A Journey towards Discovering Novel Ways of Teaching and Learning

By Somanita Kheang
North Carolina State University

The Regression: Multiplication and Me

Being born and raised in Cambodia, I was taught to learn everything by rote so that I would always be prepared to answer any questions related to what I had learned. My elementary teacher—in 2nd grade, to be specific—emphasized that the best way to excel in multiplication was to repeat what we learned and practice it every day. I readily admit that I did not have a real passion in mathematics, so learning by heart was a reasonable approach to use to let multiplication facts sink in. This learning technique, though, was boring sometimes, and I could not help but wish that I did not have to take mathematics. As I started taking more advanced mathematics, I increasingly felt that learning multiplication was an unpleasant obligation, and there was no way that I could say "No" to it. I found being good at mathematics increasingly onerous, especially when my mom did not let me play with other kids on weekends if I had not mastered my math lessons. My relationship with mathematics, thus, grew worse, and it seemed to reign supreme in my childhood. To put it plainly, I don't have any good memories of learning math, only frustration and dull moments. On one occasion, one of my classmates was punished and made to stand up in class for about half an hour just because she did not remember her multiplication facts, nor did she understand how multiplication works. This served only to convince me further that multiplication was not useful for anything—the only reason that I tried to be good at it was just because I wanted to get a good grade and make my parents happy. Still, I took to heart the belief that the best way to excel in any subject in my elementary school was to learn it by heart so that I wouldn't have to risk being embarrassed or even punished for drawing a blank in front of my teacher and other students while being tested in class.

In similar fashion, I took the same approach—learning by rote—to excel in my writing class in elementary school. I was taught to write an essay using only the structure that was provided by the teacher. While this linear approach allowed me to be successful, I found it uninspiring and impersonal. I wished to be given leeway to write my essay and present it to the class using whatever style I felt comfortable with and enjoyed doing. One day, we were asked to write a short essay about family members and present it to the class as our mid-term exam. I knew that I had to follow the writing script in drafting my text, but I thought that showing some creativity in terms of how I presented my essay to the class could result in higher scores. I wrote the required essay and turned it in to my teacher, but instead of reading my entire essay to the class word for word as we had been instructed, I drew a picture of my daddy reading a newspaper, my mom cooking food, my sister watching TV, and myself playing with my brother and presented that collage to the class. I colored everything nicely as I imagined being showered with compliments. My hopes were dashed when I received a poor grade because I did not follow the instructions. I felt this was very unfair, and the whole experience came out as a disorienting dilemma to me. I cried myself to sleep that night and could not get over the humiliation and feelings of unfairness for several weeks.

All of my classes in elementary school had the same format and expectations—we had to sit in a row, listen to the lectures, and do homework following the guidelines

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provided by the teachers. I did not feel comfortable practicing these norms, especially when the entire learning process was just copying verbatim whatever I had been given. I became convinced that, in order to be successful in school, students should not even try to question that norm. Following that pattern, I achieved success in school, but I am not remotely proud of my achievements to this day.

I have always been the kind of person who resists following what people say I should do, preferring my own ways of learning and doing things. I was fortunate to be nurtured by great parents in a close-knit family. My mom and my dad are my best friends—they raised me to be an independent and strong woman so that I am not afraid to have my own opinions about things, while still being willing to discuss and compromise if needed. Plainly put, I have developed my life philosophy from their wisdom and ways of living. I still remember what my dad said to me when I asked him how to discover my passion so that I could succeed in life. He gave me the following advice:

> *Know yourself, your values and your brand, and you will be able to build a firm foundation in yourself that even a big storm cannot break apart. Considering yourself a victim of any life circumstance is not remotely attractive. You are who you choose to be. There is no upper limit to your success—you just reap what you sow. If you believe that you can do it, you definitely can do it. Dealing with rejection is not always an easy thing to do, but remember that only the strongest survive. Never take failures in life as a limit to your possible self—it is just a test of your creativity and perseverance. Accept the message from reality and keep moving forward with hope*.

His advice really touched my heart, and my self-doubts were magically brushed away as I contemplated on my life goals and how to successfully achieve them. The definition of success was no longer an ability to get everything I have set my mind on, but the fact that I have tried my best with what I believe I could do.

In my quest to integrate my educational history with the person my parents had raised me to be, I sought out education in three different countries (Cambodia, Thailand, and the U.S.), which allowed me to compare and contemplate the possible and preferable future of helping teachers and students to teach and learn mathematics in a more effective way. One of the major issues that the teachers in my home country of Cambodia have is that they all are trained only to practice specific pedagogical techniques to help students learn, and there are very few professional development opportunities for them, which means that they have no support for learning more effective instruction techniques. I first started to think about the importance of providing teachers with a variety of pedagogical approaches when I was in Bangkok, Thailand, for my master's degree in Non-Formal Education at Chulalongkorn University (CU).

The Thai education system allows students to select from different learning settings, environments, and activities. For example, their system recognizes both formal and non-formal education diplomas and certificates. In my two years in Thailand, I had a chance to visit various non-formal learning centers in different provinces, including Chheang Rai, Pattaya, and Pech Buri, to name a few—those learning centers provide opportunities for younger and older adults to learn basic mathematics and literacy, life skills, and other vocational training. The teaching and learning happen in a place that is convenient to students in the community, and the learning schedules and activities are flexible in accordance with learners' learning styles and preferences.

In the second semester of my master's degree in Thailand, I was introduced to the concept of andragogy, and I became more familiar with the theory and practices of andragogy when I came to the U.S. for a study exchange in Fall 2013. The term andragogy was first introduced by Kapp, who was a high school teacher in Germany (Henschke, 2016). According to Knowles (1980), andragogy is the "art and science of helping adults learn" (p. 43). Kheang (2018) emphasizes that the application of andragogy in teaching means that teachers' beliefs, feelings, and behaviors are important in building trust and helping students learn. That said, although andragogy is an art and science of teaching adult learners, it is recommended that the approach be applied in the teaching of children as well.

Many teachers in the U.S. education system do not realize that their teaching methods are a combination of andragogical and pedagogical theories, which is not surprising—usually, this term is only introduced to and/or stumbled across by adult education scholars who have done research or who are taking classes in the field. Still, compared to the education systems I have experienced in other countries, the U.S. education system values creativity (including students' diverse learning styles), integrity, and freedom of learning for both adults and children. The characteristics of this education system encourage students to be self-directed and active (rather than passive) when it comes to learning specific subject matters—both in and outside of classroom (Kheang, 2019, 2022). The learning activities in the U.S. K–12 and higher education systems prepare students to challenge what is right and what might be a better way to look at and/or handle particular problems. The growth of various teaching and learning techniques in the U.S. education system resulted from their school principals and teachers being open to new ideas and concepts while helping diverse students learn.

The Progression: My Dream of the Future of Mathematic Teaching and Learning

As a result of my education in Cambodia, Thailand, and the U.S., I have come to the conclusion that andragogy is a very inspiring learning approach indeed, especially when the students are given leeway to be self-directed learners. I also learned that teachers should trust that every kid is unique in terms of how they learn certain things, and those kids should be encouraged to use any learning style that they believe can help them learn the subjects. In other words, teachers should not play the role of authoritarian, but rather that of facilitator in supporting students' learning processes. There should not be an absolute rule when it comes to how particular subjects can be learned. I would like to empower elementary teachers to borrow andragogical instruction techniques and apply various teaching activities and allow students to take part in choosing the learning activities that are helpful for their learning processes—this practice will help elementary students learn and excel.

I strongly believe that education is the passport to a better future, and it is a ladder to a myriad of opportunities and success. I also believe that learning mathematics, or any other subject, does not have to be wearisome, and every student should be encouraged to excel in learning in a less stressful learning environment than the one I experienced. The disorienting dilemma in my childhood has continued to resonate with me, and I have become crystal clear that I want to be a teacher so that I can develop alternative methods to teach students and utilize my knowledge, skills, and experiences to inspire others to think more, do more, learn more, and become more. As a teacher educator, I want to encourage the future generation of elementary teachers to be more sensitive

towards students' diverse learning styles and be willing to compromise when it comes to providing instructions for completing specific homework. To accommodate student success, I hope that the future generation of elementary teachers will consider applying both linear and non-linear approaches to help students learn, allowing for more flexibility and creativity. I understand that there are multiple steps and obstacles that I need to experience in order to reach the pinnacle of this career as a teacher educator—getting a higher degree, more experience in teaching and working in higher education, and, especially, interacting with more scholars in the field so that I am up to date with how mathematics is taught in elementary school. Additionally, I need to be able to teach and inspire adults (elementary teachers) in this rapidly changing world to teach mathematics in a more creative and fun way.

Analyzing the Possibility of Inspiring Elementary Mathematics Teachers

As I continue to inspire mathematics teachers to strive for changes in their instruction styles, I give myself permission to value creative ideas and academic interests as they stand alone, without needing approval. My passion is to work with future teachers as leaders to co-create learning environments in which mathematics teachers are utilizing both linear and non-linear approaches to teach and learn from students in this rapidly changing world. The power of this transformational journey unwinds through this spiral even as I write these words. I am inspired by my parents, my professors, and my entire educational journey to make such transformation possible for good.

In this process, I am currently working on my second doctoral degree in Adult, Workforce, and Continuing Professional Education at North Carolina State University in Raleigh, North Carolina. I consider myself both a teacher and a lifelong learner—these two identities tangle together in my work as a graduate student, teaching assistant, and researcher. My first doctoral degree is in Instructional Leadership, and I am convinced by both of my doctoral journeys that the only way that I can be a worse teacher is when I believe that there is only one way for students to learn specific content, and that one way is for them to follow everything I say.

Instead of being an authoritarian, I am inclined to allow my students to utilize their learning styles and techniques that might be helpful for them to learn specific content. I continue to provide support to students whenever they need it, and to do so, I have made myself more accessible to students—students can set up an in-person and/or an online meeting with me if they have questions or concerns regarding specific learning goals, assignments, or other learning issues. I have faith in my students, so I always provide them a second chance to submit their assignments should they have proper excuses for late submissions or problems with successfully completing the assignments on time. I believe that all of my teacher education students are unique and capable of becoming wonderful teachers after graduation. To me, learning is a process of growing and becoming a more capable person, so students should not be merely judged by whether or not they have firmly followed the guidelines or instructions provided by me as their teacher, but whether or not they are willing to learn from their mistakes and commit to better learning outcomes.

Additionally, I always encourage my students to bring their creativity to the table when it comes to classroom discussions and accomplishing specific projects or assignments. I strongly value creativity in learning, simply because I believe that creativity is not confined to special people or to particular art-based activities, nor is it undisciplined

play. Instead, "creativity is possible wherever human intelligence is actively engaged and is a vital part of an effective education: it includes all areas of understanding and all children, teachers and others working in primary education" (Cremin & Barnes, 2015, p. 359). Nurturing learner creativity, thus, should be acknowledged as a key aim for both educators and school leaders to help students learn, grow, and succeed.

Unfortunately, utilizing creativity in elementary classes might still be a real challenge for Cambodian teachers. I still keep in touch with my elementary teachers from Cambodia, and they connected me with some of their friends who had expressed interest in utilizing fun and helpful learning techniques to help their students learn. I had a chance to interact with mathematics teachers in an elementary school in Cambodia and learned about their experiences and challenges in helping students master multiplication concepts. It was an informal meeting, so all of the teachers were willing to share their challenges in helping students to stay focused and engaged in math class. I was told that most students tend to misbehave when being told to follow guidelines and review the previous mathematics lessons in class. Some students would make noise and choose to be punished by the teacher instead of submitting their mathematics homework. Some provided excuses for not doing their homework and ended up getting a bad grade in class. Teaching mathematics had become a real challenge for elementary teachers, and the problem was only going to get worse if no effective intervention was taken. This issue was reported to the school during a monthly teacher meeting, yet no resolutions were recommended to mitigate this tension.

In my meeting with these teachers, I asked if they knew what "andragogy" is, and none of them said "yes." One of the main barriers to working with teachers from Cambodia is that they are comfortable with the traditional pedagogical teaching method, and they expressed reluctance when being introduced to andragogical teaching methods—even if it was just a suggestion to combine andragogical and pedagogical teaching methods to provide a more fun and relaxed learning environment in a mathematics class. For example, teachers can help students learn mathematics by using pictures, games, or cartoons to explain the mathematical concepts rather than a whole bunch of descriptions and notes. Those teachers expressed concerns that students may not pay attention to the significance of mathematics if they are allowed to learn it in a relaxed and fun environment. They fear this could result in a lack of discipline, and students might earn even poorer grades on their final exams. After my conversation with these elementary teachers, I came to the realization that, in order to transform teaching elementary math given these barriers, it is important that teachers be encouraged to be more open-minded when it comes to applying various teaching methods to help students learn. Teachers need to also trust in the power of positivity and fun and be willing to support and encourage students to try novel ways of learning mathematics.

This change process can start with teachers having a creative state of mind that is exercised and developed through their creative practices and creative personal/professional curiosity (Cremin et al., 2009). Teachers can learn to be creative by exchanging ideas and experiences with fellow elementary teachers through a process called "peer mentoring." This process does not require any authorization or school policy changes to make it happen. All that is needed is the teachers' commitment to student success.

Friere (1998) talks about correct thinking and how a teacher who thinks correctly transmits to the students the beauty of our way of existing in the world (pp. 34–35). He encourages students to think correctly in order to reflect and act accordingly with

the surrounding environment so that they can generate new and innovative ideas to address issues they face. Smyre and Richardson (2016) also encourage students to ask appropriate questions and engage in debating and using dialogue so that students can develop innovative and transformative ideas in a rapidly changing world (p. 53). I am convinced that mathematics teachers can borrow this correct thinking technique to help facilitate the learning of their students, since this allows students and teachers to be more open when it comes to the learning style and processes that might be helpful for students.

Synthetic Stage: Exploring Novel Ways to Teach and Learn Mathematics

Creativity is the basic element in evolution. If there is anything I, as a teacher of adults, seek to do in my practice with adult learners/students, it is to guide, motivate, and support them to be more creative and think correctly so that they can succeed in any learning circumstances. According to Smyre and Richardson (2016), in order to dive beneath the surface of casual thinking, we need to unlearn our traditional educational ideas and relearn at a more complicated level so that we can deal with the nuances and subtleties of an increasingly complex world (pp. 35–36). My teaching philosophy is to teach with love, trust, and understanding. I teach because I want to affect changes in others, and the key to helping adults learn and grow is to work with them using both the head and the heart. I seek to apply both pedagogical and andragogical instruction techniques to help adults learn. I focus on learning processes rather than learning content when it comes to the facilitation of adult learning in the classroom.

I believe that every student (whose age is 18 years old or older)—regardless of gender, socioeconomic status (SES), race, ethnicity, culture or educational background—deserves to be treated as an adult—as one among equals—in the learning process. In order for the education of equals to occur, I design pedagogy and instruction according to subject matter differences, individual differences, and situational differences so that diverse students in my class can relate course content to their cultural contexts. I play the role of facilitator rather than teacher in the learning process. My facilitating techniques are in line with Knowles' (1980) eight learning processes: preparation, climate setting, mutual planning, self-diagnosis of needs, setting objectives, designing a pattern, conducting activities, and evaluation. In the doctoral classes in adult education that I taught at Lindenwood University, I used andragogical approaches to engage students in a positive learning environment, in which they could utilize their past experiences as learning tools and use both their peers and the facilitator as educational resources to enrich their understanding on particular subjects. As a facilitator, I also encouraged students to discover their inner voices and authentic selves so that they can actively participate in classroom discussion, discover their passions, and ultimately unlock their unique potential for the sake of success in the graduate program. Ten doctoral students in my EdD program reached out to me for further advice on their dissertation writing process given that they appreciated how I led the entire classes with sensitivity, trust, and love.

Additionally, I believe that students learn best when they are encouraged to become self-directed learners. Thomas and Brown (2011) mention in their book, *A New Culture of Learning*, that learning can take place outside the school context, and as long as learners stay true to their learning needs and goals, they will become self-directed and unstoppable. The authors introduce the concept of arc-of-life learning, which emphasizes that, in this 21st century, there are various learning approaches that can allow both teachers and students to learn. We can also use this concept with teaching

kids. For example, mathematics teachers should be up to date with new ways of helping students learn. They can use technology—such as the internet, email, and games, to name a few—to facilitate teaching and learning processes and enhance our own comprehensive understanding of specific subject matter so that we can help students learn mathematics in a less stressful way (Thomas & Brown, 2011, pp. 17–33). The COVID-19 pandemic is a great example of how teaching mathematics online is possible, even though it may not be a preferable way. Online teaching is still novel to the majority of Cambodian elementary teachers, so incorporating mathematics in an online learning environment would take time. The effort could still be worth it.

Equally momentous, mathematics does not have to be a scary subject for elementary students if the teacher allows students to make mistakes and learn from their experiences. Even though mathematics is a concrete science, students should be given chances to learn, practice, and improve their multiplication skills without too much pressure and punishment. Thomas and Brown (2011) acknowledge the concept of "tacit learning" as the production of three dimensions of learning: knowing, making, and playing. These three techniques should be embedded in the process of mathematics teaching and learning because it is important that educators understand that both knowledge and belief are situated as a question of "what." For example, in "knowing," "what" refers to the content of knowledge that students should learn, but it also embeds teachers' specific *beliefs* on how students can learn specific content (i.e., group discussion can be considered as one of the techniques that mathematic teachers can use to help their students learn because teachers believe that students can learn specific content through a peer-support technique).

"Making" refers to how knowledge is transferred beyond information sharing—through the process of making, students learn how to craft the context of their learning process in addition to creating the content—this helps students with decision making processes as they are dealing with problems and changes in this fast-changing world. For example, in order to use "making" in the classroom, mathematics teachers may show students the specific content that they want their students to learn (information sharing). Students then develop a context regarding how and where they want to learn—they may want to learn through memorization, role play, arts, or games, to name a few. Once they have decided which learning approach works best for them, they then decide on whether learning from home or at school will help them grasp the concept or knowledge of specific content better. As a result, they may come up with a suggestion of specific learning activities that might be helpful for them to learn similar content or content of a specific type in the future. When students are engaged in the "making" process, they tend to develop their flexibility and creativity in learning, and this helps solve many mathematics learning issues (p. 94).

Playing creates culture—it allows students to engage in complicated negotiation of meaning, interaction, and competition, not only for entertainment, but also for understanding why learning mathematics matters in life. For instance, teachers can teach mathematics through gamification. Smyre and Richardson (2016) mention in their book that gamification is a great strategy that adult educators can use to engage students' instincts for learning and socialization (p. 95).

Teaching is a challenging yet rewarding profession. Educators need more than a working knowledge of creativity and the prescribed curriculum in order to be creative educators. We must be sensitive and supportive when it comes to helping students learn and grow. Inspiring future elementary teachers requires time and effort as well as strong commitment to enabling changes in traditional instruction techniques. We should not

solely focus on standardized test scores and mere academic records, but on students' experiences and on helping them develop a strong determination to succeed in specific subjects. Mathematics can be taught in a fun and flexible learning environment so that students and teachers can work collaboratively to ensure more promising and satisfactory learning processes and outcomes.

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