

DESIGN K12

Tackling the Lost & Found at Solar Prep

Human-Centered Design as a scaffold for real world, project-based learning

"I'm warning you, it's a big mess," second-grader Abbey said to a visitor to Solar Preparatory School for Girls in Dallas on an afternoon this past spring. She was talking about the school's lost and found, which, until her class started using design thinking to tackle the problem, had been a giant pile of pink, purple, gray, and black sweaters, sweatshirts, jackets, hats, water bottles, headbands, lunch boxes, and the occasional stuffed pony. "One time, I almost drowned in there!" added Sofia, another second-grader. "Don't scream when I say this, but I found seven shirts in the lost and found," said a third student, Tiana, to a couple of her classmates. They immediately screamed.

Solar Prep is an innovative school in the Dallas Independent School District that is getting national attention, including from the New York Times. The district designated it as a "transformation school," a choice school open to students across the district with no academic entry requirements. Families are enrolled by lottery.

The school has a long-term partnership with the SMU Maker Education Project to implement maker education and design thinking throughout the curriculum. Assistant Principal Jennifer Turner saw the lost and found as a perfect opportunity to put design thinking to work. The students would solve their own problem through a process of empathetic data collection, brainstorming, and trying out a series of prototype solutions with feedback until they generated the best solution they could implement.

When brainstorming potential design challenges to tackle, Katie Krummeck, Director of the SMU Maker Education Project and Turner agreed that a real problem facing the school would be the best arena for students to practice their design thinking skills. "School-based challenges are great for building confidence, and they help students see the impact their work can have on the community," said Krummeck.



Students collaborating to synthesize the data they gathered from their design research.

During the 2017-2018 school year, Turner taught a thirty-minute design thinking class for second-graders at the end of every school day. Day by day, she guided them through the design thinking process to figure out a solution to the lost and found problem. As the students progress through the grades, they'll become more familiar with the process and apply it to a range of problems. In kindergarten, for example, students try to improve the life of the class hamster. Another project asked students to observe their family life and then design a custom chair for someone in their family.

The first thing Turner assigned was a scavenger hunt: how many items of clothing could the students return to their owners in twenty minutes? The girls picked up a few items and went classroom to classroom, asking if the items belonged to anyone there. They only returned two items, and they interrupted lessons along the way. "I was so embarrassed," Tiana said. But this experiment gave the girls a sense of what wouldn't work.

Gathering data on users' experience is a crucial early step in design thinking. In this case, the users represented everyone associated with the school. So Turner's students interviewed Ms. Perez, the school's custodian, who finds many of the lost items. They asked parents if there was a lost and found in their workplaces. They polled other students about their experience losing and finding things. They presented their problems to a panel of parents and staff for feedback.

From here, the students generated "How Might We?" questions to guide the next steps of the design process. "How might we organize the lost and found so it looks better and isn't so messy?" "How might we make sure each scholar puts her name on her clothes?" "How might we keep parents from getting angry?"

Turner then asked the students to draw up potential solutions on poster board – from nametags to posting pictures of found items on social media – and vote on the most promising ones. Those were the ideas the students would keep developing, get more feedback on, and iterate successive prototypes until one was ready to implement campus-wide.

The goal of ideation in design thinking is to generate many solution ideas at the beginning of the process without regard for limitations. Not every idea the girls came up with was feasible. "Get fairies to find them" and "time travel" made it onto an early list of possible solutions but went no further. Other ideas were a step more practical. "One of their first solutions was a scanning system," Turner said. "Every girl would have a barcode sticker in their clothes," and they could scan lost items to discover who they belonged to. "That would be great, but we don't have a barcode scanner."



Students digging through the Lost & Found to learn more about their challenge: the improve the system for finding and returning student's lost items.

The committee members drafted a how-to guide for ironing the tags onto clothing items. In testing out their own procedure, they realized they needed to specify which side of the tag to write on and which side to stick to the clothing. They realized they needed to specify that parents use a permanent marker, which the school would provide if needed. They realized they needed pictures to illustrate the steps.

After many revisions, they were happy with the how-to procedure. "It's five easy steps," Claire said at a committee meeting one Friday afternoon. She read the steps out loud to everyone around the art room table. "They're easy. They're really easy."

In designing policies for the lost and found, the girls initially wanted to clear out the items every week, donating all remaining items to charity. On a survey they distributed and analyzed, parents said they wanted at least a month, to give their daughters a chance to realize something is lost and then recover it.

"That's way too long!" Tiana said. The students worried that if they didn't demand a quick turnaround on lost items, the pile would grow, and they would be back to their initial problem. They eventually agreed to the parents' request. "But if they don't come get their clothes after a month," Tiana said, "too bad!"

After one meeting of Turner's class, students of all grade levels were heading out to buses and their parents' cars for pick up, and a girl named Mia approached Turner to talk more about a nametag proposal. She was still thinking about it.

"How can we attach the nametags to the clothes?" Turner asked her.

"Maybe a paper clip?" Mia replied.

"Are there any other ways you've seen to attach something to clothes? How could we get parents to do that?"

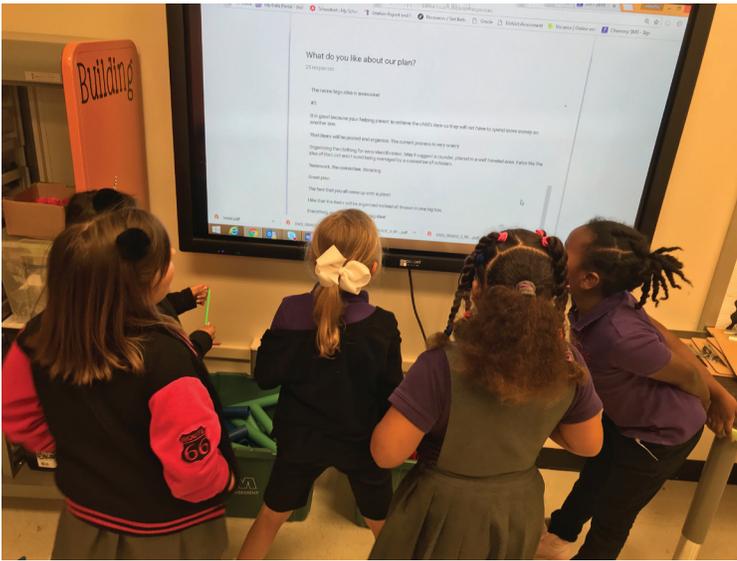
"You could sew it."

"Is there any way you've done it in the maker space?"

"With an iron-on." Second grade students had already completed a makerspace unit in which they learned to design a digital logo and print it using a vinyl cutter. They used an iron to press their logos onto T-shirts.

That was a solution that would stick.

A month later, a lost and found committee had formed out of the second-graders who had the most interest



Students analyzing the survey feedback they received from families in response to the first iteration of their solution.

Turner said that parents and staff have all tried to solve the persistent lost clothing problem without much success. She's confident that students can take ownership of it and find a solution. "It's something they interact with every day," she said. "It's not an 'out-in-the-world problem,' it's an 'in-my-world problem.'" "It has been so fun to see how engaged and committed the students are to implementing their solution and to see that the Solar Prep leadership is willing to hand them the reins, makes for such a powerful learning opportunity for the long-term," said Krummeck.

The authenticity of the problem and solution led students to engage with it and to develop social-emotional skills. Speaking of the iterative process of design thinking, Claire said, "We're going to have to climb a mountain, then roll back down." She illustrates climbing and rolling through dramatic gestures. "Climb a mountain, then roll back down. There's going to be ups and downs," she said. "The easiest way is not always the best," Isabella added.

Girls spoke of the value of the design process in terms of the "Solar Six" – the six core disposition at the heart of the school's mission. Olivia said "the best solution isn't necessarily your favorite solution. Even though you don't like a solution, you have to go with the best one." While she was speaking, Claire chimed in to say, "Humility," which is one of the Solar Six. Olivia continued, "I think being curious goes really good with lost and found. It's all about curiosity and asking questions," another core disposition.

Then Tiana jumped in to offer her perspective on an idea for sustaining the lost and found after the committee members graduated from the school. They were a team, and they wanted to sustain their work. More brainstorming, more debate, and more laughter followed.

The next step was making sure parents had the right materials to make the plan work. So the committee members calculated the number of feet of iron-on vinyl each family would need and multiplied it by the 400 families who would have a student in the school next year, and calculated that they would need three rolls of vinyl for the project, which would cost \$389. To get the money to move forward with their plan, they would need to pitch it to Dr. Nancy Bernardino, the school's principal.

"I was nervous and excited at the same time," Claire said about the pitch meeting.

"I was nervous that she wouldn't like our plan. I was shivering!" Tiana added. "What if our plan's not great enough? We'll have to start all over."

"We would have done all that math for nothing!" Allyson added.

But Dr. Bernardino liked the plan and approved the funding. The school will roll out the new lost and found system in the new school year.



Students working together to design and test a prototype of their solution to improving the Lost & Found.