

Screech owls, Super Soakers, and school gardens

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January 29, 2024

Project-based learning can promote and foster students' literacy motivation and engagement.



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Leon, in his efforts as a student ornithologist, surreptitiously attempted to slip a field guide into his backpack before his conscience got the better of him: “I had one in my backpack, but I had to put it back in the box. I didn’t really ask. I just wanted to keep it a secret so I can just learn more about the eastern screech owls.” Leon was a student in a classroom we were observing in a study of how elementary-grade teachers integrate literacy learning in the context of project-based science instruction. Over a year of observation, we were encouraged by the motivation and engagement of students in these classrooms.

For example, teachers found themselves in the unfamiliar position of hiding books. One teacher told us, “I kept [a book about the NASA scientist and designer of the Super Soaker, Lonnie Johnson] in the closet because I thought, ‘OK, this book is really going to end up not coming back to the shelf.’”

Teachers commented on students’ excitement about reading and their willingness to try challenging text:

I ... was able to see the excitement from them, whether it was a book [or] when they read something online ... even some of their independent projects, they spun off of what we were doing in science or wanting to use their Chromebooks to look up information.

Students’ inquiries were not limited to the classroom. A teacher told us:

We’d be out on the playground and the kids would be so excited if they saw a bird or saw a smaller bird, probably a sparrow, going after a hawk and they would ask, “Why does that sparrow keep following that hawk up there?” I’ve heard the kids out there talk about the types of wings they have and [say things like], “Oh, I bet those are up there ... I bet that ... they’re looking for little mice or something down in that field.”

This teacher attributed these shifts in student behavior to “confidence as a learner,” that grew from the reading, writing, speaking, and listening that were part of project-based learning (PBL).

Leon’s motivation to learn more about the eastern screech owl led him to consider absconding with a resource. The students’ curiosity regarding the habits and habitats of birds they were learning about led them to notice the world around them and question what they saw. The students’ excitement about pursuing knowledge spurred them to grapple with challenging text sources.

PBL has long been recognized as a classroom approach that can motivate and sustain learning (Blumenfeld et al., 1991). Thoughtful and supported integration of text and reading into PBL can motivate and engage students in literacy and reading.

AT A GLANCE



- Students can be motivated to read when given high-quality reading instruction and materials, as well as meaningful and engaging purposes for which to read.
- Project-based learning (PBL) is a multifaceted instructional approach that is motivating and engaging.
- Research shows that PBL can promote and encourage student engagement in literacy activities.
- The SMILE concept — sharing, me, importance, liking, engagement — can guide the design and teaching of PBL that fosters reading motivation and engagement.

Focus on reading in project-based learning

As educators, we owe it to students to provide access to high-quality reading instruction and materials, as well as meaningful and engaging reasons to read. Early reading proficiency is a predictor of later school achievement and life outcomes, and students' access to research-based instructional practices beginning in the elementary grades is a critical educational and social issue. Recent research indicates that instruction designed to foster reading motivation has significant effects on both the reading motivation and achievement of K-12 students (McBreen & Savage, 2020).

Reading is integral to learning across disciplines. It is not possible for children to learn all there is to learn from firsthand investigations of the natural and social world. The need for literacy is even more pressing as information proliferates on the internet and as we confront a range of increasingly complex issues that call for an informed citizenry.

PBL provides an opportunity for students to use inquiry learning to ask and answer questions about the world around them. As they engage in inquiry, learners must be mindful about the purpose of the inquiry and attentive to the relationship between the question guiding the inquiry and the investigation itself. They must also be able to monitor the progress of the inquiry in terms of how well it is advancing their understanding. Integrating texts in inquiry-based disciplinary learning can promote important general literacy skills, as well as provide an opportunity to acquire information about the world and learn specific academic language. PBL provides a compelling — motivating — context in which students can practice their literacy skills and experience the benefits of literacy.

Integration of text in project-based learning

PBL is an instructional approach that enhances students' conceptual knowledge as well as their motivation and engagement (Blumenfeld et al., 1991; Condliffe et al., 2017). Joseph S. Krajcik and Namsoo Shin (2014) described six characteristic features of PBL learning environments:

1. The use of “driving questions” that are meaningful to students and anchored in real-world problems (e.g., *How can we design gardens to grow plants for food in our community?*).
2. A focus on standards-aligned learning goals, such as the Next Generation Science Standards or the Common Core State Standards for English Language Arts.
3. Student participation in disciplinary practices to solve problems, such as hands-on investigations.
4. Collaboration among students, teachers, and others in the community to address driving questions.
5. The use of cognitive tools, such as digital technologies, to scaffold learning, inquiry, and collaboration.
6. The creation of artifacts that address driving questions.

We are struck by the overlap in these features of PBL and findings from research on the characteristics of motivating and engaging instructional contexts for literacy learning.

For example, while not described as a project-based curriculum by its designers, Concept Oriented Reading Instruction (CORI) embodies many of the features of PBL that Krajcik and Shin (2014) described. Informed by their research on reading motivation, John T. Guthrie, Allan Wigfield, and colleagues designed the CORI program of research to investigate the hypothesis that key to the improvement of reading is *engagement*. That engagement is attained when learners are provided rich conceptual challenges that they pursue in collaboration with others, supported by strategies that promote self-directed learning (Guthrie & Wigfield, 1997). The designers of CORI chose science topics and hands-on activity as the rich conceptual space that could lead to engaged reading along with teachers' instructional practices of choice, collaboration, relevance, success, and thematic units. Students who participated in CORI reported greater intrinsic motivation for reading and greater self-efficacy (Guthrie, McRae, & Klauda, 2007).

Research on CORI provides some promising evidence that instructional contexts that share features with PBL have the potential to foster literacy motivation and engagement. More recent research on PBL approaches that integrate literacy and disciplinary learning — including social studies and science — in elementary classrooms provide additional empirical evidence to support these ideas. For example, in Project PLACE, an integrated literacy and social studies PBL curriculum, the students of teachers who implemented PBL instruction with fidelity demonstrated significantly higher levels of motivation than students who did not participate in PBL (Duke et al., 2021).

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Research on the Multiple Literacies in Project-based Learning (ML-PBL) curriculum, which integrates literacy and science instruction in elementary classrooms, also provides evidence that PBL has the potential to foster literacy motivation and engagement. Students who participated in ML-PBL self-reported significantly higher skills in collaboration, which can promote social motivation (Krajcik et al., 2023). Finally, in a case study of one 3rd-grade teacher's enactment of the ML-PBL curriculum, Miranda Fitzgerald (2020) found that the teacher used instructional practices that foster social motivation, valuing, and intrinsic motivation.

Together, the findings from research on Project PLACE and ML-PBL provide promising evidence that PBL is a productive way to promote literacy motivation and engagement.

Designing PBL to enhance reading motivation and engagement

Guthrie and Wigfield (2017) introduced the acronym SMILE to represent multiple dimensions of reading motivation and engagement and to guide teachers' instructional practices.

- S is for sharing.
- M is for me.
- I is for importance.
- L is for liking.
- E is for engagement.

Building students' motivation and engagement requires intentional planning that incorporates these dimensions. Examples from our own work with elementary-grade teachers on the ML-PBL project illustrate how to accomplish this.

Sharing

The s in SMILE stands for *sharing* or *social interaction*, which can promote students' social motivation. Teachers can promote social motivation in the classroom by providing opportunities for students to collaborate during reading or by presenting students with meaningful tasks that allow them to obtain and share information with others both within and beyond the classroom.

In one 3rd-grade ML-PBL unit, students investigate the driving question, "Why do we see so many squirrels, but we can't find any stegosaurus?" The nine-week unit focuses on NGSS-aligned science learning goals related to structure-function relationships, organism adaptations, and ecosystem interactions. Throughout the unit, students have multiple opportunities to collaborate and communicate learning with their peers. For example, students read texts to obtain and share information during jigsaw activities (Aronson, 1978) about the kinds of squirrels they see around their schools and homes, as well as other organisms in the squirrels'

environment (e.g., garter snakes, oak trees). Students then use the information they learned from text, firsthand observations, and video observations of squirrels and other organisms to collaboratively develop and revise scientific models. They draw and label the models to explain how squirrels survive in their habitats and how their interactions with other organisms affect their survival.

Me

The *m* in SMILE stands for *me*, or the self-efficacy dimension of motivation. Self-efficacy is related to students' perceptions of their ability to succeed at a challenging task. One approach to fostering students' perceptions of success related to reading is supporting them to build background knowledge before reading. When instruction is organized around conceptually coherent topics and aligned with meaningful learning goals, students can see connections within the curriculum and connect new learning to background knowledge.

Because PBL environments focus on a driving question anchored in real-world problems, project-based units cohere around a particular set of topics or related disciplinary ideas. This gives students multiple opportunities to build knowledge about a set of ideas. As students build new knowledge throughout a project, they bring that knowledge to each new text they read. This contributes to their perceptions and experiences of success within their literacy learning.

A nine-week PBL unit focused on force and motion, systems and systems models, and engineering design is guided by the driving question, "How can we design fun moving toys that other kids can build?" During the unit, students investigate moving toys, build prototypes, and revise their designs to optimize toy performance. One of the toys they investigate and read about is the Super Soaker. Before reading the book *Whoosh! Lonnie Johnson's Super-Soaking Stream of Inventions* (Barton, 2019), students have examined a variety of moving toys to learn about the role of pushes and pulls in force and motion. They've also examined the design of a Super Soaker and tested its performance against other water squirters. The background knowledge they've built related to force and motion and engineering design can support their comprehension of important ideas in the text.

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Students' perceptions of success and challenge also can be addressed through incorporating learning scaffolds that model cognitive processes and give structure to complex tasks. ML-PBL does this in a variety of ways, including through students' participation in interactive read-alouds, in which the teacher reads a text to students and facilitates discussion of the text. While reading, the teacher models cognitive processes related to engaging in disciplinary literacy practices, such as developing scientific models or constructing scientific explanations.

Importance

The *i* in SMILE stands for *importance* or value. Teachers can promote students' valuing of literacy tasks by framing literacy activities as important and useful. When students perceive their purposes for reading and writing to be meaningful, they are more likely to be motivated to participate in those tasks. PBL promotes importance through the use of a driving question that is meaningful to students and connected to real-world problems. The driving question in project-based instruction fosters students' valuing of project-related tasks and drives their "need to know" (Krajcik & Shin, 2014; Parker et al., 2013).

In another nine-week unit guided by the driving question, "How can we help our local birds survive and thrive?" students read and interpret a variety of texts and engage in firsthand investigations. They then come up with solutions to help birds in their community. For example, students consult field guides to identify the habitat and food sources of local birds. They examine migration maps to determine which local birds migrate and when they are present in their community. They also play a migration game, reading and learning about the different obstacles that threaten birds on their migration journeys. Finally, they participate in an interactive read aloud of the book *Beaks!* (Collard, 2002) to determine how particular birds' beaks are adapted to eat particular foods. These reading activities help students address the driving question and propose design solutions, such as birdhouses and feeders that are designed to meet the needs of specific birds in their community. In this example, students' "need to know" about birds' food sources, structures (e.g., beaks), predators, and migration patterns to address the driving question provides a compelling purpose for reading.

Liking

The *l* in SMILE stands for *liking*, or intrinsic motivation. Teachers can foster students' intrinsic motivation by providing literacy learning opportunities that are relevant to students' firsthand experiences in the classroom or their lives outside the classroom.

Similarly, the driving question in PBL instruction centers on real-world problems that are relevant to students' lives and communities. Another feature of PBL that can promote intrinsic motivation is engaging students in disciplinary practices to solve problems. In the case of science instruction, students make firsthand observations of phenomena and plan and conduct firsthand investigations to address the driving question. Providing opportunities for students to make meaningful choices in the context of literacy activities can promote intrinsic motivation as well.

In a final ML-PBL unit guided by the driving question, "How can we design gardens to grow plants for food in our community?" students connect multiple reading experiences with firsthand investigations and design solutions. In one example, students choose and examine seed packets to learn how to plant and cultivate the seeds for growth in their school garden. They then observe the growing conditions around their school (e.g., amount of shade, type of soil) to identify an optimal location for the garden. Students also participate in an interactive read-aloud of the book, *In the Garden with Dr. Carver* (Grigsby, 2010) to identify features of the environment described in the book and that they have observed around their school. They plan and conduct an investigation to determine how different features of the environment affect the growth of particular plants. Finally, students observe and graph the weather (e.g., precipitation, temperature) in their community over time and study local weather patterns using climate data to identify plants that grow particularly well in their climate.

Students have other opportunities to make meaningful choices about reading as they engage in ML-PBL instruction. For example, across the four projects that make up the yearlong 3rd-grade curriculum, students make choices about which texts to read; what toys they want to build (and hence, read and write about); which seed packet they want to examine; how they will represent ideas learned from texts and firsthand investigations through scientific models; and what local bird they want to study and protect.

Engage

The e in SMILE stands for engage or literacy engagement. Key to literacy engagement is access to interesting, diverse reading materials and opportunities to spend time in authentic reading. PBL instruction fosters students' engagement in project-related tasks, including literacy tasks, and promotes students' need to know.

Across projects, the ML-PBL curriculum provides opportunities for students to engage in authentic reading through participating in interactive read-alouds as well as small-group collaborative reading (e.g., partner reading, jigsaw activities) and independent choice-based reading at school and home. The four previous dimensions of literacy motivation — sharing, me, importance, and liking — come together to drive students' engagement in multiple reading activities for meaningful purposes, all related to addressing a project's driving question.

Essential to fostering literacy engagement is providing students with access to interesting, diverse, conceptually coherent reading materials. The 3rd-grade ML-PBL curriculum includes a variety of informational and fiction trade books, as well as articles, videos, websites, interviews, and biographies. They all were selected to promote students' science knowledge-building related to standards-aligned learning goals and to connect to and enrich students' firsthand investigations.

One 3rd-grade teacher we worked with spoke to the value of pairing reading with firsthand experiences in PBL. She noted, "I'm so grateful that ... we've got a variety of read-alouds that really connect with what we're doing." She also noticed students' eagerness to read the variety of texts included in each project, mentioning, "The picture books, the field guides, the nonfiction — they can't get enough of it."

PBL and motivation

Motivation is a rich and multifaceted construct; furthermore, motivation and engagement are influenced by instructional context. Emerging research evidence from classroom-based studies investigating the implementation of PBL have found the model to be both motivating and engaging. We have further argued — and illustrated — how PBL provides a motivating and engaging context in which to teach students to read challenging disciplinary-specific text. Educators can use the SMILE concept to guide the design and teaching of PBL in a way that fosters reading motivation and engagement across grade levels.

References

Aronson, E., (1978). *The jigsaw classroom*. Sage.

Barton, C. (2019). *Whoosh! Lonnie Johnson's super soaking stream of inventions*. Charlesbridge.

- Blumenfeld, P.C., Soloway, E., Marx, R.W., Krajcik, J.S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26 (3-4), 369-398.
- Collard, S.B., III. (2002). *Beaks!* Charlesbridge.
- Condcliffe, B., Quint, J., Visher, M.G., Bangser, M.R., Drohojowska, S., Saco, L., & Nelson, E. (2017). *Project-based learning: A literature review*. MDRC.
- Duke, N.K., Halvorsen, A.L., Astrachan, S.L., Kim, J., & Konstantopoulos, S. (2021). Putting PjBL to the test: The impact of project-based learning on second graders' social studies and literacy learning and motivation in low-SES school settings. *American Educational Research Journal*, 58 (1), 160-200.
- Fitzgerald, M.S. (2020). Overlapping opportunities for social-emotional and literacy learning in elementary-grade project-based instruction. *American Journal of Education*, 126 (4), 573-601.
- Grigsby, S. (2010). *In the garden with Dr. Carver*. Albert Whitman & Company.
- Guthrie, J.T., McRae, A., & Klauda, S.L. (2007). Contributions of concept-oriented reading instruction to knowledge about interventions for motivations in reading. *Educational Psychologist*, 42 (4), 237-250.
- Guthrie, J.T. & Wigfield, A. (1997). *Reading engagement: Motivating readers through integrated instruction*. International Reading Association.
- Guthrie, J.T. & Wigfield, A. (2017). Literacy engagement and motivation: Rationale, research, teaching, and assessment. In D. Lapp & D. Fisher (Eds.), *Handbook of research on teaching the English language arts* (pp. 57-84). Routledge.
- Krajcik, J., Schneider, B., Miller, E.A., Chen, I.C., Baker, Q., Bartz, K., ... & Peek-Brown, D. (2023). Assessing the effect of project-based learning on science learning in elementary schools. *American Educational Research Journal*, 60 (1), 70-102.
- Krajcik, J.S. & Shin, N. (2014). Project-based learning. In R.K. Sawyer (ed.), *The Cambridge handbook of the learning sciences* (2nd ed.) (pp. 275-297). Cambridge University Press.
- McBreen, M. & Savage, R. (2020). The impact of motivational reading instruction on the reaching achievement and motivation of students: A systematic review and meta-analysis. *Educational Psychology Review*, 33, 1125-1163.
- Parker, W.C., Lo, J., Yeo, A.J., Valencia, S.W., Nguyen, D., Abbot, R.D. . . . & Vye, N.J. (2013). Beyond breadth-speed-test: Toward deeper knowing and engagement in an Advanced Placement course. *American Educational Research Journal*, 50 (6), 1424-1495.

This article appears in the February 2024 issue of *Kappan*, Vol. 105, No. 5, pp. 26-31.