PDIG 37527 Final Report

Project Description

Together, teachers met over 8 half-day sessions. Before the first meeting, Nathalie Rollin, the principal, purchased the text Windschitl, M., Thompson, J., & Braaten, M. (2018). *Ambitious science teaching* for participants. Many teachers read sections of the book before the first meeting, which provided a rich starting point for our work together. In the first meeting, we began exploring what inquiry-based teaching involves. This included eliciting students' ideas about the natural world and adapting instruction to support a deep understanding of scientific concepts, encouraging students to engage with discourses centred on scientific concepts, providing students with collaborative, hands-on scientific inquiries that engage them with experimentation, generating opportunities for co-construction of evidence-based explanations based on student observations and data, comparing students' explanations and models to accepted scientific phenomenon. Teachers formed critical friend groups (CFG) and began planning the topics of their lesson study. The focus of a CFG is to work with a colleague who is encouraging and supportive, but who also provides honest and candid feedback.

Throughout the project, teachers worked on two distinct lessons. Some groups changed the CFG and others stayed in the same group. Groups were organized around the courses teachers taught – the goal was that teachers would work to teach similar lessons and then convene to co-construct a lesson plan that highlighted the combined successes of the lesson.

The project unfolded as planned, as noted in the schedule below:

Day 1: Introduce and develop PD goals and approach, IBL teaching, CFG initiated, and began talking about lessons they wanted to work on.

Day 2: IBL lesson plan deconstruction and **l**esson plan development of IBL lessons (CFG).

Prior to Day 3: Video record lesson/teaching.

Day 3: Share key learnings with the group and discuss the process they want to adopt moving forward. Share teaching videos using discussion prompts (CFG).

Day 4: Share progress and outcomes of lessons. Edit/Develop lesson plans (CFG).

Day 5: Reflection on IB teaching & establish goals for a second round of PD (CFG).

Prior to Day 6: Video record the second lesson.

Day 6: Develop a second lesson plan (CFG).

Day 7: Share recorded lessons with discussion prompts, and complete lesson plans (CFG)

Day 8: Celebration of work accomplished - successes and tensions with the PD process (video club, lesson plans) and future pedagogical goals.

The one challenge faced by teachers was finding time to meet that was minimally disruptive to teachers' classroom teaching activities. Teachers chose to meet over lunch and the last 75-minute teaching period of the day to minimize disruptions to their teaching schedule, even though the PDIG allowed for a half day of release.

Project Goals and Outcomes

The goal of this project was to provide teachers with an opportunity to develop sophisticated inquiry-based practices and then create lesson plans that had explicit references to these practices. Teachers created videos of themselves teaching, which elicited rich and reflexive conversations about how they created inquiry-based teaching moments in their classrooms. Additionally, teachers embedded their reflections about the strengths and possible delivery problems of their lessons in their lesson plans. The overarching goal was that teachers would have opportunities to work together and engage in conversations with colleagues about issues related to pedagogy. This goal was met.

Teachers met for 8 PD sessions, and all teachers produced two classroom videos and participated in developing two lesson plans. Teachers developed expertise with inquiry-based practices and included references to these practices in their lesson plans. As expected, not all teachers reached the same level of proficiency with these practices. Some of the experienced teachers were working on incorporating these practices for the first time. They noted that inquiry-based practices were an extension or polishing of their current practices. The novice teachers benefitted from having an opportunity to revisit lessons learned in science methods courses, which they reported as being remarkably helpful.

As anticipated, teachers found that having time to work and learn with colleagues at school, focusing on pedagogy, was invaluable. Most teachers had not participated in PLD that focused on developing classroom practices informed by literature and transforming this into actionable knowledge.

Reinvestment

The seven lesson plans created by the participants include inquiry prompts and follow the Ambitious Science Teaching (AST) model (Windschitl, M., Thompson, J., & Braaten, M., 2018). These practices included:

- Use of a driving question to establish an instructional goal.
- Eliciting students' ideas by pressing and revoicing student thinking
- Orienting students to each other's ideas
- Positioning students competently
- Representing and maintaining a record of student thinking by recording key ideas on a board.
- Use of model-based inquiry

- Collecting and making sense of data
- Developing Evidence-Based Explanations

Science teachers new to AST could find the lesson template useful as it includes prompts for AST and guides teachers through the process. Additionally, teachers who teach secondary 3, 4 Science and Technology, or secondary 5 Chemistry could find the related lesson plans interesting and useful. Some lesson plans included formative assessments and classroom handouts that could benefit science teachers interested in this work.

I would highly recommend that this project be carried out by other teams. Teachers appreciated looking at current models of teaching science and incorporating these methods into formal lesson plans. Teachers reported that having time to co-develop these practices with colleagues was a rich and rewarding experience.