

**The Animals, the Plants, and the Dirt That Soiled the Underpants:
How an Agriculture Immersion Environment Shapes K-6 Students' Relationship with Schooling**

Dr. Bonnie Stelmach
Studies in Educational Leadership
Faculty of Education
University of Alberta
bonnies@ualberta.ca
website: <https://www.schoolbasedag.com/>

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As a former school teacher, imagine my heartbreak when a couple of grade 6 students I interviewed for my research study in an agriculture immersion K-6 school said to me, “I’m not the kind of guy who likes school” or “If this [agriculture] school wasn’t here, I don’t know what I would do.” When I pursued this, one of them said “for me it’s just boring in a way that I have to constantly do different questions.” They did not see the meaning or relevance of the work they were required to do, and yet, when they described being involved in projects, they became animated:

If I’m doing, like, a science project, I’m thinking, building, and writing, and having fun building, and having fun experiencing how this thing works, and asking questions on how to figure out how it works more...whereas this—the math—I just like ask for help and I’m just thinking and writing. And that’s what’s boring.

The silver lining is that it’s not that the students don’t like *learning*; it’s that they don’t like *schooling* in the conventional way it is often delivered. A distinction between learning and schooling was iterated by other students in the study, including those who liked school. Most preferred the hands-on and outdoor experiences, which they did not equate with “school”. This came to light one day when my research assistant, Leah, and I tagged along with the Grade 4-6 classes on a planting excursion at a nearby lake in June 2024. We noted the students fully engaged in planting over 200 seedlings and plants. As I watched one student dig and insert the seedling, I asked them what they thought about this idea of planting trees at the lake. They said, “It’s fun, it’s so much better than school!” This is not the first time that I’d heard students make this distinction.

Scholarship on experiential learning (Kolb, 1984) has confirmed the value of hands-on activities for increasing engagement, enjoyment, and learning outcomes. Because agriculture is naturally a hands-on activity, students reap the same benefits. What struck me about the way students interpreted experiential activities as “not school” but when asked, agreed they were learning. In their recent book, *The Drivers: Transforming Learning for Students, Schools, and Systems* (2024), Fullan and Quinn identified students’ disconnection from content in their schooling as a current challenge. My research reports on a rural school in Alberta, Canada, that has a unique program based on agricultural literacy, experiential learning, and land stewardship that shows promise for shaping young students’ relationship with school in a way that engages their natural curiosity and multidimensional ways of learning. The poster I created invites a conversation about how an agriculture immersion program makes that happen. This brief paper elaborates on the poster points.

The Research Context

I have been conducting a study exploring how an agricultural literacy lens enhances K-6 students’ learning and life skills development, based on an intrinsic study of a rural public charter school in Alberta, Canada. Alberta is uniquely positioned in Canada because it offers the most education options for parents to select the best learning environment for their children. Alberta was the first jurisdiction to permit public charter schools in 1994, and in 2020, the *Choice in Education Act* (Government of Alberta, 2020) reaffirmed parents’ right to choose their children’s education by expanding the number of public charter schools that can be created. This poster presentation draws from the larger data set.

In Alberta, charter schools receive provincial funding, which distinguishes them from charter schools in the United States. Public charter schools are expected to “improve student learning by providing a different environment beyond the services provided by the existing local school board” (Government of Alberta, 2022, p. 4). Public charter schools have autonomy in terms of program innovation, but they deliver provincial curriculum and are bound by the Education Act; therefore, they do whatever they want, a myth that unfortunately persists in the public discourse (Thompson, Kowch, &

Gereluk, 2016). Further, while public charter schools fund the basic education amount for students, they do not fund the innovation. New Humble Community School (NHCS), where I am conducting the study, has raised over \$230,000 CAD at their annual fundraiser. Donations and sponsorship for infrastructure (e.g. barn, livestock, feed, propane, expertise, labor) are central to the success of the agriculture program. To provide a sense of community support, the first fundraiser in the school's inaugural year raised \$46,040 CAD, \$77,570 CAD in its second year, and \$112,941 CAD in its third year. The school is currently in its fourth year of operation, and received approval to expand to include grades 7 to 9. In Alberta it is the only agriculture immersion program at the elementary school level that delivers Alberta curriculum through agriculture, rather than as an extracurricular program. The school framed its charter around the National Agricultural Literacy Outcomes (NALOs) (Speilmaker, year), but has since developed a framework to align with local needs and foci.

According to the Alberta Education School & Authority Index (2024), there are currently 22 charter school authorities in Alberta. Following school closure, parents and community members collectively reimaged New Humble Community School as a public charter school focusing on agricultural literacy, experiential learning and land stewardship. It began operation in 2021 as a K-6 school. This is when I was invited to discuss a potential study on the school, as public charter schools in Alberta are mandated to conduct research so that other school authorities can benefit from their innovation. Following a community-based philosophy, we held a community dinner to discuss potential research directions. Throughout the data collection, a recurring theme was how these K-6 students seemed to differentiate between learning and school, which compelled me to further explore how an agriculture immersion program shapes students' relationship with school.

Literature Review

Decades ago, Zilbert and Leske (1989) argued that “agricultural education has always had a strong orientation toward learning by doing (p. 1). More recently, in their review of literature on agricultural literacy among school-aged students, Cosby et al. (2022), reconfirmed the importance of providing students with formal and informal experiences so that students make connections that will support “understanding of the breadth and influence of agriculture’s production processes, [and] overcome negative perceptions and stereotypes” (p. 10). In these statements Dewey’s (1938) philosophy endures. Dewey believed students cannot develop intimate knowledge of any subject matter without having direct and meaningful experiences.

Studies have confirmed that because of its hands-on nature, agriculture has a positive impact on academic outcomes and school experiences for students (Knobloch et al., 2007), but most of the literature is based on episodic experiences, and primarily document Grade 7 through 12. STEM and agriculture are a natural fit, which may explain the research attention to sciences and mathematics at higher grades. Compared to direct instruction, experiential learning has shown to improve students' concept attainment (Baker & Robinson, 2016). There is also a strong empirical spine suggesting that agriculture leads to higher scores on creativity and practical intelligence (Bradford, 2016), better retention, higher order thinking, and future application of concepts (Arnold et al., 2008). Farming simulations have shown to increase students' entrepreneurial knowledge, willingness to set challenging goals, take initiative and risks, and display “diligence, innovation and efficiency in goal attainment” (Brown & Knobloch, 2022, p. 97). When it comes to elementary schools, gardening predominates. Here, too a narrow curricular focus is evident, with most research aimed at scientific concepts, nutrition knowledge, and changing children's food behaviour (Triador et al., 2015). Nonetheless, the list of qualitative benefits from gardening is long: enthusiasm, motivation, pride, teamwork, bonding, self-esteem, work skills, aesthetic appreciation, independence, level of activity, and delayed gratification (Casey et al., 2019; Hershey & Parks, 2022). While the literature helps us to understand the value of agricultural and experiential learning via projects, we do not have insight into how an immersive agricultural experience across the curriculum may create additional value for and enhance schooling experiences for elementary students. Nor do we have this insight from the younger students themselves. My study is a corrective in these ways.

Methodology, Conceptual Framework and Methods

Because New Humble Community School is the only K-6 agriculture immersion school in Alberta, it is what Stake (2005) called an intrinsic case. A pilot (Winter 2023) preceded the current data collection (commenced, Fall 2023). This poster presentation is based primarily on individual interviews with 53 K-6 students (See Appendix A for full list of data sources). Some students participated in a walking interview (Evans & Jones, 2011), using a GoPro to capture wholistically students' experiences. Prompts like "teach me to (e.g., approach an animal)" created a space for students to share their learning in a more natural, age-appropriate, and perhaps even a poetic way. When a grade 2 student, for instance, told me they enjoy learning outside because they "get to see the wonders of nature", I felt compelled to see the data—and students' learning potentially—beyond conceptual. For this reason, I was inspired to explore the data through Beeman's (2006) "attentive receptivity" which they define as "well-intentioned, kind-hearted, being-in-listening [where]... the greatest possible connection is made with the world-not-human" (p. 210). The connection is not simply to place, but to "source of life" which occurs through "livelihood labour" (p. 203). At whatever level students are able to do them, chores are the livelihood labour. These students have a farm to keep alive. Attentive receptivity has been explored through adults, but my study aligns with the new sociology of childhood which assumes "research ought to approach children not as social "becomings" but as social "beings"... and as active and diverse social participants in their own right" (Wall, 2019, p. 258). I aim to privilege young children's voices, and am intrigued by what I see in the data regarding how these students' learning from and with the animals and plants—their "peerless co-teachers" as Blenkinsop and Beeman (2010, p. 31) would call them—assigns meaning and direction to curriculum, helps students to see long-term value in their schooling, and leaves them with awe and wonder. Thematic analysis was conducted to attend to key insights into how these students experience school through agriculture.

Research Highlights

In this section, I provide a brief summary of interpretations that have been made at this point in the study.

New Humble Community Students all have an opportunity to interact with animals in the barnyard, although Grades 4-6 students can apply and interview for a job to be a "manager" of one of the animals on the chores team. At an early stage, students are already learning how to self-assess their skills and interests, and to take risks at doing something they might never have done before. The responsibilities that students take on are adult-like. The chores team is overseen by an adult agriculture director, but they do not micromanage the students once they are trained for their jobs. Rather, a student in a higher grade is a General Manager, and this is the person to whom all members of the chores team direct their questions. I have tagged along on many chore sessions so I can confidently claim that students take their roles seriously, and they work as a team, but also know they are individually responsible. The care of animals demands students have a strong work ethic. Furthermore, caring for the animals involves adult-like, high-stakes responsibilities, and this perhaps explains why the students are so keen to secure a position on the chores crew. They learn accountability by caring for the animals because mistakes cannot be hidden, and consequences are real. If someone gives the wrong feed to an animal, for example, illness will signal the error. At NHCS, however, students are not penalized for honest errors, but rather, are encouraged to learn from them. Students take pride in this aspect of their schooling because as one student said, it gives them purpose.

Animal and plant care, and land stewardship helps students develop an environmental ethic. Students do what is right even when no one is watching because they know that the health of the animals or the growth of the garden, for instance, depends on their actions. When I asked students questions about land stewardship, many of them reported that we need healthy animals and plants so that we can eat healthy food. Many students knew that plants played a key role in the air we breathe, and so they internalized behaviours to treat nature well. They developed what Beeman (2006) called "attentive receptivity regarding nature. It was often surprising to me, how these students considered the tiniest of

creatures. One afternoon when a Grade 3 class was feeding the compost worms and cleaning the container, one student picked up some worms, held them up to her face and said, “I like holding worms because it helps me to respect nature.” My research assistant and I were stunned at this unprompted statement. Another day during recess I observed a group of students gathering up moss and grass, and carrying it to an area on the field. When I asked them what they were doing, they said they were piling it up to feed the insects. They were not sure whether the insects would eat it, but they were trying. They were clearly developing an attitude of responsibility for all living things.

NHCS is not a huge entrepreneurial site; however, all animals (except Domino the rabbit, perhaps) serve a purpose to provide food. Students tell me that any new animals that are introduced must have a purpose. Every grade participates in planting and harvesting a vegetable garden. When the broilers are butchered, they are sold. When the vegetables are picked, they are bagged and sold. Students reported to me that they have learned to appreciate how much work it takes to raise food. At a time when many Canadians (perhaps Americans too?) are alienated from their food sources, NHCS students are learning not only the sources of their food, but are closely connected to production. Appreciation for the labor-intensive nature of growing food may contribute to ethical purchase and use of food, something that is increasingly important considering a growing concern about food wastage. Furthermore, students develop oppositional thinking, the ability to see pets as companions and food at the same time. The cattle are given names, but the students understand that in June they will go to market. When I asked one of the students how they felt about seeing animals go to market, one told me that was reality. “There is livestock and there is deadstock” this student said. Developing resilience is a key outcome for these students. More than one animal has died from disease or predator, and while students say it makes them sad, they handle it with maturity.

A famous project that one of the teachers conducts with their class is the “Soiled Underpants” project in which students bury cotton underwear in various places around the school yard, barnyard, and garden to test soil health (Soil Conservation of Canada, 2024). This is an inspiring project for more than one reason. First, students bury the underwear in Fall, and excavate in Spring. This means they wait about seven months before they get to see the results, which instill patience. In a world of instant gratification, these students learn how to delay gratification. When the day arrives, students learn how to hypothesize about the underwear, and they get to use their “science words” to explain how microorganisms are responsible for breaking down the underwear, and they know that cotton is a natural fiber. Last year when I attended the excavation, there was one location where the students could not locate the underwear. This was a pile of straw and manure from the animals’ pens. I watched in amazement as students developed a team to locate the underpants in the huge pile. They got a group to dig with shovels, they figured out they should build a trench so that it would be easier for the person hauling the materials with the wheelbarrow. On that day, they dug and dug, but they did not find the underpants. Recently, I observed while another class started the experiment by burying the underpants. The teacher told me that last year’s class went out at recess every day to dig in the pile. They dug for a week and finally found the underpants. This is an excellent example of what Metcalf & Kornell (2007) called “desirable difficulty”, a pedagogy that engages students in learning by challenging them, but the challenge is just enough to give them a sense of confidence. Challenges that are too easy create boredom; challenges that are too difficult, cause students to give up. NHCS students see school as a place where they participate in projects that help them understand something about the world that surrounds them – in this case, land.

Agriculture is by nature an inter-disciplinary enterprise. This supports cross-curricular connections. When students are involved in solving problems in the barnyard, they are able to apply knowledge and skills to real-world problems. For instance, the students noticed that the steers were laying in straw in the open pen rather than in their shelter. They figured out that the shelter is shaded, so the steers seek the sunshine, but end up getting quite dirty. The class worked on proposals to improve the cattle pen, and some students presented their solution to the Board of Trustees. In this one project, students were applying knowledge and skills from math (measurement), science (weather), social studies (democracy and decision making), and language arts (writing and public speaking). Epstein (2019)

emphasized that interdisciplinary learning helps students build abstract models for problem solving. NHCS students are learning that content is not inert; what they are learning has practical value and use.

Among the most heartwarming observations I have made at the school involve children's interactions with the animals. I have witnessed these young students bottle feeding a lamb, cradling chickens and ducks, cozing up to the bunny, leading the goats around, and petting the pigs and the cattle. I was impressed with how calm the students were, and how they politely remind each other not to run in the barnyard, not to approach animals aggressively, and to share time with the animal. Students tell me that they sometimes seek out the animals to calm down, so they are learning skills of self-regulation. Moreover, these students are practicing nurturing behaviour. Animals are excellent sites for relationship work because there is little guesswork with animals. Animals present themselves as they are, and once you understand how to read them, which many of these students do, then students can approach them with confidence. Animals differ from people because, as one student told me, they "don't talk back" and "they don't judge" or "give opinion." Students can trust them. According to Melson's (2003) research, the importance of animals for children is that, unlike with human babies, nurturing is gender- and age-neutral. Melson claimed that around the age of eight boys tend to stop nurturing behavior with babies, but there is no age threshold or gender bias when it comes to nurturing behaviour with pets.

Awe and wonder are key for motivation and engagement (Kelly, 2007). I have definitely noticed that animals have more of an appeal to the students than plants, but I have heard squeals of delight when students discovered the tiniest of creatures. An afternoon of pond dipping, for example, had every student curious and invested. I thought tiny bugs found in creek water would be uninspiring, but the students were excited when they could find things in their little cups, and then could identify them on the legend the teacher gave them. Discovery is natural for students, and in a school where there are frequent interactions with the natural world, children's natural curiosity comes alive. An indelible statement was made by a Grade 2 student who told me that they enjoy learning outdoors because they get to see "the wonders of nature." What could be more inspiring than that?

NHCS has a motto: "Not all classrooms have four walls." Teaching through agriculture helps students see that the world is a co-teacher, as Blenkinsop and Beeman, (2010) described it. When asked whether it was important to learn about agriculture, all students from K-6 claimed it was. Older students could connect agriculture to animal health, food production, and the environment, but the youngest students' claims that it will make you "smart" was telling for me. Students love learning, but when learning is confined to a desk and a classroom, it is still engaging for some, but for a lot it is not. Agriculture gets them in touch with a living world, and while a video about agriculture or nature can be interesting, students like that they can see "details" in the real world. Furthermore, even though a lot of NHCS students do not live on farms or in the country, agriculture is a key economic base in the surrounding community and so their learning has resonance with what they see and hear around them when they are out of school. One parent told me that their child had a conversation with a community member about cattle that they knew could not have happened had they not learned about it at school. The students, then, have a link to those who do not attend the school, including farmers, business owners, and neighbors. This creates a connection to place (Gruenewald & Smith, (2008), and perhaps helps students see the "why" of their schooling. Even if they do not always realize they ARE learning.

Conclusion

Children's language and actions are powerful for conveying what school means to them. Hands-on agriculture and nature-based activities feel distinct from conventional schooling. Without the boundaries of the classroom walls or desks, students have practical engagement in what they are learning. This brings out not only curiosity, but joy. When students experience wonder, they will 'linger' in their learning. They see their learning connected to something important in a way that seatwork perhaps does not translate. A key insight I have gained from these students in terms of how agriculture shapes their relationship to schooling is that not liking school does not necessarily equate to not liking learning. A compelling question then is, what is *school* felt more like *learning* for ALL students?

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Appendix A: Data Sources

Data sources:

- Individual interviews with K-6 students (2 students were interviewed twice spanning over the 2023-2024 and 2024-2025 school years):
 - K = 3
 - Gr. 1 = 8
 - Gr. 2 = 8
 - Gr. 3 = 12
 - Gr. 4 = 5
 - Gr. 5 = 9
 - Gr. 6 = 5
 - Student Alumni (Gr. 7 at another school) = 2
- Individual interviews with teachers and staff (n=7) (one teacher interviewed twice)
- Individual interviews with parents (n=12) (two parents interviewed twice)
- Individual interviews with community members (n=5)
- Web-based parent survey May 1 – 31, 2024 (n=29)
- Observations of learning: indoor and outdoor classroom learning (e.g. pond dipping; tree planting; composting), in-school field trips (e.g. making cars, solar system, virtual reality goggles), special events such as Ag/SEED days, science fair, guest presentations (e.g. Cowboy poetry)
- Interviews with:
 - K-6 students
 - parents
 - teachers
 - school staff
 - community and agri-sector members
- Observations of learning
- Web-based parent survey