Written Documentation in Makerspaces

Kristin Fontichiaro

For several years, I've been running the Michigan Makers after-school project in elementary and middle schools alongside graduate students from the University of Michigan School of Information.

Sometimes I pause and think, "Ahhh, it's working." But articulating this to my less-experienced student colleagues did, in early years, cause a bit of a struggle. "I know it when I see it" is unconvincing at best and alienating at worst. Learning how to describe the growth, engagement, and synergies I saw was critical to my maturation as a facilitator of creative, fruitful maker activities and helped to sharpen my practice. Now, on days when I struggle to communicate successes, it's far more likely that the successes were not there that day, not that I cannot describe them.

It's tough to articulate what is happening in a makerspace, in part because there is such variety in answering what a makerspace is, what it accomplishes, and what the larger benefits are. Consider that the maker movement began as a kind of rebellious collective, then moved into the White House with language like, "Today's D.I.Y. is tomorrow's 'Made in America'" (Obama, 2014). Today, many school makerspaces are organizing themselves around STEM (science, technology, engineering, and math). Silicon Valley has hyped the need for more coders, launching code-friendly plug-and-play toys, robots, and free curriculum. Meanwhile, public libraries are seeing growth in traditional handcrafting activities like knitting or quilting.

So which type matches your maker initiative, how do you know it is working, and how do you gather the artifacts and observations that support your stance when you communicate with outcomes-oriented administrators and decision makers? It starts with documentation.

In the November–December 2017 column, I discussed how photos and videos can be powerful tools for recording what is happening in spaces and how we can use those multimedia files to reflect and share. In this column, I turn my attention to documentation methods that feature text, including journals, exit slips and Google Forms, blogs and portfolios, Maker Reporter, and lesson plan books.

JOURNALS

In Michigan Makers, we have had mixed success issuing each student a composition notebook (the speckled black-and-white bound books). If your school already practices science notebooking to document one's scientific thinking throughout the planning, execution, and analysis of student-designed experiments, or writer's workshop, which encourages short writing bursts, this can be an effective way of getting students to document their planning and thinking over time. In a middle school with high academic achievement and several student makers of above-average motivation and intelligence, this was a successful strategy. Students used their notebooks to store their badges, sketch prototypes, and document the day's learning and reflection.

On the other hand, we had minimal success with underachieving after-school elementary kids, who told us they loved Michigan Makers but hated writing. These students, we discovered, were being rightly pushed hard during the academic day and, like any kid, craved time to make their own decisions and exercise their agency. Anything related to writing felt like more school. (The academic push was worth it—they have since abandoned their status as the lowest-achieving school and are now so in-demand as an International Baccalaureate school that they have built an addition!) Here, we learned that students were much more open to photographing their work or participating in video interviews.

If you choose journals, it can be helpful to have a prompt to which students can respond quickly, as you won't want your students' making, experimentation, and prototyping time interrupted significantly by this reflective practice. Here are some prompts that you may find helpful:

- What do you know today that you didn't know yesterday?
- If a new student joined your group tomorrow, what would you tell him or her to explain what you've been working on this week?
- What questions do you still have?
- What "aha" moments have you had?

BOOKMARKIT

BETTY WINSLOW

JUNIOR FICTION

NEVER GIVE UP!

Bertman, Jennifer Chambliss. **The Unbreakable Code** (Bk. #2, The Book Scavenger series). Henry Holt, 2017. 368p. $16.99. ISBN: 9781627791168. Grades 3-7. Emily, Matthew, and James, members of Book Scavenger (a book hide-and-hunt game), recently helped its founder, Mr. Griswold, find a previously unknown Poe manuscript, which is being published. Since they discovered it, Mr. Griswold is honoring them at the gala book release. While there, they notice Mr. Quisling, their unpleasant social studies teacher, acting strangely. Did he really just steal something out of someone's purse? Why is he there anyway? Is he a Book Scavenger, too?

Meanwhile, a series of suspicious fires seem to be connected to the game, their teacher, and an unbreakable code from the past. Is Mr. Quisling the arsonist? Or is it his ex-girlfriend? Why is he (or she) setting them? Why is Mr. Griswold acting so oddly? And what does a copy of Tom Sawyer have to do with all this? Can they figure out what's going on before someone really gets hurt? Includes back-of-the-book material.

Ellis, Sonia. **Time Tilter.** Tumblehome Learning, 2017. 234p. $10.95. ISBN: 9781943431311. Grades 4-7. Singer's parents, focused on winning, raise golden retrievers for extreme sports competitions. Singer is a disappointment—lame since birth, she can't compete alongside them, and her only friend is a golden retriever with a career-ending injury. Dublin's a great pet, but that's not what dogs are for, according to her parents. He's history. So Singer and Dublin run away, ending up, along with several other unwanted kids, enmeshed in the machinations of a mysterious gaming company,

Given a mind-altering drug after unspecified physical alterations are done on each of them, the kids are dumped into a gaming site called Time Tilter to make their way out (or not), all the while struggling with what has been done to them. Will they make it out before the drug side effects change them permanently? Or before the game kills them? Either is possible—and time is running out. Includes a secret website that unlocks additional material.

Kraatz, Jeramey. **Space Runners: The Moon Patrol.** Harper, 2017. 352p. $16.99. ISBN: 9780062445971. Grades 3-7. It's 2085 and Benny Love spends his days scavenging to help keep his family alive (when he's not taking his dune buggy out for a spin.) When he is chosen for a prestigious scholarship that includes a trip to the moon and a large sum of money once he comes back to Earth, he jumps at it. Once he gets back, things will be different for his family! No more going hungry, doing without water, or third-rate dune buggy. Only the best will do for them!

But life on the moon isn't exactly what he expects, and there are dangers that no one knows about lurking around every corner. Will Benny make it back to Earth and his family? More importantly, will he and his teammates be able to work together to save the moon colony (and Earth, too)? If not, there will be no Earth—or family—to go back to.

Vickers, Elaine. **Paper Chains.** Harper, 2017. 287p. $16.99. ISBN: 9780062414342. Grades 3-7. Although Katie and Ana have been friends for four months, ever since Katie moved in next door, they're keeping secrets from each other. Katie, who's always known she was adopted, is starting to wonder about her Russian birth family. But Ana doesn't even know Katie is adopted! She also doesn't know that Katie had a heart transplant as a child, which is why Katie's mom worries so much.

Meanwhile, Ana has hatched a desperate plan to convince her hockey player dad (who left the family for his career) to come home. Her mom, sad and lonely, has asked her dad's Russian mom to come live with them for a while to help out (and maybe coax her son to come back to his family). But she's odd, her cooking is terrible, and it's more than Ana can bear (or talk about). Friendship requires truth. Are they brave enough to tell each other?

- What are you trying to learn? How close to your goal are you?
- What do you understand about engineering/coding/knitting that you didn't know before?
- Describe the progress you made today.
- What did you learn today?
- Where are you in the design thinking process?
- Do you have the information you need to move forward? What's missing? What might be getting in the way of clarity in moving forward?
- How would you pitch this product to customers? Investors?

EXIT SLIPS AND GOOGLE FORMS

Exit slips can be a quick alternative to long-form writing. Whether you ask students to fill an index card with ideas or hand out a photocopied prompt from above, remember to ask for the student's name and the date so you can sequence these slips over time and look for lulls in energy, perseverating on the same tools repeatedly without making progress, and other signs that instructional, entrepreneurial, personal, or interpersonal interventions are needed.

A method that can make data collection and sorting even easier is to repeatedly use the same Google Form for each class. I learned this strategy from Amanda Nichols Hess, now at Oakland University in Rochester, Michigan. A form with a reflective prompt can make it easy for you to keep track of student reflections over time because you can sort the results in a spreadsheet and quickly see the longitudinal trajectory of student thinking.

BLOGS, PORTFOLIOS, AND INSTAGRAM

These tools can help track process and/or product and create a central repository for student work, which assists with their ability to see their growth over time. The trick to these is not just to use them as places to document *everything*, but in setting aside time for students to do what Niguidula (2010) describes as the "collect, select, reflect" process. Students can certainly *collect* a wide variety of process documents and artifacts but should then gain experience *selecting* items that convey a cohesive narrative and *reflecting* on the reasons each item was chosen (e.g., to demonstrate a soft skill like teamwork or a thematic skill like electricity). In the case of an individual WordPress blog, for example, regular updates on process and product might be created using *posts*, with standalone *pages* set aside for thematic portfolios. The popularity of the online portfolio tool Seesaw, popular with classroom teachers, can be an easy and fluid way to engage in this process. A blog that you and/or a small team of students write can be excellent reflective practice for you while also documenting activities. Instagram accounts (if your makers are over 13) are fast and easy ways to record daily progress; images can later be pasted into a portfolio page as needed. Reviewing the posts over time can help you see patterns and sharpen your focus moving forward. As I review our Michigan Makers blog (http://michiganmakers.si.umich.edu), I'm reminded of past projects and tools, now-graduated mentors and the unique skills they brought to the table, and days when we just didn't seem to hit the mark.

MAKER REPORTER

This is a role well suited to someone who takes more time to get settled into creative acts. You can designate a reporter (try a "Reporter" lanyard for elementary makers) and invite them to make notes, blog, create a news feature, or design a poster about what they are observing. In the November–December column, I mentioned that some maker reporters abandon their task 20 minutes in, once they find something that interests them (and this is a good thing!); still, their perspective can reveal insights and details that you may have overlooked from your bird's-eye perspective. Alternatively, this can be a rotating role for one student daily.

LESSON PLAN BOOKS

A long-ago classroom colleague gave me great advice about lesson planning. The trick, she said, was to go *back* at the end of the day and write what you actually *accomplished*. This not only created a more accurate record but also provides a road map for what to do next year. Consider the same as you keep your plan books—are there tools or materials you wished had been on hand? Extension activities you thought of after the fact? Supplies you'll need to restock before attempting this next time?

REVIEWING WRITTEN DOCUMENTATION

Just as with portfolios, move from *collection* to *reflection*. Find time to review the paperwork or digital artifacts you are collecting. Ask yourself questions like, "What do I see here? How do I know *x* is happening? Which of these anecdotes will best resonate with various stakeholders and decision makers?"

CONCLUSION

Asking students to document their thoughts and progress, as well as documenting your own observations and insights, can seem tedious or even counterintuitive to the serendipities you want to seed in your space. But it is by this evidence that we gain the ability to see where we are: our ruts, our blind spots, and our opportunities for renewal and growth.

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