Observing Enables Deeper Learning for Disaffected Learners

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Abstract

Post-COVID, upon returning to the classroom, many students, but most especially those from among our more vulnerable populations, have difficulty collaborating and communicating with each other and reconnecting with their learning. We describe how a learning exploration that positioned struggling rising sixth-graders as cricket explorers, who would become cricket experts by observing the habits and behaviors of crickets in their care, nurtured their capacities for collaboration and communication and created a community of deeper learning, for both the students and teacher. That all students have opportunities for deeper learning is a matter of social justice. The exploration took place as a co-curricular activity in a four-week summer scholars program and involved nine students, five boys and four girls.

Introduction

In summer 2022, Eric Crivac, an elementary science teacher, was afforded the opportunity to teach in a four-week summer program that was designed to support the literacy and numeracy skills of rising sixth graders who were struggling academically. Post-COVID, upon returning to the classroom following an extended time of technology-enhanced remote learning, these students had challenges reconnecting with their academic studies and working together collaboratively as a classroom learning community. Identified as "reluctant," "unmotivated," "struggling" learners, these summer students had little confidence in themselves as learners and meaning-makers. To foster an informal and "un-school like" environment, program administrators encouraged participating teachers to supplement the program curriculum with activities that would increase student engagement and motivation in their learning.

Prior to the program start, Eric reached out to Fiona, a teacher educator he knew from his experiences in a professional development opportunity where he had experienced critical exploration pedagogy. Developed by Eleanor Duckworth (2006), critical exploration pedagogy is an application of Piaget's clinical method in the classroom. The pedagogy necessitates that teaching "put students into direct contact with the actual materials of the world . . . Students develop and build ideas from their own current knowledge as it is called forth by new experiences with these materials. The teacher is the developer and guide in such experiences" (Hughes-McDonnell & Schneier, 2023, p. 20).

Collaborating as teacher and teacher educator, we thought about the capacities that Eric sought to develop in students, the aspects of his teaching that he sought to develop, and the different activities that he might introduce. First and foremost, Eric wanted to re-ignite students' wonder and curiosity in the world, the fuel that drives exploratory learning. Rather than tell students how things work, Eric sought to create settings that "give [students] the occasion to have . . . wonderful ideas . . . and to feel good about [themselves] for having them" (Duckworth, 2006, p.1). He wanted to create a setting in which these reluctant summer students "would be called upon to think and to talk about what they think" (p. 159) and to feel safe and free from judgement when doing so. He wanted to provide an experience through which these students would gain confidence both in themselves and each other as observers, questioners, problem-solvers and knowledge-makers, such that they might work together as a team—capacities that are fundamental to scientific inquiry (Next Generation Science Standards [NGSS] Lead States, 2013). Eric wanted to encourage exploratory learning, learning that fosters autonomy, beginning with learners' engagement with material that captures attention and develops with self-directed activity. Eric wanted to reignite his passion for teaching and re-connect with aspects of his teaching that he valued but which were increasingly constrained in his regular teaching setting. The capacities that Eric sought to

nurture and environment that he sought to establish aligned beautifully with attributes associated with "deeper learning."

Teaching Toward "Deeper Learning"

"Deeper learning" crept into educational circles in 2013 as an umbrella term for educational outcomes that go beyond acquisition of content knowledge to include those that are needed for success in life and in work (Hewlett Foundation, 2013). Often termed 21st century skills (Pellegrino & Hilton, 2012), the "deeper learning" frameworks of both the Hewlett Foundation and the Learning Policy Institute (2022) describe educational outcomes that include: the ability to think critically, the ability to solve complex problems, the ability to communicate effectively, the ability to learn independently, and the ability to work collaboratively as a team. As observations of the teaching and learning happening in classrooms across America have revealed (Darling-Hammond & Oakes, 2019; Dintersmith, 2018; Mehta & Fine, 2019), creating environments that nurture deeper learning is challenging even when it is the goal. The Learning Policy Institute identifies learner behaviors observed in classrooms that support deeper learning outcomes: learners engage in inquiry-based and hands-on learning; they hone their verbal, written, and graphic communication skills through written and oral assignments and presentations; they develop social-emotional competencies; and demonstrate their learning in authentic ways.

Selecting Materials

As educators, we recognized that to support the capacities that Eric wanted to nurture, the activity introduced must connect with students, capture attention, and spark curiosity and wonder. Only then would students be sufficiently inspired and motivated to keep looking closely and have observations to share with each other as a learning community. Our first task, then, was to identify an object of study that would fascinate even the most reluctant and disconnected learner. We sought material that might be found in the local environment, which was a part of the students' lived experience, but which they were likely to know very little about. Surprises encountered in material that was familiar to students would sustain curiosity and provide a bridge into new learning. We considered a range of possible materials (rocks, fish, leaves) and finally settled on crickets. Ranging between one and two inches in length, crickets can be seen with the unaided eye. Animate in nature, crickets display behaviors and sounds that are sure to capture the attention of even the most casual observer. Crickets are indigenous to New England and can be found in the local environment. They are readily available at most local pet stores, where they are sold in units of 25, 50, and 100 as a food supply for reptiles. Stored in large tanks without food or vegetation, any effort to preserve and care for the cricket would be a good thing! The availability, low cost, and unit of sale make it possible to provide each student with a cricket. We also knew that it would be possible for students to gather materials to construct a mini ecosystem for the crickets that would reflect their natural environment.

Observing to Connect and Learn

Having settled on crickets as the object of study, we considered the learning exploration that we would present and different ways that Eric might structure students' first experience such that students might encounter the cricket as a living entity with characteristics unique to itself. These summer students, we decided, would become cricket experts by observing and exploring the behaviors and habits of the crickets in their care. Over the course of the four-week summer program, Eric would make space for students to observe their crickets. Some days the time available might be just a few minutes, other days longer. There would be days when scheduled program activities would not allow time for crickets.

Preparing for the Crickets

Eric informed students that he would be bringing live crickets into the classroom. Students were excited to hear that they would each have their own cricket. Eric announced that their job was to become a community of cricket experts by observing and documenting the habits and behaviors of the crickets in their care. He gave examples of early scientist-explorers who frequently could not transport their new discoveries back home; their drawings and descriptions had to convey the information. Neither did these early scientists have access to technology to research their discoveries. This meant that, google and any other search engine were off limits. And, like these early scientists, their cricket observations had to capture the

cricket in sufficient detail that others could know what they had seen.

A Cricket Home

The immediate problem to solve was to construct a home for the live crickets that would soon arrive. The cricket home should be self-contained with all that their cricket would need to stay alive. A table of supplies provided an array of materials to construct the physical structure. Materials included clear 2-liter soda bottles, plastic cups, cotton string, cotton pads, egg cartons, construction paper, scissors, tape, markers. Eric showed students an example of how they could construct a terrarium-like structure to contain their cricket. Students worked together, sharing their materials and their thinking about the structure they might put together. Students assisted others by taping structures and making suggestions. Once the structures were put together, a hike around the school grounds allowed students to collect materials to put into the cricket home. The materials should replicate those of their natural environment. Students gathered pinecones, sticks, grass, dirt, sand, and small rocks. Eric added to the supply table containers of sliced apples and potatoes. Returning to the classroom, students took care as they meticulously placed their materials inside their cricket homes. Students spontaneously shared materials they had gathered and were thoughtful in how they used them, creating areas of soil, grass and twigs. The seeds of curiosity were taking root.

Figure 1

"My Cricket Home"

A Cricket Journal

Eric reminded students that as cricket experts, just like scientist-explorers, they would need a place in which to record their observations and questions. Some students used white paper to construct a personal cricket journal, others used composition notebooks that Eric provided. To support autonomy and self-direction, Eric resisted giving explicit instructions on how to format the cricket journal. He did, however, ask students to date each observation and include both drawings and written descriptions of what they were seeing, noticing, and questioning. These journals would play an instrumental role in helping students to focus their observations, which deepened their connections to their crickets and furthered their learning. To further support student thinking and give focus to their cricket observations, Eric invited students to write out their cricket ideas and wonderings on post-it notes: "I wonder what crickets eat?" "I wonder if crickets sleep?" "I know they live outside," "I know that they are bugs," "I know that they can make a sound," "Are there different types of crickets?" "Do crickets have eyes?" Students posted their "wonderings" on the Cricket Wonder Board.

Live Crickets Spark Wonder and Curiosity

On the morning of the crickets' arrival, and before the students entered the classroom, Eric placed the box of crickets on a desk in front of the classroom. The crickets were held in a clear plastic container. As the students entered, they dropped their backpacks and huddled around the desk. Eric watched and listened as students observed the crickets, commenting out loud on what they were seeing and noticing. Students' spontaneous comments exhibited wonder and curiosity and illuminated what they were seeing, noticing, and questioning. "I see their eyes!" "Is that a tail?" "I wonder if they will grow?" "They've got wings!" "They've got big legs," "Where do they go in the winter?" "How do you tell a boy from a girl?"

Figure 2

"Do You See That?"

Once students had huddled around the cricket container, they returned to their desks where Eric issued them each two crickets to put into their cricket home. These tiny live crickets provided the spark which initiated their self-directed exploratory learning.

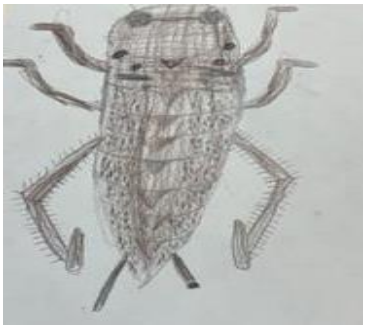
Seeing the Cricket

As students observed their personal cricket in the home that they had constructed, Eric invited students to share with others what they were seeing. I see "two wings," "I see a small head," "I see two big eyes," "I see 2 long antennas," "I see 6 legs," "I see 2 big hairy legs," " I see jointed legs." Rather than comment on observations shared, Eric asked students if they could see what others had observed in their cricket. Students pointed to what they thought were eyes, antennae, tails.

When students' observations subsided, Eric then invited students to share things that surprised them or things that they were not sure about. Students were not sure about "the tails." Others remarked on the length of the cricket antennae. Whereas some students saw "two tails" others saw "three tails." "That's weird!" remarked one student. Some students saw "eyes," other students were not sure. The question of color was also debated. Are crickets brown, green, or black? "Can crickets be any color?" asked one student. Students then began to notice less obvious features, describing the cricket as "hard and tough" and "smelly." Students described cricket behavior as "curious," "interesting," "active," "jumpy." Students who observed their cricket with hand lenses noticed the cricket's finer markings and details. Some saw stripes, others described color – brown, black, green. One student exclaimed, "I think my cricket made a chirping sound!" Students' growing connection to their crickets and each other was evident when they began to name their crickets, "Peanut," "Chickpea."

Figure 3

Looking Closely and Seeing the Cricket



Connecting, Collaborating and Communicating for Deeper Learning

A Cricket Conference

To foster a community of deeper learning and help students "hone their verbal and graphic communication skills" (Learning Policy Institute, 2022), we decided upon the idea of a mini-cricket conference, what Eric termed "a verbal gallery." A cricket conference, which in this case was created by bringing the classroom desks into a circle, would replicate a meaningful setting to share observations. In this space, even the most reluctant learner freely shared their cricket drawings, pointing out to others what they had observed.

These observations now included aspects of cricket behavior they had observed directly. Students spoke with growing confidence in their statements. New questions emerged that were grounded in observations they had made of their live crickets. "Crickets like to drink!" "Crickets eat!" "Crickets don't like to be seen." "I think crickets dig into the soil." "I don't think they like to be crowded." "Do crickets like to be alone?" "Do they like the dark?" "How come crickets have wings if they can't fly?" In this class, demonstrations of confidence such as this were rare, and learning from direct experience with

materials and phenomena of the world was a first. Even more rare for these students was the attentiveness and respect that they exhibited toward each other as observers, knowers, and questioners. Transitioning from his previous position as information deliverer, Eric took notes, observing and listening closely as students listened to what their peers were observing and describing.

Respecting peers as experienced cricket explorers, students used ideas shared to enrich their cricket homes such that the crickets had all that they needed to thrive. Some students, noticing that "crickets like to hide," and that the container in which the crickets arrived contained egg cartons, added egg cartons and small paper cups into their cricket home. Students watched excitedly as their crickets "found a hiding place." "Crickets drink!" shared one student. "How cool is that!" Eric suggested to students that they find ways to provide their crickets with a water supply. Some students used saturated sponges; others created a miniature pond using water-filled upturned bottle caps. Noticing crickets' attraction to moist food sources, students added apple slices, and potatoes.

Motivated by their observations of live crickets, this group of once "reluctant" learners, moved from observer to listener to co-collaborator as they contributed observations and offered suggestions and possible answers to questions posed. Recognizing their peers as cricket explorers from whom they could learn, these young students became a community of science learners, listening attentively to hear what other cricket behaviors their peers were seeing and noticing.

A Cricket Funeral

Sold in stores as food supply, where they are kept in environments not suitable for a healthy life, store-bought crickets tend not to have a long life span. Upon finding a dead cricket, the students came together to organize a cricket funeral and procession, complete with musical instruments. Students processed down the school hallway to dispose of the deceased crickets. Deceased crickets would not be disposed of without appropriate ceremony. The community of care extended to crickets.

Figure 4

A Cricket Funeral and Procession

Eric watched from a stance of inquiry as students who once remained silent took risks, sharing with the group ideas that they were unsure about. Students were developing awareness of their own abilities as observers and inquirers and seeing peers in the same light. All observations were pursued and no observation or idea was taken as holding authority based solely on who offered it. The crickets themselves became the new google. Freed from textbooks, students noticed for themselves that a suitable environment for crickets must contain food, water, and shelter. As Eric reported, "The concept of basic life necessities was no longer an abstract concept." This idea was generated in students' lived experience. These tiny crickets – intended to be sold as a food source – had mediated a community of young scientists, giving these young students and Eric a source of renewed energy and inspiration in what teaching and learning might be.

A Cricket Gallery

As the close of the summer scholars program came into sight, the program included activities that would take up much of the time that remained. Yet, there was still much to notice and explore about crickets. We decided that the forum of a Cricket Gallery would be an authentic setting that would sustain critical thinking and allow students to exhibit their learning (Learning Policy Institute, 2022). To deepen and extend observations in the time that remained, Eric suggested to students that the gallery drawing focus on one specific cricket structure. Students found great appeal in this idea and they worked earnestly – some using hand lenses so that they might see the cricket up close – to create a detailed drawing. Students posted their

completed cricket drawings near the cricket houses for all to enjoy.

Confident and motivated cricket experts, these students were motivated to share their work with others. Together, teacher and students walked the gallery, their individual and collective knowledge and understanding of crickets deepening as each student shared their different observations and explained to the group what they had seen and noticed.

Figure 5

"This is Kinda What a Cricket Looks Like Up Close, So Cool Right!"

One student remarked that over the course of the summer months that remained she would look for crickets around her home neighborhood. Others agreed that this was a good idea.

Reflections

With more time, these students were now ready to use their observations and questions as a basis to conduct more formal inquiry into crickets and their behaviors. The observations and questions were now their own. They had ownership of their learning. Some questions centered on aspects of crickets that might be known by further looking, other aspects might require researching what other cricket explorers have discovered. These students had confidence that they could come to know a great deal about crickets by looking closely at the crickets and by listening to what other students had observed and noticed. Through this exploratory learning experience, students were developing the skills that will allow them to take part in public discourse. Creating space for these struggling learners to engage in free observation and exploration supported their well-being, their sense of efficacy, their capacities of collaboration and communication, and their long-term potential for success – in life and in school, and as citizens in a democratic society.

Eric's Reflection

My desire to keep wonder and curiosity alive in the classroom is what inspired me to pursue this teaching-learning inquiry. Rather than telling students all that I know, I became a facilitator, listener, observer, and explorer of my students' learning. Rather than determining the questions and presenting students with a sequence of prescribed lessons, I encouraged their exploratory learning. These students thrived and flourished in this environment. Seeing my students become attentive observers and not wait for someone to tell them what they need to know has been incredibly encouraging. My choices as a teacher helped these students believe they can control their learning. The power of this experience will carry through my work as a teacher; if I create environments that encourage students to wonder and explore, then wonderful things will happen. As a teacher there is no better feeling than to see students making connections, building understanding, and developing confidence in themselves as learners.

Inspired by my summer students' exploratory learning, I have purchased an ant farm to introduce into my fifth-grade science classroom during the school year. I want to use their explorations as the basis for attaining deep and fluid understanding of core disciplinary ideas. Balancing facilitation of learning through providing students space for free exploration with the expectations of traditional teaching is difficult to achieve. I anticipate that I will find myself introducing more structure. I will likely be more specific in how to structure the journal and what to include, as well as include journal prompts. I may assign roles when working together and will likely introduce technology. I want to be cautious and thoughtful in the decisions that I make. Whatever I do, I must pay attention to the observations that students make and the questions that they raise and let these guide our collective learning.

Fiona's Reflection

Collaborating with teachers on projects such as the one described here brings joy, new energy, and new learning. Through this study, all of us –

the rising sixth graders, Eric, and I – gained insights into topics of mutual interest that were sustained by close observation and inquiry. The students developed their individual and collective understanding of crickets and nurtured their capacities as co-collaborators, communicators, and sense-makers. Eric and I, working together as teacher and teacher educator, deepened our insights into how learning happens and developed ways to create authentic settings within the classroom that foster deep learning. To support students in developing the capacities to contribute to a democratic society and flourish in an unpredictable and ever-changing landscape, it is essential that classrooms encourage inquiry, autonomy, and self-direction and transform into places that enable deeper learning for students and teachers, with confidence in their abilities as observers, questioner, and sense-makers.

Declaration of interest

The authors report that there are no competing interests to declare.

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