A New Destination: Fostering Student Thinking

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Have you ever made preparations to go back to your hometown after being away for some time? You pack your bags in anticipation of all the local activities and attractions you know so well. You're familiar with the roads and the houses and the landmarks. And you look forward to getting back to all that is recognizable and common-place. There is something comforting and nostalgic about getting back to your roots and picking up where you left off in such a recognizable, everyday place.

But what if your journey took an unexpected turn? You step off the plane that is supposed to land in your hometown, only to find yourself instead in an entirely new and unique place, somewhere like the City of Light, Paris, France! You didn't pack for Paris, and you aren't familiar with the customs or landmarks there, and you don't speak the language. It's overwhelming and exciting all at once, stepping out into the unknown. Unexpected though it may be, even a bit intimidating and formidable, the possibilities offered by a destination such as Paris are endless, exceeding your wildest dreams, and offering to enrich your life abundantly.

The Journey Began

That's been my own experience in teaching high school mathematics. My destination changed - dramatically. My journey started with the goal of becoming a superstar high school mathematics teacher. I loved the opportunity to encourage students and connect with them, and I felt confident in my ability to explain and demonstrate mathematical concepts. And I was certain of the best approach to present mathematical ideas to students so they could understand.

However, there came a point in time in my teaching journey when I regularly encountered students who underperformed and were also unmotivated and disengaged. I leaned heavily on the experiences of teaching tricks I experienced as a student, and I had even refined them a bit to make these strategies more relevant. While my students and I had good relationships, even those relationships did not make the learning enticing or accessible enough. All those very familiar, recognizable, and common-place ideas did nothing for many of my students.

A Crossroads of Belief

I had entered a phase of my teaching journey I refer to as a crossroads of belief. What did I really believe about students and their ability to learn mathematics? And how did that belief impact the way I presented lessons and planned for instruction? It became quite unnerving and even overwhelming that many of my students would not or could not learn mathematics. Those around me said that these failing students were simply not prepared or were, in fact, incapable of learning mathematics. The failure of these students had nothing to do with me as their teacher. Failure was just a part of the high school experience for such learners, I was told.

This attitude about students was unsettling and dissatisfying to me. My students seemed intelligent and showed evidence of that capability in a variety of other academic areas or out-side-of-school interests. The real crisis came when I acknowledged the wide gap between their potential to learn and their decided underachievement with mathematical concepts. And I finally had to admit that most of my math pedagogy, my teaching bag of tricks, was largely unsuccessful in helping my students learn. Even my most capable students seemed to hold on to procedures and practices only for the unit test without much retention.

A New Direction

My crossroads of belief came to a critical stage during my tenth year of teaching. And, coincidentally, it was during that same year that I was recruited to take part in a three-year mathematics education research project

headed by Dr. Thomas Cooney from the University of Georgia. I was one of five teachers from across the state who participated, and Dr. Cooney and his doctoral students met and planned with us regularly. And they were in and out of our classrooms for the duration of the research. Dr. Cooney observed me teach a lesson at the onset of the project. Following the observation, he said, “That was the most masterful lesson I have ever seen on geometric mean. It is obvious you have a deep understanding of this concept. But let me ask you a question. What do your students know?” I could not give him an answer. I knew then I was out of my depth and needed all the help I could get.

This research project sought to answer the question, “Will students know and do mathematics more deeply when they are assessed with open-ended questions at a high level of rigor?” It was not until the end of the first year of this project before I came to a personal understanding of the pedagogical moves the research team utilized. Slowly but surely, I began to understand this new direction as my belief followed my practice.

I had assumed that students who struggle in mathematics were only capable of answering low-level questions about procedures after the teacher explained them. This assumption was easily debunked by the way my students responded to the opportunity to grapple with higher level questions about concepts and procedures as well as to their level of engagement. Almost immediately, I began to notice a difference in the motivation and achievement of my students. They eagerly explained their thinking. This provided opportunities for them to clarify and retool that thinking through student discussions and writing as well as the feedback I provided and the metacognitive strategies I used. Eventually, I came to understand that students can and should own their mathematical knowledge with the teacher acting as a mentor who guides learning by asking rigorous and clarifying questions. Additionally, I moved to using rich tasks for instruction since this approach organically allows for deeper, more thorough questioning to help students reveal their thinking about mathematical concepts.

My colleagues and administrators also took notice of this change in student achievement for those struggling students in my classes. My room was often filled with my colleagues, our building administrators, and our school district leadership observing this new student-thinking focus of teaching and learning. My own attitudes continued to broaden my outlook so that I included all of my students in this process, not just those who struggled to achieve. I found that the retention level of my students also rose significantly as demonstrated in their ability to use and build upon previous concepts while learning new ones.

A Final Turn

In a final twist, I discovered that I had become an agent of my own understanding of what creates and sustains great learning experiences for students. I read relevant research and literature on strategies and interventions that provide opportunities for students to be more successful in tapping into and revealing their thinking. Leveraging student thinking during lessons became a mainstay in my instructional practices. I was enlisted by our principal to lead some of the professional learning with the mathematics department at my high school, focused on the inclusion of the practices I had learned from participating in research as well as those I had discovered through reading and study. I attained certification by the National Board for Professional Teaching Standards for Adult/Young Adult Mathematics, using this new teaching approach as the foundation to meet their rigorous requirements.

VIDEO 1: Kaycie provides additional insight as to how the National Board Certification process is part of her journey.

After sixteen years of teaching with student thinking as the focus, I moved into a position to support high school mathematics teachers across thirteen school districts. I had never imagined leaving the classroom, and I did not relish the thought of stepping away from the everyday experience of working with students. However, this opportunity to support and challenge teachers in a positive way to embrace changes in their own practice was too exciting to resist.

But, there was much to learn in this new position. One of the first insights I gained is that teachers will not embrace changes in their practice unless and until they personally are ready for them. Many teachers who make this change are dissatisfied with student motivation and achievement, as I was. Others move into this new focus of revealing student thinking because their math department has agreed to make that change as a team or the school district has encouraged this refocus for student learning. I have found that lasting change in teaching practice occurs when the motivation is internal and not external. A second insight is that teachers, like students, deserve my gracious support from the stance of goodwill as one who comes alongside them to shoulder the load. Seldom does anyone respond to criticism or demands. However, asking questions like, "What do your students know?" or "What have you got to lose from using new strategies?", can trigger opportunities for discussions of practice and, hopefully, move towards a crossroads of belief. And thirdly, I need to celebrate every victory, even the small ones. Baby steps in this new direction can accumulate into transformed outlooks and actions over time.

VIDEO 2: Kaycie shares advice about supporting teachers that are starting to reform their practice and incorporate Effective Teaching Practices.

It’s been forty-two years since my journey began. Nothing has been wasted. The challenges I experienced early in my teaching career prepared me for the opportunities to step into a new way of thinking about effective learning experiences for students. I am grateful for what I have learned from these experiences and continue in my journey to support teachers as they open doors for their students. This new destination in my teaching and learning journey did not disappoint, enriching my life and the lives of others beyond anything I had imagined as I began.

VIDEO 3: Kaycie shares one of many experiences working to support teachers.