The Beginnings of Engineering Design in an Integrated Engineering and Literacy Task

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Abstract: In *Integrating Engineering and Literacy* (IEL), students identify and engineer solutions to problems that arise for fictional characters in stories they read for class. There are advantages to this integration, for both engineering and literacy goals of instruction: The stories provide "clients," to support students' engagement in engineering, and understanding clients' needs involves close attention and interpretation of text. Results are encouraging, but mixed, in part for variation in how students frame the task. For instance, while students often pay close attention to the stories, interpreting and anticipating their fictional clients' needs, they sometimes focus more on the teacher and what they think she would like to see. This variation occurs both within and across groups of students, and it motivates studying the dynamics of student framing. Here we examine two students' stability in framing their work as nascent engineers.

Introduction

The following excerpt takes place in a fourth grade classroom in a rural Massachusetts town. The students are involved in an Integrated Engineering and Literacy (IEL) design task based on the book Shiloh, by Phyllis Reynolds Naylor. They are to design and construct a small scale model of a dog pen for Marty, a young boy trying protect Shiloh, a small beagle, from an abusive owner. Ms. C, the students' teacher, has explained they are to use craft materials (e.g., cardboard, tape, glue, felt) to create a model that will "fit on their desk." She noted that their designs will be "tested," but she does not say how. Stella and Alexi are working on their sketch (Figure 1) when Ms. C asks them about their design.

Ms. C: What kind of entrance is it?
Stella: It's…
Alexi: Just a little door, like the walls are two feet.
Ms. C: Two feet thick? Or two feet high?
Alexi: No, two feet high.
Ms. C: Two feet high, okay.
Alexi: I wrote it on this side somewhere (flipping over the paper), here it is. Oh yeah, oh, it's three feet.
Ms. C: Three feet! Wow. Why three feet, what made you decide three feet?
Alexi: Um… so it wouldn't be too short, like when Marty wants to go in, since it has, like, that glass that doesn't break on the top, he doesn't have to scrunch down (positioning her body to make scrunching gesture).
Ms. C: Ah, so Marty could go in as well?
Alexi: Yeah.
Ms. C: Alright, very cool. Did the graph paper help you guys draw your diagram?
Alexi: Yeah.
Stella: Like, she did six squares that way, and then eight squares that way (pointing to lines sketch).
Ms. C: Oh, so you're using *measurement* as well, excellent work!
Alexi: (to Stella) And now, you can draw the bolts (pointing to outer edge of hexagon)…
Stella: Okay. Right, so the door is, like, right here. Okay?

Stella and Alexi continue discussing the advantages and disadvantages of entrance locations, adjusting their sketch.

Our first purpose in this paper is to argue that Stella's and Alexi's considerations and reasoning evidence nascent abilities for engineering design. For example, Stella and Alexi consider their clients and what might help them, and they use graph paper to generate an appropriate scale. Explaining their estimate of "three feet," Alexi describes the possibility of Marty needing to enter the tunnel and a height that would allow him to fit comfortably. Like engineers, they negotiate criteria (e.g. access, height, location) and constraints (e.g., abutting glass elements), and they "prioritize the needs of their clients" (Ropohl, 1997, p. 70).

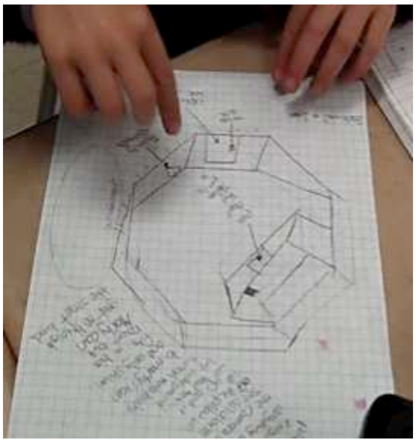

Figure 1. Design sketch

Our second purpose is to consider how Stella's and Alexi's pursuit of a design solution reflects their understanding of what it is they are doing. It is one thing to have abilities, for example, to scale a diagram; it is another thing to recognize a need to make use of those abilities. For the girls, scaling their diagram to "real life" was not part of their assignment; they recognized a need to scale in order to support their thinking about their design. That is, part of the dynamics of their activity in this moment involves their understandings of "what is it that's going on" (Goffman, 1974, p. 8), for their client in the story as well as for them in the classroom, in other words their *framing* (Goffman, 1974; Tannen, 1993).

In the following sections, we discuss the construct of framing, in particular of epistemic activity (Redish, 2004; Hammer, Elby, Scherr & Redish, 2005), in a classroom setting and as applied to research on engineering (Dym, Agogino, Eris, Frey, & Leifer, 2005; Schön, 1983; Vincenti, 1990). We then turn to Stella and Alexi to interpret how they frame what they are doing, in particular to their stability in framing: The girls show resilience in their understanding the activity as involving designing and presenting their ideas for the fictional clients. In this we propose that part of their stability was their involvement in the story itself, including their empathy for the characters. We close the paper with a discussion of further questions for research and possible implications for instruction.

Framing

In a given situation, whether it involves playing soccer, learning science, or designing a bridge, people form a sense of what is taking place, what researchers have called a "frame" (Goffman, 1974; Tannen, 1993). Forming that sense, or "framing," reflects structures of expectations formed from previous experiences (Tannen, 1993). In these accounts, frames are knowledge structures that both shape and are shaped by experience, and framing is a dynamic interaction between expectations and perceptions. Frames are not static, rigid structures, but are active and responsive, perpetually evolving as they are informed, shaped, and tuned with new experiences; in this sense, they are "schemas" (Bartlett, 1932) of activity. "One's structures of expectation make interpretation possible, but in the process, they also reflect back on the perception of the world to justify that interpretation" (Tannen, 1993, p. 20-21).

For Stella and Alexi, part of the challenge was to form a sense of their task, engineering for Marty and Shiloh, and that would involve their tapping into patterns of their previous experiences of telling stories, doing projects in school, making things, and so on. Part of the challenge, too, was in understanding the situation in the story. Their experiences similarly shaped their comprehension of the novel, in structures of expectations about caring for dogs, ownership and protection, and so on. At the same time, their experiences in this task contribute to those patterns, perhaps helping them understand future experiences. Reading the story, for example, may be their first encounter with the idea of an abusive owner; designing the protective pen may be one of their first experiences of engineering.

Epistemological Framing in a Classroom Setting

There are many aspects to framing, at multiple scales and with complex, nested relationships. Someone baking has an overall sense of what baking involves, but may cue finer-grained framings within subtasks of measuring, mixing, frosting, etc. In Stella's and Alexi's case, their framing of being students in a classroom may be constituted by expectations for sitting at their desks, listening to their teacher or an adult in charge, and enacting certain actions for specific time blocks. Within that, they may activate frames for "learning science" that involve experimenting and making sense of phenomena, and other frames for "learning spelling" that involve memorizing sequences of letters. Thus, across and within different activities or classroom contexts, students activate and tune their expectations, including with respect to knowledge and learning, that is their "epistemological framing," (Redish, 2004).

Research in science education has paid significant attention to students' expectations with respect to knowledge. A variety of studies have documented students experiencing science class as focusing on the authority of the teacher or textbook (Lemke, 1990; Jimenez-Aleixandre, Rodriguez & Duschl, 2000; Hammer, 1994; Redish, Steinberg & Saul, 1998), rather than on making tangible sense of natural phenomena. In these cases, students frame what they are doing as memorizing, storing, and reproducing known information, rather than, for example, producing and assessing knowledge. Recent accounts have built on this work by attending to the local dynamics of students' framing (Hammer, 2004; Louca, Elby, Hammer & Kagey, 2004; Rosenberg, Hammer & Phelan, 2006), evidencing the sensitivity to features of context and social interactions. Researchers' findings indicate that for students to be actively learning science, they must not only frame what they are doing as sense-making about natural phenomena, they must do so with stability**, e.g.** for resilience against the familiar "classroom game" (Lemke, 1990) that focuses less on the natural world than on the authority of the teacher or text (Hutchinson & Hammer, 2010).

In this work we study how students frame their work in engineering. We are interested to understand aspects of framing that are productive for engineering as well as in the local dynamics, stabilities, and variations. As in science, students may frame what they are doing in ways that are counterproductive for engineering, including following a sequence of steps (e.g., Massachusetts Curriculum Frameworks, 2010), or assuming there is a single "right answer" (Johnsey, 1995, 1997; Hennessy & McCormick, 1994; Welch, 1995). Accordingly, research in engineering education often focuses on students' abilities follow these steps, such as planning in the beginning of a design endeavor. In such cases, when students do not follow the prescribed sequence (e.g., planning while constructing), they may be diagnosed as lacking in engineering ability. A framing perspective, however, offers an alternative possibility: Students' understanding of what is taking place have them invoke abilities they have, e.g. for planning (Portsmore, 2010). This motivates attention in engineering education beyond abilities, both in interpreting students' work and in planning objectives for lessons, in particular to cultivate productive framings for engineering.

Productive Framing in Engineering

A view of framing sees engineers' understanding of design as involving patterns of familiar experiences, tuned to the particulars of situation. This is the heart of schema theory; a schema is "an active organization…of past experiences" (Bartlett, p. 201), active to include local tuning As Schön (1983) describes, engineers "are not confronted with problems that are independent to each other, but with dynamic situations that consist of complex systems of changing problems," (p. 16). In "making sense of a situation" (Schön, 1983, p. 40), an engineer maintains a heightened awareness of the overarching design task, while attending to the multiplicity of interacting subtasks (Dym et al., 2005). Accordingly, design tasks generally involve subtasks, and this is part of engineers' framings. For example, an engineer's framing of a bridge design project may involve optimally meeting the client's needs while adhering to situational constraints. Within this overarching framing, the engineer is simultaneously recognizing subtasks, such as researching the environment, developing and analyzing computer models, and negotiating with contractors and community members. At each decision juncture, the engineer must reflect on the big picture, recognizing clients' needs and design constraints, and respond with appropriate modes of reasoning and action, such as analyzing, evaluating, constructing, etc (Trevelyan, 2010).

Analogously, students' framing of an IEL task may involve reflecting on the story and responding to characters' needs. Our early findings suggest that a story setting provides a sufficiently "messy" (Schön, 1983, p. 33) design context, in which story characters become clients with wants, needs, and potential dilemmas, and there are implicit physical, social, and economic constraints (McCormick & Hynes, 2012). Thus, in framing a complex design task as beginning engineers, students may recognize a need to reason, make decisions, and act as engineers: to develop an optimal solution for their client. We argue that engineering abilities, or "technical know how" (Ropohl, 1997), should not be our sole end goal in engineering education. Fostering productive framing should be a central target for research and practice, such that students recognize a need to use their engineering abilities.

Integrating Engineering and Literacy

This study is part of an NSF funded project at University *Integrating Engineering and Literacy*. The primary goal of IEL is to support elementary school teachers' incorporating engineering into work with children's literature. Participating teachers develop and implement IEL units using stories that are already part of their curricula. In preparation, teachers attend approximately forty hours of professional development per school year at Tufts University to work with researchers in developing lessons and implementation strategies.

Research Aim

Over the last three years, our research team has collaborated with teachers to explore IEL activities in elementary classrooms, with a variety of book genres, materials, and lesson structure. Much of our interest is to understand what comes or may come of these choices, in particular with respect to the students' learning of engineering design and development of literacy skills. We have noticed a wide spectrum of ways in which students engage in the assignment. For example, while some stay anchored in the story, others focus on what they think their teacher wants to see; while some stay focus on tangible mechanisms, other incorporate fantastical elements in their design. We see this variation as reflecting dynamics of students' framing, including where students direct their attention, what ideas they consider, and how they evaluate those ideas.

In this paper, we focus on a pair of students who, the evidence suggests, are stable in their framing. While many of their classmates respond to prompts in the classroom, apparently shifting from focusing on the situation for their fictional clients to focusing on their sense of the teacher's requirements, Stella and Alexi persist in designing a solution that fits within the story context. With this analysis, we aim to understand how they are framing the task, why they do so with stability, and how their framing supports their engagement in engineering design.

Research Setting

This case study comes from a in a fourth grade classroom in a rural town in Massachusetts, about forty miles from Boston. The teacher, Ms. C, had attended approximately thirty-five hours of professional development as part of the IEL project and was excited to try an IEL activity using the book <u>Shiloh</u>. She was devoted two hours per day for three days: Day One involved class read-aloud, discussing the major problems in the book, and starting individual plans; Day Two working with a partner on design plans and building, and Day Three finishing designs followed by group tests and presentations.

Data Collection and Analysis

Members of the researchers team are often in classrooms during IEL activities, providing materials, supporting teachers and students during building, as well as taking field notes and video recording. In this case, two researchers were present, including the first author.

The following draws from multiple viewings of the video in the research group, including consideration from multiple theoretical lenses to understand student engagement (Jordan & Henderson, 1995). Here we focus on evidence of framing (Tannen, 1993), in students' discourse, gestures, as well as writings and sketches.

Phases of the Task

In the following, we show three excerpts of Stella's and Alexi's work in chronological order. We highlight these moments to show evidence of how they frame the task, and the stability with which they do so. In the first excerpt, Stella and Alexi explain their design decisions, focusing on their fictional clients' needs. In the second and third, they show resilience in this framing against competing expectations regarding testing and evaluating criteria.

Design Considerations (Day One)

During the initial phase of their design, all of the students in class are working in pairs or groups of three to co-construct a sketch of a dog pen for Shiloh. When the materials for building (e.g., cardboard, paper, glue, etc.) become available, many students rush to grab them. Others, including Stella and Alexi, continue to work on the details of their design sketches. In the following, the first author asks the girls about their work.

Mary:	That's a cool design. What is, so what do you have?
Alexi:	It's like, in this [unclear], and there's a little lock, so Marty can just turn the lock, and there's a little door that Shiloh just fits in. And if the camera sees something that it doesn't recognize, like, if it's not Marty's family or something, or if it's something else, it'll, like, this door will go automatically open, and the pillow will come out, and there's underground tunnels, and there's, like, a little, um, there's kinda, like, a little box in here — I kinda drew dotted lines.
Mary:	That's really cool!
Alexi:	-and then there's tunnels leading to Marty's room, and an alarm will go off in Marty's room, so he can just crawl through the tunnels and get to Shiloh.
Mary:	Oh, that's really cool! So you're thinking about how Marty can — is Marty the owner of the dog?
Alexi:	Yeah.
Stella:	Well, not necessarily the owner…
Alexi:	But he wants to be the owner!
Mary:	(laughing) He wants to be!

Alexi: So that's why he's trying to keep it very secret.

The girls focus on keeping Shiloh safe, comfortable, and accessible to Marty. They describe the functional issues of the tunnel connection, with attention to details from the story: the tunnel is accessed only through the pillow door, and provides a direct route for Shiloh to Marty's room. As they imagine Shiloh's escape route, they consider multiple perspectives: Alexi describes the path Shiloh will take to get to Marty's room, as well as a way for Marty to be alerted so he can quickly rescue Shiloh in the case of danger. They develop contingency plans to account for implicit "what if" circumstances, such as sizing the tunnel door so that "just Shiloh fits in," in case the bigger dog gets past the first barrier, while maintaining "must haves" (i.e., an door to the pen) (Schön, 1983, p. 101). Although keeping Shiloh hidden or "secret" was never discussed as a classroom requirement, Stella and Alexi make it a top priority, realizing that if he is caught, he will likely be abused again.

Thus Stella and Alexi coordinate their overarching design goals of keeping Shiloh safe and secret with subtasks of developing and evaluating components. Their decisions are not driven primarily by the classroom requirements of size and testability but by the girls' sense of the physical and social setting of the story. In these ways, the evidence suggests they frame the engineering design task as situated in the story.

How Do You Test It? (Day Two)

At the start of Day Two, with the class assembled as a whole, Ms. C. calls on Stella to summarize the requirements.

Ms. C.: Stella, can you give a quick summary of what our requirements would be?
Stella: Oh, okay. Um, must fit on top of our desk and the test must be able to fit inside (referring to "inside" the dog pen).
Ms. C.: Whatever we choose, however we choose to test, it (referring to testing object) must be able to fit inside (the dog pens) so we can see if Shiloh would be able to get out and if something would be able to get in. And there was one more on the bottom, it has to be some sort of...
Stella: Pen.
Ms. C: Pen, right? Some sort of enclosure.

The students' design task, as Stella remembers, is to construct a model of Shiloh's dog pen that is scaled to "fit on top of our desk," and the scaled model must be functional. Ms. C. confirms and elaborates several criteria for the test, referring to a wind-up toy they will use in class to represent Shiloh: (1) the object must fit inside the model; (2) the model must have boundaries that will prevent the object from leaving ("we can see if Shiloh would be able to get out"), and (3) the model must protect keep outside objects from getting in.

As the students in the class construct their pens, they all evaluate their projects, but by different criteria. For instance, while some evaluate based on how well it will work for Marty and Shiloh, others prioritize "classroom" expectations, anticipating how their projects will be assessed in comparison to their classmates'. In the following, Stella and Alexi are working on their project when another student, Owen, who has finished his dog pen, comes to look at their work.

Owen: Did you guys see ours?
Alexi: Yeah, yours is awesome. Did yours make it through the tests?
Owen: Not yet.
Mary: How are you guys testing it?
Stella: Um, over there, I don't know what she's doing (pointing towards Ms. C).
Mary: How do you think you'd want to test it?
Alexi: I think she's gonna take, like, a little wind-up toy, and it's just gonna walk around and it can't, your thing can't fall over.
Stella: Well this is felt, so I don't even know if it would be able to walk. But the felt is good, cause then it's soft.

The interaction between Stella and Owen evidences competing expectations for the design task. The "classroom" expectations involve passing the test with the wind-up toy; the client-focused expectations involve optimizing a design for Marty and Shiloh that makes sense in the story context. When Alexi asks Owen if his dog pen "made it through the tests," she shows an awareness that their projects will be tested when they are done, that Ms. C is "doing" the test, and that her design may be compared to the other students' designs based on their relative success on the test. When pressed on what the test involves, Stella reacts dismissively: She gestures to the other side of the classroom, but quickly resumes her focus on constructing, biting her lip as she figures out how to attach the roof. She is clearly uncertain about the parameters of Ms. C.'s test, but does not seem phased by this. Alexi then elaborates that the test involves an action that "she" (her teacher) will perform using a "wind-up toy" to make sure the "thing can't fall over." And, when Stella sees a feature of their design that might perform badly in the test—the felt might keep the toy from being able to move—she keeps it anyway, thinking of her clients.

In a classroom framing, the test is a familiar event that makes sense; it adheres to classroom expectations. However, for the girls, "test" cues up a pro-forma event that is disconnected from the story context and their goals. In this event, their teacher performs an action, Shiloh is a "wind up toy," and their dog pen is a "thing." Although they recognize that other students may be prioritizing the test, Stella and Alexi remain rooted in the story context, as evidenced in Stella's comment in the last line. Her explicit prioritization of Shiloh's comfort over classroom testing criteria suggests that she is aware of the competing sets of expectations but committed to her own.

Evaluating for the Client (Day Three)

On Day Three, all of the students take turns presenting and testing their designs. Ms. C announces that the dog pen test is two parts: (1) a "small dog" test, which involves letting a small wind-up toy scurry about inside the pen for thirty seconds without escaping, and (2) a "big dog" test, which involved winding up two bigger toy cars (to represent big dogs) and letting them crash into the sides of the pen. During Stella and Alexi's presentation, they highlight meaningful features of their design, elaborating on how the tunnel will function as an escape route in case the antagonists of the story come after Shiloh. When they are ready to test, Ms. C suggests that the first test should be for the small dog to slide down the secret tunnel part of the design. The students are gathered around Stella and Alexi's design to observe, hoping to see the small dog emerge from the bottom of the tunnel.

Students:	He's at the bottom! ("He" refers to Shiloh and/or the toy).
Ms. C:	Oh, he came out! All right, so the small dog was able to go through the tube (referring to the tunnel). Why might it be tricky to test going *up* the tube?
Alexi:	(without pausing) He (referring to Shiloh) doesn't go up the tube because Marty lives on the bottom of the hill and Shiloh's pen is on a hill. So he would just like, Marty would walk him up the hill.
Ms. C:	Okay, so he's not expected to go back up the tube. He's expected to start at the top and go all the way down.

During the test, Ms. C raises the question of whether using the toy would be appropriate to find out whether the dog could go up the tunnel. For Alexi, though, that question is moot. She responds by describing how her design works in the story setting, insinuating that there is no reason to test the small dog going up the tube because that is not how the tunnel is designed to work. Rather than adapting their framing to incorporate the classroom expectations, Stella and Alexi persistently remain focused on designing for their clients.

Stable Beginnings in Engineering

Our initial motivation to study this case was to examine Stella's and Alexi's abilities to reason and act as engineers. In early analyses, we examined how they spontaneously planned by considering multiple aspects of the design context and their clients' needs, and generated appropriate scales to ensure accuracy in a "real life" context. In accounting for social and physical dimensions, they seemed to tacitly recognize that "design does not take place for its own sake or in isolation, but rather is directed at a practical set of goals intended to serve human beings" (Vincenti, 1990, p. 6). Much like engineers, the girls demonstrated "design thinking," making informed assumptions, reasoning to narrow uncertainty, and considering outcomes of hypothetical situations (Dym et al., 2005).

As we continued to study Stella and Alexi, we became more interested in their framing of what they were doing, itself an aspect of their nascent engineering. Like engineers, Stella and Alexi were continually reflecting on and responding to their clients' needs within the context of the story, in contrast to some other groups that evidently framed what they were doing more directly in terms of their own needs within the context of the classroom.

We were struck as well by Stella's and Alexi's stability in their framing, in contrast, for example, to the ways another group shifted their framing in response to classroom cues. That group, of three boys, discussed their initial design decisions based on "keeping Shiloh safe," and ensuring access to sunlight so Shiloh "doesn't feel trapped," evidence of framing comparable to Stella's and Alexi's. Later, when presenting their design to their teacher, the boys made a point of using terms from geometry, including "rhombus," "square," and "hexagon," which they rightfully expected Ms. C would appreciate. In another instance, a pair of girls incorporated LEGO figurines as "body guards" and pipe cleaners as "laser beams" to protect Shiloh. Because their initial design sketch did not include these imagined features, we suspect the girls' interest in craft materials triggered a shift in their framing away from the situation of the story. That is, they adjusted their framing of what they were doing, essentially shifting the genre of the story as written, to include elements of fantasy or science fiction (1).

To summarize, many of the students' framing of the IEL task dynamically evolved as they responded to classroom prompts, interactions with other students, or materials in the classroom. Stella and Alexi, however, remained stable in their focus on designing for their fictional clients, within the context of the story, even in potentially pivotal moments.

Their stability has piqued our interest and spawned a larger research question: What was it about their framing that enabled them to be stable? Based on this analysis, our conjecture is that Stella's and Alexi's stability in this task came in part from their investment in the story, including their caring for the characters and their problem. We see evidence of the story holding their attention in their responses to questions about their activity, with references to details about the situation, such as Marty wanting to be Shiloh's owner, as well as signs of their imagining aspects of the situation not explicitly in the story, such as how their system might need to let Marty's family in, that Marty might need to get in the tunnel himself, or that the real need for the tunnel would be to escape from the pen to Marty's room if endangered. In this they demonstrate *design empathy* (Kouprie & Visser, 2009), an understanding of and concern for their clients, ensuring that Marty and Shiloh will have access to each other and that Shiloh's pen will provide safety, comfort, and security. By imaginatively projecting themselves into Marty's and Shiloh's situations (Koskinen & Battarbee, 2003), Stella and Alexi are able to deeply discern their clients' circumstances and perspectives (Battarbee, 2004), and to design a solution to best meet their needs.

While the importance of empathy in design is well recognized (Batterbee & Koskinen, 2005), many researchers have noted that it is often lacking in the design process (Fulton Suri, 2003; Mattelmaki & Batterbee, 2002), and have developed a number of tools and techniques to enhance designers' empathy (Kouprie et al., 2009). In this case of children engaging engineering design, however, we see the opposite: Stella and Alexi's ability to empathize not only informs their design decisions, it supports and sustains their framing of the task as engineers.

Conclusion

In this study, we showed elementary students' abilities to reason and act as engineers for fictional clients in children's literature. In developing an optimal solution for Marty and Shiloh, Stella and Alexi considered design criteria and constraints that were implicit to the story; their need to understand the characters was synergistic with their need to comprehend the text. As they interacted with a complex design situation, the girls were not following a procedural set of engineering design steps, but instead were invoking their engineering abilities purposefully and with agency; within their framing of task, their actions made sense. In contrast to many of their classmates, Stella and Alexi remained stable in their framing, even when their design criteria were in tension with the classroom expectations for testing.

This case study is part of a larger project to understand students' framing in engineering. From this and other observations and analyses, we suggest that student framing should be a central target in engineering education research and practice. By attending to student framing in research, we may illuminate not only students' engineering abilities, but also their reasons for enacting those abilities. Moreover, we may be better equipped to foster and cultivate productive framing during engineering activities in practice, providing students with opportunities to design for clients and to interact with multidimensional problem situations. Our hope is that as students gain experience in framing as engineers, they may strengthen their abilities to navigate complex design situations, such that their engineering "ways of knowing" become "tacit, spontaneous, and automatic" (Schön, 1983; p. 60).

Endnotes

(1) Of course, Stella's and Alexi's design was also unrealistic—it would be quite difficult to dig that tunnel! Our claim is that imagining a tunnel is much closer to the story context than imagining bodyguards and lasers.

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