

“Figure it Out:” Stories About a PDS Partnership that Put the Needs of Students First

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Abstract: During the Spring of 2020, teachers and professors across the United States were required to transform their in-person instruction to fully remote instruction. In this paper, we used a Narrative Inquiry (Clandinin, 2013) methodology to help us understand how and why one middle school math teacher taught during the initial months of the pandemic. We examined how the intersecting “Professional Knowledge Landscapes” (Clandinin & Connelly, 1995) of the authors provided teacher candidates the opportunity to practice teaching math to real elementary school children. An analysis of the author’s “told stories” revealed their “Intellectual Character” (Ritchhardt, 2001) and how the dispositions associated with this construct influenced their decisions to always keep the needs of their students and parents in the foreground.

KEYWORDS: Narrative inquiry, COVID-19, intellectual character, math methods, school-university partnerships, high-leverage practices, practice-based teacher education

NAPDS NINE ESSENTIALS ADDRESSED:

Essential Two: Clinical Preparation. A PDS embraces the preparation of educators through clinical practice.

Essential Four: Reflection and Innovation. A PDS makes a shared commitment to reflective practice, responsive innovation, and generative knowledge.

Essential Five: Research and Results. A PDS is a community that engages in collaborative research and participates in the public sharing of results in a variety of outlets.

“Figure it Out:” Stories About a PDS Partnership that Put the Needs of Students First

Chris: Who told you how to organize your beginning remote instruction?

Liz: I told myself how to do that. I was just told that we needed to continue rolling through the content as usual. We couldn't skip lessons or ...

Chris: ... So you really didn't have someone tell you? It was ...

Liz: ... Figure it out.

This interview snippet took place between the lead author, Chris, a math education professor, and Liz, the second author, a middle school math teacher and former student. Liz's ability to “figure it out” meant that she taught herself how to teach math remotely at the beginning of the COVID-19 pandemic (Spring 2020). Her instructional approach was adopted by my math methods teacher candidates in the Fall of 2020 and used with real elementary school students who attend my rural Professional Development School (PDS). Jill, the third author and principal of the school, welcomed my teacher candidates after I told her we could teach K -5 students using Google Classroom (GC), Google Meet (GM), Loom and Jamboard; digital tools available to her teachers and used by Liz. This paper describes how Liz's “lived in-classroom stories of practice” and Jill's “lived out-of-classroom stories” (Clandinin & Connelly, 1996) contributed to clinically rich teaching opportunities for my math education teacher candidates during the shift to virtual teaching and learning.

Before I describe their “lived stories,” I would like to present a remote teaching and learning story told by MJ (pseudonym), one of my teacher candidates, and Echo (pseudonym), a fifth-grade student, to my teacher candidates and me during our last post-teaching discussion at the end of the Fall semester. Due to the pandemic in the United States, and at the request of my PDS' teaching faculty, MJ and his classmates were allowed to come to Jill's school to practice teaching math, but with one caveat, they could only teach remotely. Because of my relationship with Liz, and my partnership with Jill, I was able to provide my teacher candidates with math teaching experiences for the entire Fall semester. Liz provided me with a system to teach math remotely and Jill provided access to the students.

Multiple, low-stakes teaching experiences (Lotter et al., 2009), completed throughout the semester, gave us the *reflection data* we needed to discuss six high-leverage practices (Grossman et al., 2009) that the teacher candidates implemented while teaching real children (see Appendix A). Grossman et al. (2009) described HLPs as teaching practices that: (a.) occur with high frequency; (b) can be enacted in classrooms across different curricula and instructional approaches; (c) novice teachers can master and help them learn about their students and (d) have the potential to improve student achievement (p. 277). McLeskey et al. (2019) defined HLPs as “practices that are essential to effective teaching and fundamental to supporting student learning” (p. 332). Recently, my institution adopted an HLP framework for our dual-certification undergraduate program in general education and exceptional education (see Maheady et al., 2019); MJ and I are involved in this program.

In the teaching story that follows, MJ explained how Echo learned to divide fractions using a colored Google Slide framework (see Appendix B). MJ and Echo's shared experience could not have taken place without Liz and Jill.

A Remote Teaching Story: Learning How to Divide Fractions ... Remotely

Today I (MJ) worked with Echo and we did sixth grade math; we divided fractions. We started off with the green slide. I had her start to do it and then she said that she doesn't understand how to do this. I reinforced her by just saying that it's okay, this is sixth grade material and that it's perfectly fine to not understand this. We went through the chart and I asked her where she was; she said she was overwhelmed and doesn't know where to start. So from there we went to the yellow side, where I explained how I would solve the problem. I used Jamboard to show three different ways to solve it; one way was by using pictures; one was by simplifying and then the last one was simplifying in true simplest form. From there, we worked together on the red and black slides, and I asked her just what we should do, what information we should take from the problem. We did the 'What do I know? and What do I want to know?' together and I asked how she would set up the problem. We'd go step-by-step, back and forth. For the last slide, which was white, I had her go through it by herself and then explain to me how she solved it. She said she looked back at the yellow slide and what we did on the red and black slides. We reviewed her work and she said she felt a lot more comfortable doing this type of problem.

As stated earlier, MJ and Echo's experience, and many similar to this, could not have occurred without my relationships with Liz and Jill. MJ was able to teach 6th grade math content to a 5th grader in a remote manner. He learned how to teach math from me; he learned how to deliver this instruction indirectly from Liz and he was able to practice what he learned because of Jill. So, how and why did this happen?

Methodology

Data Collection and Analysis

The stories chosen for this paper were selected from interviews and artifacts (emails, texts, GC Stream postings and instructional videos). Narrative Inquiry (Clandinin, 2013) was used to study our storied experiences because we valued the experiential knowledge obtained by Liz and Jill during the pandemic. Narrative inquiries are relational practices conducted by researchers that begin and end in the storied lives of people. In this article we highlight Liz, Jill, and my stories along with all those with whom we interacted. Our stories composed our "*professional knowledge landscapes*" (Clandinin & Connelly, 1996), which, according to Clandinin and Connelly, is a metaphor composed of teacher stories, stories of teachers, school stories and stories of school. Understanding our stories provided us with a view of the teaching and learning situation during the pandemic through the "eyes" of a teacher, a principal and a math education professor. They helped us answer two research questions:

1. How did our "in-classroom" and "out-of-classroom" lives, during the pandemic, provide my teacher candidates with clinically rich math teaching experiences that afforded them opportunities to engage in high-leverage practices?

2. What directed and motivated the way we thought about teaching and learning during the pandemic?

Ron Ritchhart's construct of *Intellectual Character* was used to help us understand the thinking that directed and motivated the intellectual behaviors revealed in our stories. He described *Intellectual Character* as a set of dispositions, demonstrated consistently by a person over time, linked to good and productive thinking that shape and motivate intellectual behaviors (Ritchhart, 2001, Beyond Abilities section, para. 1). He believes character is built on beliefs, attitudes, temperaments, and tendencies. For this paper, we used five dispositions Ritchhart associated with *Intellectual Character*: the disposition to be: open-minded, curious, metacognitive, truth seeking & understanding, and strategic (2001, An Integrated Perspective, para. 1).

It is our belief that the authors' *Intellectual Character* enabled MJ and his classmates opportunities to teach math to real children during the pandemic and implement high-leverage practices.

Our Shared Professional Knowledge Landscapes, Part I

The Disposition to be Metacognitive

Individuals who demonstrate the disposition to be metacognitive are able to monitor, regulate and evaluate their thinking (Ritchhart, 2001). In the following story, I describe how my teacher candidates practiced teaching math before the pandemic and how the disposition to be metacognitive directed my thinking as I encountered the uncertainty of the Fall semester.

I teach undergraduate teacher candidates how to teach mathematics to K - 5 students. We work in a rural PDS elementary school 2 times per week for 13 weeks for 4 hours each day. Small group instruction is a valued pedagogy in this school, so my teacher candidates teach math in this manner. These low-stakes teaching experiences, coupled with guided reflections (Lotter et al., 2009), increase their *Pedagogical Content Knowledge* (Shulman, 1987) because the guided reflections are structured around *high-leverage Practices (HLPs)*. This cycle of teaching and reflecting upon one's teaching created a "thinking-rich learning routine" (Ritchhart, 2001) that addressed the HLP: *Self-analyze teaching for the purpose of improving instruction and learning* (Maheady et al., 2019, p. 360); I require these guided reflections to "actively, encourage, involve and support students' thinking" (Ritchhart, 2001, Thinking Routines section, para. 3) about teaching elementary school mathematics.

In the following guided reflection example written by Azure (pseudonym), one of my former teacher candidates, she told a story about teaching math to a small group of second graders (during a semester before the COVID-19 pandemic),

I worked with 5 students and created an engaging and positive learning environment (HLP #16) that improved their learning outcomes. While doing this, one student in my group was having a bad day and it was clear to me that I had to make him feel comfortable. Although he is a very smart student, he can become easily overwhelmed. When I gave the group independent work, I could tell he was becoming stressed, so I had him take a break and talk to me. We talked about Halloween, what he did over the weekend, and how excited he was to go to gym. The conversation was no longer than two minutes, but it gave him enough time to destress.

According to McLeskey et al. (2019), the amount of time my teacher candidates spend in real elementary classrooms during their methods course is not typical in teacher education programs. The authors claim that most teacher candidates spend most of their time *talking* about teaching instead of *teaching* real children. My teacher candidates, however, have always spent the majority of their time teaching real children math and reflecting upon their experiences. Prior to the pandemic, performing all the HLPs was challenging, but doable. But with strict health and safety protocols in place, I was not sure how my Fall 2020 teacher candidates would carry out these HLPs and learn how to teach math like Azure.

As I evaluated and monitored my thoughts about the upcoming challenges of the Fall semester, in the late Spring of 2020, I directed my thinking toward answering this question: How will my teacher candidates practice teaching math? It was at this time that Jill's *professional knowledge landscape* intersected with mine.

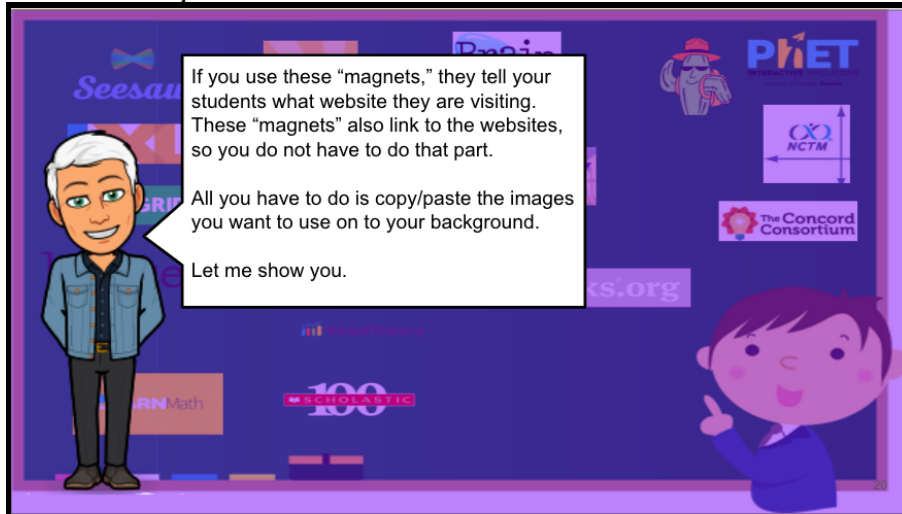
The Disposition to be Strategic

Individuals who demonstrate the disposition to be strategic are able to organize, plan and set goals for future events in order to maximize efficiency (Ritchhart, 2001). In the following story, Jill used her understanding of one teacher's successful remote teaching experience to organize professional development (PD) for all K - 5 teachers in her district and get them ready for remote teaching in the Fall of 2020.

Jill called me in June and asked if I would provide professional development. She wanted me to show K - 5 teachers how to create a digital classroom made with a Google Slide (GS), a Bitmoji character and a cartoon background of a typical classroom. When I asked her why, she said that the teachers needed to learn how to communicate and organize instructional resources more efficiently for their students and parents, Jill said,

I saw the success that Kayla (pseudonym - 4th grade teacher) was having with her students, but mostly with her parents. Our parents were having a hard time finding things online. I was getting telephone calls from parents saying, "I can't find this, I can't find that, things are all over the place" and I thought nobody's calling from Kayla's class. She shared her digital classroom with me and I thought, isn't this great, everything is right there and her kids loved it. One of her parents even told her that this makes their lives so much easier.

In an effort to organize instructional resources, Kayla created a digital classroom using a Google Slide (see Figure 1). She posted it to her GC Stream so that all her 4th grade students and parents had to do was navigate to the Stream and tap images embedded in the slide that link to instructional resources and learning tasks. Jill and Kayla recognized that teaching during this pandemic affected parents as much as it did the kids. Jill's experience with frustrated parents in classrooms other than Kayla's caused her to plan PD with the goal of reducing parental stress by making remote learning more efficient.

Figure 1*A Digital Classroom Example****The Disposition to be Curious***

Individuals who demonstrate the disposition to be curious are able to generate questions and pose problems about the world (Ritchhart, 2001). In the following story, my co-planning with Liz, for PD for the PDS consortium, caused me to ask: why did Liz continue to adjust her instruction during the pandemic?

PD was delivered to Jill's teachers at the end of June and sometime in July, more GC PD was required by me for members of the entire PDS consortium. I met with the PDS co-directors and planned four PD sessions: one session would provide an overview of the Google Workspace (Drive, Gmail, Docs, Sheets, Slides and Forms), another would provide an overview of GC and the third would showcase Kayla's digital classroom. The fourth session would show the audience how Liz taught math to her 7th and 8th graders during the pandemic. Liz was included in this PD because she used Google Workspace tools and organized math lessons with her GC.

Kayla and Liz developed rough drafts of their presentations and shared them with me. Liz's presentation revealed an *autobiographical narrative inquiry* that revealed the "personal, practical, and theoretical/social justifications that shaped" (Clandinin, 2013, p. 191) the student-teacher interactions in her math classes. In preparing for the presentation, Liz noticed that she changed her teaching behaviors as she reacted to her middle school students' needs; these changes occurred in three distinct phases. Liz's self-analysis was an example of the HLP: *Self-analyze teaching for the purpose of improving instruction and learning* (Maheady et al., 2019, p. 360); this is the same HLP that influenced my decision to conduct guided reflections with my teacher candidates. Her analysis was an example of the disposition to be metacognitive because she evaluated her thinking about teaching math during the Spring of 2020.

As I listened to Liz speak, I wanted to know why she kept revising her teaching. I used narrative inquiry because I needed a methodology that studied Liz's teaching life and honored her lived experiences because I believe her stories were "a source of important knowledge and understanding" (Clandinin, 2013, p.17) and they had the potential to influence my own teaching life. As a former technology integration specialist, I understood how and why Liz used the technology she did without her explanations, but I did not understand why she kept making adjustments to her instruction. Like Archibald (2008), I believe that stories teach lessons, so with

this in mind, I conducted a series of open-ended interviews designed to help Liz reconstruct the experiences (Seidman, 2013) she shared with her students. These interviews were developed to teach me how to think about her teaching actions, to solidify my understanding of teaching math remotely and attend to my own curiosity.

Our Shared Professional Knowledge Landscapes, Part II

The Disposition to be Seeking Truth and Understanding

Individuals who demonstrate the disposition to be seeking truth and understanding are able to examine things closely, look for connections and play with ideas in search of the truth (Ritchhart, 2001). In the following stories, Liz described why the idea of “keeping things as close to normal” during the beginning of remote teaching did not work for her math students.

Liz wrote on a slide of her PD presentation,
 After COVID-19, I taught 2 sections of math. and each section lasted 15 minutes. There was NOT balance in my classroom! I felt I could not support my students and they felt they were a number in a crowd and were reluctant to participate. There was no time for remediation or enrichment. I felt like a subliminal message was being sent to my kids, “If you got it, great, if you didn’t ... sorry, see you tomorrow! But from mid-March through the end of June, I underwent a complete transformation as a teacher. I learned how to be more flexible in order to meet the needs of my students, who were giving me their all. In my reflection, I identified three distinct phases in my teaching (see Figure 2).

Figure 2
Table Depicting the Characteristics of Liz’s Phases

Instructional Strategy	Direct	Modeled	Shared	Guided	Independent
Phase 1 (March - Early April) 1 lesson/day 5 days/week	Assigned a Mini lesson video for homework Used Loom with a document camera to record video and posted it to Google STREAM	Assigned a Mini lesson video for homework Used Loom with a document camera to record video and posted it to Google STREAM	Honor System Students shared their work with me using a physical whiteboard during a Google Meet session LOL Nobody writes	Google Meet was used during Live Class Students solved the problem with me and I shared their solution with a document camera	Four IXL Skills/Week with a goal (homework)
Phase 2 (Early April - Beginning of May) 1 lesson/day 5 days/week	Assigned a Mini lesson video for homework Used Loom with a document camera to record video and posted it to Google STREAM	Assigned a Mini lesson video for homework Used Loom with a document camera to record video and posted it to Google STREAM	Google Meet was used with Live Class and students solved the problem with me and I shared their solution with a <u>document camera</u> Teacher writes.	Google Meet was used during Live Class Students solved the problem with me and I shared their solution with a document camera Teacher writes.	Two IXL Skills/Week with a goal (homework)
Phase 3 (May - June) 4 lessons/week (Monday-Thursday)	Assigned a Mini lesson video for homework Used Loom with a document camera to record video and posted it to Google STREAM	Assigned a Mini lesson video for homework Used Loom with a document camera to record video and posted it to Google STREAM	Google Meet was used with Live Class and students solved the problem with me using <u>Jamboard</u> and share the digital pen. Students write.	Google Meet was used with Live Class and students solved the problem with me using <u>Jamboard</u> and shared the digital pen. Students write.	One IXL Skill/Week (homework) Weekly Quiz (in class, following review on Google Slides, via Google Forms)

Phase One: “Keep Things as Close to Normal”. Throughout phase one, Liz tried to mimic what she did during in-person instruction in an effort to keep the students’ learning and her instructional approach as normal as possible. She followed her teaching instincts, which meant adhering to the Gradual Release of Responsibility model (Fisher & Frey, 2014) that she used prior to remote instruction. Liz recalled,

Phase one was my immediate reaction to finding out that my students were going to learn online with their entire cohort in only 15 minutes instead of one hour. I did what I could from instinct. I tried to keep things as close to normal as I could, in terms of following gradual release and rolling out the content.

Liz’s in-person instructional model, or what I think she was referring to as her “instinct,” was developed when she taught third grade, a role she held for 4 years. This model included whole group and small group instruction. She taught a typical math lesson to the whole class using a version of Explicit Instruction (Doabler & Fien, 2013) and then used math rotations to differentiate. Liz said, “The way I taught third grade was actually pretty similar to the way I taught seventh and eighth grade.”

Third Grade Math Instruction. In order to understand how she taught her middle schoolers prior to remote instruction, her description of how she taught third grade math will reveal what she did.

I would do a mini lesson with the students while sitting on the rug with them and while my TA projected her writing with a document camera. We would unpack the learning target, review important vocabulary, and connect the lesson to prior learning. Sometimes I’d have a student paraphrase the learning target and then I would get into the direct instruction by explaining the process with an anchor chart. I would model a problem by doing a think aloud while my TA jotted down notes of what we know and don’t know, as well as a restate with a blank and a number sentence with a blank. We’d solve the problem by connecting back to the steps on the anchor chart. A student would usually get called up to share the pen with the TA when we would do a shared example on the board.

When the whole class mini-lesson was completed, Liz would rotate small groups of students through math learning tasks so she could provide guided practice and feedback that met the different needs of her students “because I do not think that it’s right to have a one size fits all approach with every student.” Liz rationalized her use of math rotations,

I would meet with the low group, then the medium group and the high group last.

That way, the low group got more support and went to their independent work immediately after meeting with me.

Middle School Math Instruction. This pattern of behavior worked for Liz and her 3rd graders and that is why she used it with middle schoolers prior to the COVID-19 shutdown. Since each grade level in her school was broken into two homerooms, she was used to providing 4 one-hour math lessons to four different classes each day. She also had a half hour block of time to conduct an enrichment group, while the rest of the students were divided into various Response to Intervention groups. Her students received tailored, small group math instruction every day. This was an excellent plan for in-person instruction, but very demanding for remote instruction.

Liz was faced with the challenge of transitioning from in-person to remote instruction over a single weekend. So when she was “told that we needed to continue rolling through the content as usual” she wondered how she could be an effective math teacher when her students

were learning from home and only receiving live math instruction for 15 minutes each day. Despite this, on March 16, 2020, the first day of remote instruction, Liz posted a brief video of herself on her GC Stream and with a reassuring countenance and a confident voice, said, “I promise we’re going to have fun and we’re going to figure this out as we go.”

It was important for Liz to show her students they could count on her to teach them during this difficult time because she had already stabilized their math instruction earlier in the school year. In the beginning of the year, she was the instructional math coach for her school, but by the start of October, she became the third middle school math teacher because the previous two teachers had a difficult time and quit. When she took over the class, Liz remembered,

It was a night and day difference when I was in there with them. They knew it was unconditional love. They knew that if I'm ever being tough on them, it's because I love them and I want to be a person who they can count on.

This love was reciprocated by her students because they turned in their math assignments and attended her live classes, a sign of mutual respect. According to school records, 94% of her 7th graders and 100% of her 8th graders turned in their classwork. When these percentages were compared to other subject areas, many of these same students did not attend to their assignments. One of Liz’s 7th graders may offer an explanation as to why her classmates shared their work with Liz, “You explain it so well for people who don’t understand. Keep up the good work. Love, your student, Juan (pseudonym).” When I asked Liz why her students came to math class, she said, “I think they wanted to see me. Middle schoolers crave that feeling of being together, and because it was something they could do with a sense of purpose and direction.”

So, with mutual respect established, grounded in “unconditional love,” Liz described the first phase of her remote instruction as a plan to imitate normalcy by introducing a flipped classroom while she continued to use the Gradual Release of Responsibility framework.

It was really a result of me trying to keep things as close to normal as I could, by following gradual release and rolling out the content. I just did one lesson a day, five days a week. Since we had only 15 minutes of live time together, I introduced a flipped classroom where their homework was watching a mini-lesson and then we would do the rest of the lesson together in class.

For the first five lessons, Liz created instructional videos that recorded her voice and hand movements with an iPevo document camera “because I was able to connect it to my computer screen and record an aerial view of my problem-solving using pen and paper without having to worry about the positioning of the camera.” She uploaded the videos to YouTube and posted links to them on her GC Stream. After a few videos, however, Liz became frustrated with YouTube because the software kept buffering, which made it difficult to watch. She switched to an online resource called Loom “because it was very easy to transfer my videos to my GC without having to wait forever for it to buffer. I also liked how all of my videos were saved into an archive.” Liz posted the videos to her GC “because it provided a space to clearly and neatly roll out the weekly lessons/assignments in one place, making it easy for students to access.”

The Flipped Classroom. Many of Liz’s students came from economically and educationally disadvantaged backgrounds, thus she used Explicit Instruction (Doabler & Fein, 2013), an instructional method that has been found to be effective with low and below average performing math students (Gersten, et al., 2005) from these backgrounds (Aud et al., 2011). Liz set up a flipped classroom, an instructional approach where “the lower levels are presented before class” so that “in-class time can be spent working on higher levels of learning” (Zainuddin & Halili, 2016, p. 316). She used the videos to teach the lower levels of a math lesson

before addressing the higher levels of a lesson with her teacher candidates using Google Meet, a video conferencing tool. This approach enabled her to gradually give the responsibility of solving a lesson's math problems to the students over a two-session period. During session one of a typical math lesson, one can think of the "lower levels" as a teacher's: (1.) unpacking of a lesson's learning target(s), (2.) explanation of a lesson's mathematical vocabulary and (3.) think-aloud that explains the mathematical proficiencies (Kilpatrick et al., 2001) required for solving a lesson's math problem(s). During session two, one can think of the "higher levels" as the students' ability to demonstrate the mathematical proficiencies revealed in the first session. In the second session, teachers help students overcome their misunderstandings by giving them feedback, providing multiple examples and assigning independent practice.

When her students came to the live classes to demonstrate the "higher levels" of a math lesson, Liz tried to provide guided instruction for an entire grade level (about 40+ students) in a mere 15 minutes, which meant that her students attempted to show Liz that they understood the "lower levels" of the math lesson taught to them from the video and she reacted to their attempts. She followed this procedure for three weeks but never felt satisfied with what she was doing. Liz remembered,

From the start with phase one, it didn't really feel right even though I was trying to make it like it was at school. It was about a week where I was telling myself, "okay, they're getting used to learning at home and if things aren't better in a couple of weeks, I'll make a change." But after one weekend, I was like, no it's not because they're learning at home, it's because this is just really not working.

When I asked how she knew her instruction wasn't working, she said,

I could just tell they weren't watching; I could see that they weren't completing their IXL¹ assignments all the way. You can tell on IXL if kids are trying or not, you could see that someone spent three minutes working on something.

IXL is a personalized online learning platform that many teachers utilized during the pandemic. One of the reasons teachers use this resource is because it can provide individualized learning skills aligned to state standards and track students' time on task and question/problem accuracy. When Liz logged into the teacher section of IXL, she saw that her students were not spending a lot of time practicing skills reinforced during the "higher levels" of her flipped classroom. They also told her they were overwhelmed and stressed out during their 15 minutes of live class time. Liz recalled,

I would start the class by asking how everyone was feeling. I'd say, on a scale of 1 to 5 let's do a quick check and see where we're all at; five was bad. A lot of kids were putting up 5 fingers. It was all threes, fours, and fives. No one really felt like a "one."

It was understandable that Liz's students felt overwhelmed because no one knew what the virus was going to do to them or their families. In addition to that, instead of having an entire hour to learn math concepts, her students were watching a 15-minute video on their own time, expected to come to class with some idea about what to do and then practice IXL math skills.

As Liz examined her instruction closely, the evidence she collected from her students caused her to realize that the way she was teaching was not living up to her expectations. She needed to make a change and this change marked the beginning of the second phase of her instruction.

¹ (<https://www.ixl.com/>)

Phase Two: “Share the Workload”. Even though Liz’s students “were really good with attendance” during phase one, she did not believe their participation during the live class sessions was effective. Instead of forcing her students to fit into an instructional model she felt was not working and blaming students for not completing the IXL skill assignments, she considered the idea that “less can be more.” So, she reduced the instructional video time, the number of IXL math skills to practice and used her live class time to share the math problem procedure with her students. Phase two began in early April, about three weeks after instruction went 100% online; she described it in this way,

I shortened the mini lesson by only covering the direct and the modeled, so this allowed me to try to share the workload of an example in class time. I still wasn't using Jamboard yet, but by completing a problem in live time with them, we were able to spend more time working together.

Besides reducing the instructional video time and the number of math skills to complete, Liz was still not satisfied because she could sense something was still not right. After consulting with her grade level teachers, they decided to create a daily schedule template in Google Docs and share it with the students. Liz justified their actions in this way,

At home it was really weird for them. I was talking to my teaching team and I pointed out to them that they don't have a schedule. A lot of them didn't have class until 2:00, so they'd sleep all day cause they were up 'till 4:00. We spent time helping them make a schedule in order to help them manage their time.

Although Liz’s students came to her class and completed the reduced number of IXL assignments, many of them missed other classes and did not hand in work. Before casting judgement upon their actions, she relied on the student-teacher relationships she built from “doing the little things, like sitting at the lunch table” to help her understand their home lives. These small acts, done when students attended school in-person, helped Liz see the connection between what she saw during her live classes with their personal lives,

I had a really big opportunity to get to know my students on a level outside of just teaching them. A lot of my students have a lot of baggage from home and it was a time where they could talk to me about it and feel like I was listening to them. It was fun, I had a good time eating lunch with them. I think all those things make a better learning environment because they knew they were spending positive time with me.

Experiences like eating lunch with her students provided Liz with a glimpse into their home lives. Office hours, time set aside to talk using Google Meet, and her live class check-ins gave her the sense they probably needed some “normalcy” while at home, in this case a schedule to follow. Liz said,

During class and in office hours they were saying that they didn't perceive themselves having time to do their work for school. But I knew they were only in school for one hour a day and they had time. They were up all night, sleeping the first half of the day, waking up and helping their siblings make food. They were so disoriented.

Despite the modifications Liz made to her flipped classroom and her willingness to help her students organize their lives, she was unhappy with what she built because she had not yet created a “true ‘shared’ portion of a gradual release lesson.” When Liz pushed her understanding of how to teach remotely under the imposed time constraints, and thought that it still was not

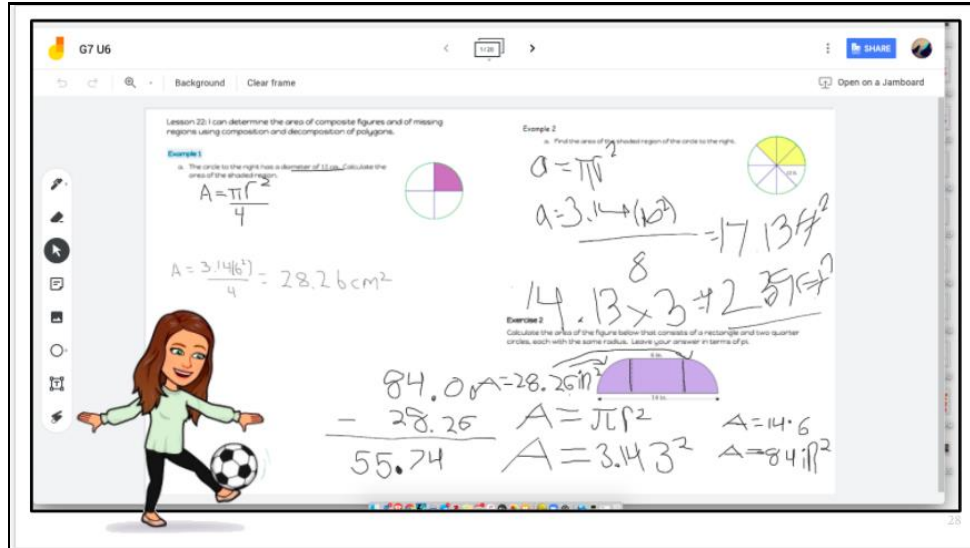
working, she was open to the idea of using Jamboard, a tool with the potential for sharing ideas. Liz explored this interactive whiteboard on her own time and thus, phase three began.

Phase Three: “Re-establish Balance”. Phase two lasted until Liz began reading GC Stream posts and emails from some of her 7th graders who expressed the need for help. Near the end of March one 7th grader posted, “i need help.” and a different 7th grader asked, “can I retry the quiz?” Toward the end of April, two 7th graders voiced their concerns in two separate emails. One student wrote, “hi i am so sorry its really latr but i am still doing ixl because i hit 79 and rn i am at 34 i mean i can still keep going but i dont want to keep going down.” The other student said, “i got 1/2 on the quiz can i retake it and get full credit? Also i got back up to 70% on the ixl lol.” These students were brave enough to post comments in public and send emails to Liz, and she knew there were many more who were challenged by the circumstances. She believed her students were “still overwhelmed” and she “felt like I was starting to lose touch with them. I didn’t sense that I was able to gauge their understanding very well. It was working, but I wanted to do better for them.” The students’ requests for help made Liz think deeper about her teaching, so she pushed her knowledge of teaching math remotely once more and adjusted her instruction for the third time.

Once again, she decreased the amount of time her students spent on IXL. Now that she was feeling more comfortable teaching online, she used Fridays as a day to review math content, an instructional approach rooted in her time as a third grade teacher. When she taught that grade she would “pick three standards they bombed on assessments and review them when she found 20 minutes during the school day.” This valuable part of the learning cycle was difficult to pull off in her current situation, so when she discovered Google Forms, a tool that enabled her to formatively assess her students’ mathematical content knowledge, she found a way to identify areas of weakness for review. Liz also learned about another new tool to help her understand her students and that tool was Jamboard. She remembered,

I used Jamboard to reestablish balance between teacher-student work in the problem solving process. teacher candidates could digitally “share the pen” to demonstrate their thinking. This was much more engaging for them and let me see their thought process more accurately. On the left side of the Jamboard I displayed what was covered in the mini-lesson and on the right side I gave my students similar problems that we would work on together.

This was the final piece to her instructional puzzle. Jamboard (see Figure 3) created the “true ‘shared’ portion of a gradual release lesson” because it “made lessons much more interactive/engaging, it allowed students to feel successful.” Liz said she, “could finally see, in real time, how my students were progressing.”

Figure 3*Shared Jamboard Used in Phase Three*

Throughout all three phases, Liz continued to seek the truth about her instruction because she took the time to think about her core beliefs about her students and her instruction. Her beliefs were described on a PD presentation slide,

Students bring a diverse set of experiences, skills and needs to my classroom and it is my responsibility to create an inclusive, nurturing learning environment that fosters the development of the whole child. I believe that it is my responsibility to provide differentiated instruction that results in all students maximizing their learning potential by cultivating positive relationships where mutual respect/trust, as well as clear/consistent behavioral expectations are the top priorities.

After hours of talking to Liz about how she taught math remotely, I knew how my Fall 2020 math methods teacher candidates would teach, but more importantly I knew that my teacher candidates' success would not be *how* they used the technology, but in their desire to reflect upon their remote teaching opportunities like Liz. Now that I had a better understanding of why Liz taught the way she did, I needed to know if we could teach at my PDS in the Fall, so I called on Jill to find out.

Our Shared Professional Knowledge Landscapes, Part III

The Disposition to be Open-minded

Individuals who demonstrate the disposition to be open-minded are able to consider and try out new ideas, look at things from different perspectives and look beyond the obvious (Ritchhart, 2001). In the following story, Jill described why she advocated for opening her school. She looked at the need for school to be open from the viewpoint of many of her students and parents.

In the Fall of 2020, the Covid-19 pandemic was still an issue in schools across the United State; many school district leaders employed a remote-only instructional model and many superintendents in my PDS consortium would not allow teacher candidates into their schools. Jill, however, was not one of those administrators. She allowed my teacher candidates to come into her school for three reasons: (1) she trusted her cleaning staff, (2) she believed in the district

leadership of the Assistant Superintendent of Instruction and (3) because I told her that I knew how we could teach her students remotely. Jill said,

I've never been worried about anything because I knew that our cleaning staff was doing the right thing because they were following a strict cleaning protocol every single night. Marcia (pseudonym and assistant superintendent) said follow the science, so we did. And you did the right thing, you went virtual.

I've had a relationship with Jill and her teachers for seven years and so I felt comfortable asking her if we could teach in her school in the Fall. Jill, a former graduate of my college, believes in our partnership, she thinks it is "a win-win situation for both of us, because you need us and we need you." She knew that my former teacher candidates have always treated this partnership with respect, so she did not hesitate to offer her school and students to us. She told my teacher candidates and me on our first day, "You're trailblazers, this is new for all of us." Jill's confidence gave me comfort because I knew that MJ and his classmates would be given the opportunity to practice teaching math. Despite this knowledge, I was still not sure why her school district decided to allow partial in-person instruction instead of remote-only teaching like many schools in our area.

It became clear to me when Jill told me a story that, unfortunately, could have been told about a few more families from her school. During the summer, the administration team in her district held a school-opening planning meeting and she pleaded her case for opening school for in-person instruction by telling them about the sad fate of one of her student's grandmother,

I have a mother, of one of my 4th graders, who just found out her mother died.

Grandma was the primary caregiver for this little boy and so he has to come to school. The family doesn't have any food in the house so I'm sending food home for him.

Tragic stories such as this were not the only reason Jill needed her school to open in the Fall. She knew that many children in her district, not just her school, were not able to learn when the district went fully remote in the Spring of 2020. She could not let that happen again, she said, "There are children along the lake shore and in our village that don't have the internet." The parents in the district also expressed an interest in having their children come back to school. Jill remembered reading comments on a district survey that said, "We want paper packets, it's easier. My child does better with paper packets and pencil." Providing students with paper packets of work could only be accomplished if the students came back to school, at least for a few days.

Jill and the assistant superintendent's persistence convinced the School Board to open school in the Fall in hybrid mode and this gave my teacher candidates a chance to work with real kids and use what they learned indirectly from Liz's "lived experiences."

Feeling a Lot More Comfortable

I began this paper with MJ's story about teaching Echo how to divide fractions in a remote manner. At the end of his story, MJ said that Echo "... felt a lot more comfortable doing this type of problem." I think we all feel like Echo now because the unprecedented problem of knowing how to teach and learn online has now become part of all of our *professional knowledge landscapes*, Liz's, Jill's, my teacher candidates' and mine. However, based on Liz's storied experiences, knowing how to teach with technology will not be enough to make a difference in the lives of students learning remotely. Teacher candidates who were not able to teach real children, even in a remote manner, were not able to put practice at the center of their teaching lives. Despite the uncertainties of the pandemic, my PDS partner, led by Jill, responded in a

strategic manner and so teaching math to real children was put front and center in our teaching lives.

We were able to plan and teach K - 5 students remotely because I learned how to teach math in this manner from Liz. My teacher candidates' experiences led to reflections about how *they* taught math and not about how a *teacher in a video* taught math. Jill and Liz enabled my teacher candidates to actively engage in my PDS' community and for that, they are COVID Heroes!

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Appendix A

Guided Reflection Questions² for Group Discussion

- 1) How did you decide what to teach today?
 - a) *HLP 5: Choose and adapt curriculum materials and tasks specific to learning goals.*
 - b) *HLP 17: Interpret and communicate assessment data to make important educational decisions.*
- 2) How did you teach today?
 - a) *HLP 6: Make learning explicit through modeling, guided practice, and independent practice.*
 - i) *HLP 7: Use strategies to promote active student engagement in whole class and small group instruction.*
 - ii) *HLP 8: Scaffold instruction during lessons.*
- 3) What happened during your lesson?
 - a) *HLP 12: Self-analyze teaching for the purpose of improving instruction and learning.*

² High-leverage Practice were based upon the descriptions of HLPs in Figure 2 from the work of (Maheady et al., 2019, p. 360)

Appendix B

Google Slide Math Intervention Framework





15. Omar has $2 \frac{3}{4}$ cups of dough to make dumplings. If he uses $\frac{3}{16}$ cup of dough for each dumpling, how many whole dumplings can Omar make?

Try to solve this problem on your own.



1

How did you feel about solving this problem?

-  A. **Confident** because I can solve the problem.
-  B. **Overwhelmed** because I am not sure how to begin.
-  C. **Kind of Confident** because I am not completely sure if I have it right, but I think I am right.
-  D. **Embarrassed** because I do not want others to think I do not know how to answer the problem.



25.) Tess has $4 \frac{1}{4}$ cups of water to make stuffing. If she uses $\frac{3}{12}$ cup of water to make one serving of stuffing, how many servings of stuffing can Tess make?

What do I know?

- 1.) Tess needs water to make servings of stuffing.
- 2.) She has $4 \frac{1}{4}$ cups of water.
- 3.) She needs to use $\frac{3}{12}$ of a cup of water for each serving.
- 4.) I need to divide $\frac{3}{12}$ into $4 \frac{1}{4}$.
- 5.) I know there are $4 \cdot \frac{1}{4}$ cups in one cup $(\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}) = \frac{4}{4} = 1$
- 6.) I know there are multiple steps to dividing fractions.

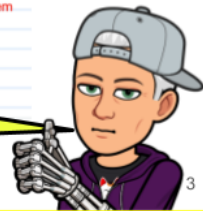
My Solution

- a.] $4 \frac{1}{4} \div \frac{3}{12} = ?$ set up the problem
- b.] $(\frac{17}{4}) \div \frac{3}{12} = ?$ convert the mixed number $4 \frac{1}{4}$ into an improper fraction $(\frac{17}{4})$
- c.] $(\frac{17}{4}) \times (\frac{12}{3}) = ?$ write the reciprocal of $(\frac{3}{12})$ which is $(\frac{12}{3})$
- d.] $(17 \times 12) \div (4 \times 3) = ?$ multiply the numerators and the denominators
- e.] $204 \div 12 = ?$ divide the numerator by the denominator
- f.] 17 servings can be made write a statement to answer the problem

What do I want to know?

- 1.) How many servings of stuffing can Tess make with $4 \frac{1}{4}$ cups of water if each serving requires $\frac{3}{12}$ of a cup of water?

I will show you how I would solve this problem by explaining my solution.



15. Christine has $1 \frac{2}{4}$ cups of dough to make cupcakes. If she uses $\frac{2}{8}$ cup of dough for each cupcake, how many whole cupcakes can Christine make?

Problem Solving Strategy

1. What do I know?
2. What do I need to know?
3. Make a plan.
4. Test my plan.
5. Evaluate my plan. Did it make sense?
 - a. If yes, make a claim
 - b. If no, repeat steps 3 – 5 until your plan makes sense.

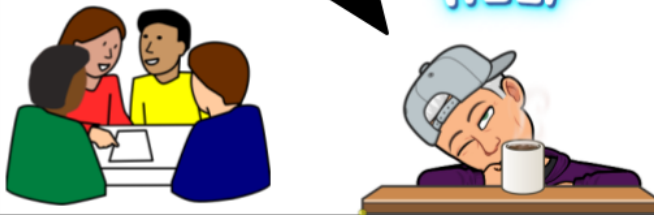


I will ask you questions so we can solve this together



15. Ross has $5 \frac{1}{3}$ sticks of pepperoni to make pizzas. If he uses $\frac{2}{6}$ of a stick of pepperoni for each pizza, how many whole pizzas can Ross make?

You will tell me how to solve this problem so we can solve this together.



Problem Solving Strategy

1. What do I know?
2. What do I need to know?
3. Make a plan.
4. Test my plan.
5. Evaluate my plan. Did it make sense?
 - a. If yes, make a claim
 - b. If no, repeat steps 3 – 5 until your plan makes sense.

15. Je'lyn has $3 \frac{2}{5}$ cups of olive oil to pour on bowls of salad. If she uses $\frac{4}{15}$ cup of olive oil for each bowl, how many bowls of salad can Je'lyn make?

You will solve this problem by yourself so I can see how much you learned. 😊



Problem Solving Strategy

1. What do I know?
2. What do I need to know?
3. Make a plan.
4. Test my plan.
5. Evaluate my plan. Did it make sense?
 - a. If yes, make a claim
 - b. If no, repeat steps 3 – 5 until your plan makes sense.

Math Concepts

1. [Dividing Fractions](#)
2. [Mixed Fractions](#) (mixed numbers)
3. [Simplifying Fractions](#)
4. [Measuring Cups](#)
5. [Multiplication](#)
6. [Division](#)

Sometimes you have to take the wrong road to know its not the right road. - Dr. Shively

Problem Solving Strategy

1. What do I know?
2. What do I need to know?
3. Make a plan.
4. Test my plan.
5. Evaluate my plan. Did it make sense?
 - a. If yes, make a claim
 - b. If no, repeat steps 3 - 5 until your plan makes sense.

