One of the greatest periods of brain development occurs from birth through age five – and the learning children do in their earliest years plays a large role in laying the foundation for their educational success.

“Research demonstrates that mathematical thinking is cognitively foundational and children’s early math knowledge strongly predicts their later success in math,” said College of Education Associate Professor Kyong-Ah Kwon, who is working with undergraduate students Jaelyn Jeff and Seon Woo Kim on a research project that explores preschoolers’ understanding of math.

The Little Mathematician Project takes a multi-pronged approach – teaching hands-on math activities with small groups, encouraging parental involvement with workshops and parents’ nights, and providing professional development for teachers who want to incorporate more in-depth math curriculum in preschool settings.

“So far, we have created various math activities rooted in play,” Jeff said. “Young children learn through play, so our activities are geared to be lively, playful and all together fun.”

Kwon, Jeff and Kim will be conducting their research in both of the College of Education’s Child Development Centers, where they’ll read math picture books to students and follow up with related math activities. Rather than explicitly teaching children math lessons, they’ll encourage students to take the math concepts they already know and apply them in their activities.

“We’re using their prior knowledge as a basis and ask them challenging questions to help them use their critical thinking skills,” Kim explained. “We’re trying to make an effective math learning environment for children and incorporate math activities into children’s daily routines.”

Kwon and her students hope to not only create developmentally-appropriate training lessons and materials for teachers, but also to close the achievement gap between children from low-income households and their more affluent peers.

“I really want to see what we can do to help children maximize their math skills and knowledge in early years and ultimately close the academic gaps between children from low-income family household and their affluent peers,” Kwon said.
“Jaelyn and Seon are learning how to interact with children in a meaningful way and guide them to think more deeply. They share their observations and reflections with me and other lab members and we learn from each other. They are very thoughtful, reflective and professional. They are such an asset and a big contributor in my research team.”

Kyong-Ah Kwon, on what her students bring to her research project

“Are they off-balance because it’s the fourth quarter, they’re dehydrated and they’re exhausted right after a full week of school, or are they having the balance issues because they’ve taken a hit on the field?” Brueck said. “That’s what we’re trying to find out.”

With millions of students across the U.S. participating in high school sports every year, it’s vital for Linens and her students to learn more about how concussions affect high school-aged athletes.

“It’s important to conduct this research because of the potential short-term and long-term effects following a concussion,” Linens said. “For example, short-term effects include sleep disturbances, headaches and disruption of concentration in an academic setting. In the long term, we’re concerned about the development of depression, memory loss and chronic traumatic encephalopathy.”

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**MASTER’S RESEARCH**

Sports medicine master’s students tackle sideline assessment tool

When a football player gets tackled to the ground and doesn’t get up right away, the team’s certified athletic trainers rush out to the field, start assessing the player’s injuries and help him over to the sideline for further examinations and treatment.

There are numerous tests athletic trainers administer to determine the type and severity of these injuries, and four of Assistant Professor Shelley Linens’ graduate students are spending their fall semesters at different high schools gathering data on one particular sideline assessment tool.

Sports medicine students Christopher Leeds, Amanda Clements, Christina Curran and Lauren Brueck have learned how to administer the Balance Error Scoring System (BESS), an assessment method sideline staff use to assess athletes who incur mild concussions on the field.

They use a specifically-designed foam pad, a stopwatch and the BESS scorecard to conduct six, 20-second trials with athletes, such as balancing on one leg and standing heel-to-toe. They’ll do this once at the beginning of the season to record baseline data about their students’ balance, and when a student gets a concussion during play, they’ll conduct it again and compare it to the baseline information.

“If they have a concussion, it’s an easy tool to use to see how severe it is,” Clements said. “Also, you can use the BESS again a week after their injury to see if they’ve gotten closer or further away from their baseline.”

Though the BESS isn’t the only method sports medicine staff use to assess the severity of a concussion – they also ask students about their symptoms and use computerized tools to test reaction time and memory – its portability has made it popular at several schools since researchers at the University of North Carolina first developed it.

For Leeds, Clements, Curran and Brueck, this semester’s research will help them determine if the BESS is a practical, useful sideline tool for assessing student athletes’ concussions, particularly at the high school level, where little research has been done in this area.

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**Sound Bite**

“Jaelyn and Seon are learning how to interact with children in a meaningful way and guide them to think more deeply. They share their observations and reflections with me and other lab members and we learn from each other. They are very thoughtful, reflective and professional. They are such an asset and a big contributor in my research team.”

Kyong-Ah Kwon, on what her students bring to her research project
People who grew up in the 90s will remember “Captain Planet,” the half-hour animated TV show whose titular hero and his band of Planeteers thwarted villains more interested in polluting the environment than taking over the world.

His catchphrase -- “The power is yours!” -- encouraged viewers to take a proactive approach to protecting Earth’s resources, and this same spirit lives on through the Atlanta-based Captain Planet Foundation, which helps schools implement hands-on environmental stewardship projects.

Carmen Carrion, a Dean’s Doctoral Fellow in the College of Education’s Department of Educational Psychology, Special Education, and Communication Disorders, has been working with the foundation to conduct research on the “learning gardens” they’ve established at several Atlanta Public Schools sites.

These gardens are initially planted on the school grounds and tended by a master gardener, but teachers and parents are slowly given the reigns, encouraging a sense of community around the gardens and allowing them to teach science lessons in an interactive way.

“It’s about looking at project-based learning involving school gardens and how they can help children have better environmental stewardship,” she said.

Carrion’s dissertation will incorporate the data she’s collecting in these learning gardens, highlighting how students learn science and how they gravitate toward more sophisticated scientific thinking.

“I think it’s important to help students understand that you don’t have to have this aura of being a scientist to think like a scientist -- it’s a natural thing we can all do,” Carrion explained. “I’m hoping that these learning gardens can be this beautiful catalyst that can help students figure out more quickly what it is to think like a scientist.”

“Last year, I attended a workshop on mentoring that emphasized empowering graduate students to ‘do it on their own terms,’ and that really stuck with me. It’s something I try to think about as I’m advising graduates in their own research. It’s about getting people to the point where by the end of graduate school, they’re comfortable in their own niche and doing their own research.”

Maggie Renken, Carmen’s faculty advisor, on her mentoring style
Bilingual teaching model highlights math learning in other languages

It’s been said that mathematics is a universal subject, but Dean’s Doctoral Fellow Jessica Hale sees it differently.

For students who aren’t being taught in their native language, learning math concepts can be a struggle.

“If you look at how mathematics is taught in different cultures, we teach and emphasize different things. And there are some cultures where our entire number system doesn’t exist, so this idea that mathematics is universal is a very Westernized thought,” she explained. “It’s amazing how quickly that can get dismantled just by doing something like teaching math in a student’s native language.”

Hale’s latest research project puts her in an Atlanta-area school that uses a bilingual model – students are taught in English one day and in another language the next. She wants to see how this model can potentially bridge the gap for students whose first language isn’t English and highlight their mathematics skills.

“We haven’t had a lot of opportunity to see this happen organically and see what it means for mathematics instruction,” she said.

In addition, Hale is working with College of Education Assistant Professor Stephanie Behm Cross to study teacher residency programs and how to support new teachers in their first few years in the field.

Both projects allow her to get to know the teachers, students and communities around Atlanta, gain more insight into mathematics education and learn how to be both a researcher and an advocate for quality education.

She believes teachers in the classroom have a lot to offer researchers and hopes her dissertation reflects what she’s learned from them.

“I want to learn what they’re doing that’s working and use my position as a researcher to then share that with other teachers and practitioners.”

“Jessica figured out at the beginning of her second year that she really wanted to do ethnographic research – which allows researchers to observe and listen to teachers and students in a nondirected way – and she hadn’t had any experience with that. I was working with a local school to collect research on a newly developed residency model for preservice and inservice teachers and Jessica suggested that she could look more closely at some of the residents at that school and spend some extended time in their classrooms prior to starting her dissertation work. I think that was beneficial for her to engage in that type of research before doing it, and it was a great benefit to me because it was a type of research I hadn’t really done before. We really learned from each other in that space; it was great.”

Stephanie Behm Cross, Jessica’s faculty advisor, on simultaneously learning from Jessica and helping her determine which direction her research would take.
Preparing teachers for success with students in urban schools requires more than classroom management skills, content knowledge and lesson planning expertise. Teachers who are empowered to make a difference inside and outside the classroom have a powerful influence on their young students.

Kim Barker, a doctoral student in the College of Education’s Teaching and Learning program and a former elementary school teacher, is taking a closer look at teacher preparation—more specifically, with graduates of the college’s Urban Accelerated Master’s and Certification (UACM) program—to determine what elements of their preparation helped them become effective teachers and advocates for their students in urban schools.

“I really want to look at effective teachers and see what it was about their preparation that helped them sustain their vision for what they want their classrooms to be.”

Barker serves as coordinator for the federally-funded Quality Instruction for English Learners grant, which offers on-site training and mentorship to support UACM students and other teachers in their first years of their careers. This role gives her the opportunity to gain hands-on experience supporting teachers working with diverse populations while conducting research on what initiatives have made the most impact on teachers working with English language learners.

She’s also looking at data the College of Education collects from students in teacher preparation programs to gain more insight into what students respond most to in earning their teaching degrees.

“It’s been a neat opportunity to get this big picture perspective,” Barker said. “We’ve been able to see how the college as a whole is preparing teachers, and get perspectives from different stakeholders—finding out what students and mentor teachers in the field think.”

“I REALLY WANT TO LOOK AT EFFECTIVE TEACHERS AND SEE WHAT IT WAS ABOUT THEIR PREPARATION THAT HELPED THEM SUSTAIN THEIR VISION FOR WHAT THEY WANT THEIR CLASSROOM TO BE.”

-KIM BARKER
COE Projects with Continued Funding

The College of Education has several local, state and nationally-funded projects that received funding in 2014 to continue their work. These include:

**Gwen Benson**  
Network for Enhancing Teacher Quality Project  
_U.S. Department of Education_  
$2.19 million

**Joyce Many**  
Georgia Troops to Teachers  
_U.S. Department of Defense_  
$479,500

**Walt Thompson**  
After-School All-Stars Atlanta  
_Georgia Department of Human Services_  
$1.26 million

**Diane Truscott**  
Teaching Teachers Together  
_U.S. Department of Education_  
$1 million

**Diane Truscott**  
Quality Instruction for English Learners  
_U.S. Department of Education_  
$375,131

**Sherry Howard**  
Best Practices Training Initiative  
_Bright from the Start program_  
$1.49 million

**Daphne Greenberg**  
Center for the Study of Adult Literacy  
_U.S. Department of Education_  
$1.77 million

**David Houchins**  
Project LEADERS  
_U.S. Department of Education_  
$249,990

**Amy Lederberg**  
Center for Literacy and Deafness  
_U.S. Department of Education_  
$2.03 million