Bialik. Cultures of
Thinkin?

Establishing Communities of Curiosity and Creative Participation at Bialik College

A Pedagogical Playbook for the Middle School Classroom—and Beyond

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STEP FORTH WITH COURAGE

Bialik College

Roxanne Summer: Using the Biography of an Idea Approach to Support Student Thinking

Roxanne is the Head of Educational Resources at Bialik College. She has worked at Bialik for seven years and during that time she has worn many hats. Roxanne began at the school as a Teacher Librarian and then progressed to become the Head of Library and eLearning. She now manages the school's learning management system.

When asked what led her to the teaching profession, Roxanne candidly shared that she had initially tried to avoid it. "I wanted to be a builder," she said, "but women did not become builders in the 1990s and early 2000s. So I did an Arts degree because mum said, 'Go to Uni.'" Following her degree work, Roxanne began teaching—but she soon hungered for a new challenge. "So I looked for something that was a side-step rather than a step-out." That's when she found the field of Teacher Librarianship. "I discovered all of the technology in there and fell in love with it," she remembered. Not much long afterwards, Roxanne also discovered the Maker Movement. "That has been the most pivotal part for me," Roxanne said. "The Maker Movement and maker-centered learning. Being able to bring the makerspace into the school." While she engages in this work, Roxanne has also maintained a position as a teacher at Bialik—which she enjoys a good deal.

For Roxanne, the most exciting aspect of her position at Bialik College is that she works within a space where she is allowed to experiment and try new things, where her day-to-day work is not prescribed, and where she is supported in her pursuit of creative possibilities. Roxanne also appreciates the community that she is a part of and the wealth of knowledge it contains. She regularly approaches her colleagues to tap their expertise in a certain content area, or in regard to a particular skillset. This is a practice that she models for her students, being candid about the fact that, "I only know this much, but I can find people that I can reach out to and connect with them." In her life and work, Roxanne identifies as a connecter and a fervent networker. She is always thinking, "Can I connect this to that and is this an opportunity for that?" Making connections is what Roxanne enjoys most about her position at Bialik; it's also a disposition—a habit of mind—that she hopes to pass on to her students.

In her role as a member of the Establishing Communities of Curiosity and Creative Participation initiative, Roxanne explored how she could reframe her work as a teacher in a STEM classroom from the perspective of participatory creativity. In particular, she was interested in having her students apply the *biography of an idea* concept into their work. Her inquiry focus question was:

How can I encourage student curiosity to drive discovery of content (rather than just deliver it and ask the questions myself)?

Year 9 STEM – Oral Presentation Rubric

Key Question:

In your opinion, what is the most significant learning moment/turning point in your design? Explain and justify with evidence.

LEARNING MOMENT/ TURNING POINTS	1. BEGINNING	2. CONSOLIDATING	3. ITERATING
Systems Thinking · purpose · people	· presents the design as a system · considers all parts of the system, including people	· considers the impact of each part and/or person on the system · evaluates the role of each part and/or person	· considers alternate parts and/or people and their impact on the system
Technical Skills & Knowledge · materials · accessing expertise	· outlines the materials chosen · describes the expertise applied to complete the project	· explains the materials chosen · articulates the expertise accessed to complete the project	· considers alternate materials · links the impact of accessing expertise to personal understanding
Empathy · limitations · inclusions	· explains the limitations of the design · outlines aspects of inclusive design	· explains inclusive design considerations · explains user experience considerations	· articulates connections between UI and UX and final design
Mathematical Thinking · exploring mathematical theory · accessing expertise	· explains the area of mathematical thinking explored · describes the expertise accessed	· links the area of mathematical thinking explored to the final design · outlines the impact of the expertise accessed on the final design	· explores the area of mathematical thinking beyond the application to the project · accesses multiple experts and compares and contrasts the findings
Beyond · other subject areas · other experiences	· outlines other subject areas or experiences that contributed to the final design	· explains how understandings or experience from beyond the STEM curriculum impacted on the final design	· explores the impact of multiple understandings or experiences from beyond the STEM curriculum as turning points and articulates their impact on the final design

Rubric to assess students' final oral presentation.

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Tracking the Connections and Turning Points that Advance Student Thinking

When she first began her work in the Establishing Communities of Curiosity and Creative Participation cohort, Roxanne was focusing her attention on a Year 6 Digital Literacy course. Here she was teaching her students about the invention of the Internet and how the Internet works. But when I last spoke to Roxanne, things had changed. She had been asked to teach a Year 9 STEM class on short notice. Roxanne accepted the task but on the condition that she could teach STEM in her own way. The administration responded positively, "Sure."

While the STEM acronym traditionally stands for Science, Technology, Engineering, and Maths, the first thing Roxanne did was to re-envision STEM as Systems thinking, Technological skills and knowledge, Empathy, and Mathematical thinking. This was a significant departure from how the course had been approached previously when it was under the aegis of the Science Department. With this reframing in place, Roxanne got to work. She set up a structure that combined master class experiences, active learning and learning from one's own lived experiences. With this structure in place, Roxanne established a project-based assignment for her students to pursue through the course. "I've asked the students to create an arcade game," she said, "and it has to be a physical arcade game, so they have to throw a ball, they have to hit something, it can't just be on a screen." The parameters for this assignment further tapped into each letter of the STEM acronym, as Roxanne had redefined it.

While the students were off and running with their arcade invention ideas, Roxanne was puzzling over how to track their thinking. To do this, Roxanne wanted each of her students to develop a biography of their idea. While it was important for Roxanne's students to authentically attempt to develop arcade games that met the criteria that she had set, the real learning, Roxanne believed, would be in her students' ability to make connections and to articulate how their ideas had developed over time. "I want them to be conscious of their process," she said, "because I really believe that is the modern way of learning; to have a student say, 'you know, I didn't know how to do this, so I watched this video on YouTube and that made me think about this, and then I spoke to this person and then I tried that.'" What Roxanne was hoping her students would do, was not only follow their curiosity by making a succession of connections, but to also be cognisant of the many ways different influencers could shape their thinking, seeking out those influencers, and then developing a narrative that illustrated the evolution of their thinking. If her students could do all of that, then perhaps it mattered very little whether or not their arcade games actually worked.

Engaging in this process and promoting this new way of thinking was not without its obstacles. One hurdle Roxanne's students had to overcome was proprietary thinking. In other words, getting beyond the notion that ideas are the property of individuals. For Roxanne this meant that students had to let go of the concept of *stealing* ideas—or having ideas *stolen* from them—but instead thinking in terms of *riffing* off of ideas. From this perspective, it is ok—even preferable—to be influenced by the work of others, so long as one is cognisant of that influence, and making use of that influence with purpose, intention and, of course, attribution.

A student constructing their physical game.

A student constructing their physical game.

## More than a Mark—Designing an Assessment Strategy to Support Student Thinking

Naturally, Roxanne's puzzling over how to track student thinking led to concerns she had about assessment. "I will know what an A looks like compared to a C," Roxanne said, "but how do I tell the students?" This prompted a discussion about what makes for a compelling biography of an idea—one that not only illustrates the story of student idea development, but also shows that a student has learned something about the process of engaging in the development of ideas. Beyond the regurgitation of facts, and even beyond the display of a successful arcade game that met all of her criteria, Roxanne wanted her students to be able to describe how their thinking evolved along the way, and how they tapped different resources to develop their ideas. Quantitative assessments seemed to be limited in this regard and the rubrics Roxanne came across appeared to be helpful, but not quite a perfect fit. What did seem like a possibility was for students to articulate the various *turning points* that influenced their thinking. More specifically, how might students look back on the development of the ideas they had been working on and identify what specific moments or events impacted their project, to say, "I was on a trajectory and then this bumped me and I went a different way."

Ultimately, Roxanne knew she had to give grades to her students, and she knew she had to have a rationale for how she gave those grades, but she also wanted to ensure that the assessment measures that she developed would be both formative and summative. When taking a biography of an idea approach to student learning, a question that comes to the surface is *how might the process of assessment serve as an episode of idea development?* Roxanne embraced the spirit of this question as she approached the deadline for her students to submit their first iterations of their idea biographies. "Next week they have to hand in their biography of an idea to-date," she noted, "and I said, 'I'm not marking it. I'm just going to write down lots of questions—and give it back.'" Roxanne's questions are sure to spark further thinking, which will in turn prompt the next chapter in the biographies of her students' ideas.

Curiosity and Creative Participation in Roxanne's Classroom

Through her work on the Establishing Communities of Curiosity and Creative Participation initiative, Roxanne prompted her students to think of their work in her newly re-imagined STEM class from the perspective of participatory creativity. Her goal was to use the biography of an idea approach to both prod and illustrate student thinking. In this space, an ongoing puzzle for Roxanne was how to assess student learning in a way that would be formative and summative, while also being true to the participatory approach to invention that her students were engaged in. Considering the turning points in a student's thinking surfaced as a promising approach to this work, one that Roxanne hoped would make her students more cognisant of the influencers that drove their ideas forward. In the end, it was less important to Roxanne that her students arrived at working prototypes of the arcade games that they were charged to develop, and more important that they displayed an understanding of how their thinking had been influenced by multiple inputs, and how their ideas had changed along the way.

Making connections served as a throughline in the way Roxanne designed her STEM class, how she hoped her students would engage in their project work, and how she thought about the process of assessment. But more than that, *becoming a connecter* was a core objective that Roxanne had for her students. As she had stated, actively making connections, rather than passively waiting to receive knowledge, is a powerful way to learn in the contemporary world, but it is also an important way for one to approach their life and work. While curiosity and creativity are indeed grounded in the connections that people make as they follow their wonder and develop new ideas, making connections is also an important habit of mind to have—and a generative way to be in the world.
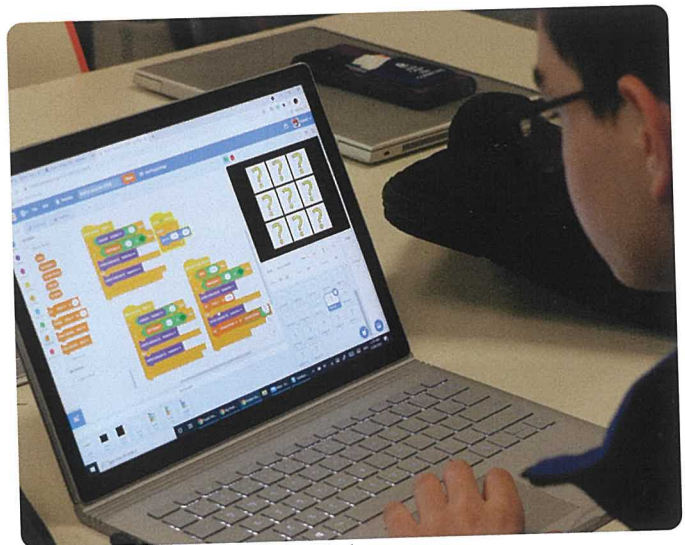
A student coding an element of their game.

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