the year during the first days of school. This may include physically showing students how they should complete daily routines. When routines are clearly stated and followed, it allows students to meet expectations naturally. Students need consistent expectations from the teacher in order to be successful. Classroom routines and a predictable daily schedule are examples of tools teachers use to make the classrooms environment comfortable for students who may otherwise exhibit anxiety and disrespectful behaviors.

For example, to teach students how to respect other teachers and students in the halls, the teacher can model how to walk in a line, which exhibits respectful hallway behavior. As one teacher noted: “Students should have hands by their
sides, facing forward, and mouths closed.” After these verbal directions, several students model the action by travel from their seat to the designated place. This modeling shows the rest of the class exactly how it is done while the teacher gives positive praise for correctly demonstrating the actions that fulfill the teacher’s expectations for lining up behavior. As students grow older, these routines and skills become more complex and abstract, but the importance of modeling and teaching them remains vital to a respectful environment. One teacher stated that in her room, “Modeling is really important. I think that we model procedures a lot, but we also model how to interact respectfully with each other.” Teachers acknowledge that students have not all been taught those skills prior to coming to school and therefore “have to spend some time teaching respect and what that means.”

One example was described in an interview where the teacher had thanked the child who was holding the door and another child asked, “Why are you thanking him? He’s just doing his job.” The teacher replied, “Because it’s nice, and he’s doing it well, and [would] it hurt me to thank him and make him feel good?” After that interaction, the teacher stated that now all twenty-six of her students say “thank you” to the door holder. Overall, she concluded by saying, “Modeling makes a huge difference in kids that age because they pick it up and go, ‘Oh! Maybe I should do it that way.’”

Reflection
Another strategy for teachers to foster respect in the classroom is reflection. Students ought to reflect on their behavior throughout the course of the year in order to become aware of their actions or how they have come to be perceived (Burns, 2010). Students may not notice the effects of their behavioral choices on their teacher or peers, especially as they become more comfortable in the classroom (Burns, 2010). To help students become more reflective about
their behaviors and how these might impact others, teachers should consider well-crafted reflection questions (e.g. “What would you do if someone called you a name?” or “How might you resolve an argument?”). Students can be prompted to reflect as a class when a teacher facilitates thoughtful discussion, or individually through a conversation or writing. Through reflection, students can momentarily step back and consider the implications of their actions (Burns, 2010; Roache & Lewis, 2011).

Not only is it important for students to reflect, but teachers can also benefit from reflecting on their actions. As Miller and Pedro (2006) note, teachers must “reflect on their own values and biases, consider the contexts of student lives and ponder what it is they are teaching their students” (p. 295). When teachers step back and consider their actions, they can begin to see more clearly how well they are modeling respect.

Reflection in Action

When behaviors deviate from the respectful norms expected by all members of the classroom community, one potential strategy, as described by our interviewees, is to have the student reflect on his or her own behavior either verbally or in writing. For example, if a student turns to a friend and talks while the teacher is giving directions, the teacher would address the behavior in a private conversation with the student after the whole group has been dismissed. She is able to better explain in a one-on-one setting why the behavior is inappropriate. As one teacher noted, “Important information is unlikely to be heard if students talk while instructions are given.” This calm, private conversation is much more likely to produce the desired outcome because the student is not embarrassed in front of his or her peers. A part of that conversation could include asking the child to think about if the teacher would have treated the student that way had the student been presenting
something to the class (e.g. “How might you feel if someone talked through your presentation?”). Alternatively the teacher might ask the student to engage in a reflective writing activity, giving her or him time to process and reflect the importance of respect in the classroom.

**Building Relationships**

Personal relationships and connections are a major building block for mutual respect and trust. Students need to connect, feel cared for and believed in, and feel a sense of ownership relating to the classroom (Bondy, Ross, Gallingane & Hambacher, 2007; Burns, 2010; Ellerbrock, et al. 2015). Although using engaging instructional techniques is important, having quality human relationships is more impactful on intellectual engagement than specific instructional techniques (Schussler, 2009).

There are specific strategies that can help bring about strong relationships between teachers and students. At the very beginning of the school year, teachers must make it clear that disrespect will not be a part of the classroom community (Miller & Pedro, 2006). Having clear and consistent expectations helps students to feel more comfortable among their peers and helps build trust with their teacher (Bondy et al., 2007). Cultivating intrapersonal and interpersonal skills in students helps develop stronger relationships and
mutual respect (Poulou, 2009). Finally, many teachers do not consider the way that relationships with their colleagues can impact their relationships in their classrooms. Maintaining positive relationships with colleagues, especially where students are concerned, contribute to the amount of respect teachers are able to show their students (Beaudoin, 2011).

Building Relationships in Action

Many of the teachers interviewed also discussed building positive and meaningful teacher/student and student/student relationships. Building these relationships makes a huge impact on the classroom environment. One teacher described that a primary purpose of this investment is to initially “get [students] to work for [her]” and in turn, by the end of the year “they learn to work for themselves.”

It is important to invest effort in relationship-building early and often. For example, on the first day of school, some teachers start with having the students meet on the carpet. During this time, the teacher tells students about herself personally, including a little bit about what she was like in that grade, so that students can better relate to her through shared experiences. Learning students’ names is another vital aspect to building a classroom community grounded in respect. To continue these efforts, teachers can greet students at the door as they arrive in the morning with a handshake, eye contact, and use their name as they offer a welcoming “good morning.” Efforts like this help students start the school day off with a positive interaction, setting the tone for the learning to come.
Relationship-building routines begin on the first day of school, allowing for the teacher to learn each student’s name. Throughout the year, students also build relationships through team building activities where they are able to interact and get to know their classmates. For example, one fifth-grade teacher interviewed does an activity involving a combination of musical chairs and memory. The students write one interesting fact about themselves on an index card. The teacher plays music, and the students pass around the cards until the music stops. The students then find the person who matches the characteristic on their last card. Once they meet, they must learn a new characteristic about their classmate and add it to the card. Then the music begins again, and the cards are passed around. In the end, everyone learns more about each other, helping them to gain a better understanding of their fellow classmates.

**Engaging in Positive Reinforcement**

In addition to carefully setting and practicing our expectations at the beginning of the year, teachers need to reinforce those expectations throughout the school year. For example, Smyth (2005) relates an experience in which ground rules for a meaningful discussion were set in place by the whole classroom. Within ten minutes, those rules had been broken four times. Smyth recounts how she immediately revisited with her students what those rules were and they all agreed on how they would be applied. By reinforcing those expectations, her class was able to have a meaningful and respectful conversation about a controversial topic (Smyth, 2005). Similarly, Miller & Pedro (2006) noted that respect is an attitude that permeates the day and it should be reinforced at all times. One way that Langland et al. (1998) found effective in reinforcing expectations was using praising language to encourage students who were using previously taught social skills appropriately.
Engaging in Positive Reinforcement in Action

Positive reinforcement is a strategy that many of the teachers interviewed use continuously. Praising students when they are following expectations encourages them to continue to make the right choices during class. Several teachers mentioned that they frequently remind students of how capable they are of “being good.” This keeps the standard of expectations at a high level and simultaneously provides the emotional support and encouragement for students to reach those standards.

One widely used method to reinforce desired student behavior is the Positive Behavior Interventions and Supports (PBIS) system. PBIS is a school-wide system that consistently supports positive behavior in students and identifies and assists students that may need additional levels of support to succeed academically, socially, or emotionally. One layer of this system is Respect Sticker Charts. When the class as a whole is doing something well, they can be awarded a respect sticker to go on their charts. When the chart is full, which requires five stickers, the class gets to vote on what their prize will be. This can include extra recess time, pajama day for the class, or even a pizza party.

One really interesting and detailed example of PBIS was used at one of the schools where teachers were interviewed to reward the students’ respectful behavior. Each time a class completed a respect chart, a pair of students would turn it in to the office for a new chart and a puzzle piece. The puzzle piece was a plain white square piece of paper with a marking on it that fit within a larger puzzle. Students would color it however they wanted and then go to the school
bulletin board to glue it in the correct place. At this time, they would also go to the guidance counselor’s office to spin a wheel for their class prize, usually a respect sticker or a popcorn party. The school-wide goal was to complete the puzzle to reveal a larger picture. The picture would then be replaced with a riddle concerning the whereabouts of a missing tiger. The riddle would be announced and the school had a day or two to figure out what it meant and where they could find the tiger. The students became very excited about the task and committed to earning respect stickers and restoring the tiger to his proper place. It is also noteworthy that in these classrooms, students rarely needed to be disciplined and they showed high levels of respect to their teachers and one another, illustrating how many of the methods described here work together to promote a climate of mutual respect.

**Conclusion**

Respect is foundational and vital to any successful classroom. However, many teachers struggle to implement effective strategies to develop an appropriate level of respect. This article has examined several methods and strategies to help teachers foster such a respectful climate. Through modeling and instructing, reflecting, building relationships, and engaging in positive reinforcement, teachers convey to students that they care about their well-being, thus making great strides to fostering a classroom based on respect.

**References**


EARNING RESPECT


REDUCING “SUMMER MELT”: Statistics show that one out of every five high school seniors accepted to a college never actually enroll. To help combat this issue (dubbed “Summer Melt”) colleges, universities, and other organizations have turned to text messaging to “nudge” students when important deadlines are looming or required documents are missing. In addition to these reminders, students are able to respond to the messages with questions and receive responses from advisors or automated systems. There are numerous implications for “nudging” students in our K-12 classrooms as well. For example, reminders could be sent out encouraging students when assignments are due—or reiterating feedback and grading criteria. Regardless of how text reminders are used, expanding our perceptions of how and when we communicate with students holds great potential. [https://www.districtadministration.com/article/texts-keep-high-school-seniors-college-track](https://www.districtadministration.com/article/texts-keep-high-school-seniors-college-track)