

Appendix

Checklist for Technology Equity

Based on our research and practice, we recommend attending to the following considerations for using document cameras in online settings.

- Determine cost of camera and any adaptors
- Determine who will cover the cost of the camera and, if needed, adaptor
- Decide on a document camera model, considering factors such as:
 - Stability of camera arm
 - Built-in light, focus, and zoom features
 - Whether the camera requires the use of application software or can operate as a “plug and play” tool
 - Our preferred model is made by InSwan
- Survey students to ascertain:
 - Wi-Fi bandwidth
 - Device (e.g., laptop, tablet, or smartphone) used for teleconference calls
 - Need for adaptors to connect document camera to device
 - Mailing address for camera delivery
- Allow time for cameras to be delivered to students
- Plan instruction to introduce the camera
 - Make time for students to “play” with their cameras in a low-stakes manner
 - Normalize that initial attempts may be messy and are opportunities to learn how to work with the technology
 - “Show and tell” about an object or image
 - Small groups in break out rooms will cycle through faster than each student sharing with the whole class
 - The instructor should be on call to pop into break out rooms to answer tech support questions as needed
 - Based on our students’ experiences, the application software available with the camera often created problems and did not add appreciably to the quality of shared images
 - Incorporate sharing visual images into regular classwork
 - Students can represent their groups’ work in whole class discussions
 - Students can share fluidly and organically in small group work in break out rooms
 - Notice and praise creative uses of document cameras to compare and contrast different solutions or drive learning in other creative ways

Data Excerpts, Initial Coding, and Code Book Creation

We share essay excerpts sorted by codes and conclude with the initial code descriptions that were synthesized into the code definitions.

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Creative	Code Count for Creative/ Replaces: 0	Code Count for Creative/Amplifies: 0	Code Count for Creative/Transforms: 16 81795: Throughout Course 2 I was able to use the document camera over zoom to share with classmates. I really enjoyed using the camera in the small group. It was nice to be able to see and follow along with my classmates' work. It made the class much more inclusive and supportive. This was a great addition to the class because I also feel like it allowed everyone in my group to be on the same page and share similar ideas. This was a challenge in Course 1 because a lot of time my group members would work on their one and it made it difficult to understand what we were learning in class and made it hard to work as a group. Having the document cameras made everyone more engaged and people collaborated even more. I am very much a visual learner so this made it easy to see what people were explaining and actually work through problems with my classmates. I enjoyed being able to see their thinking as they demonstrated their steps towards a solution. Rather than following along and trying to visualize what someone was saying in Course 1, in Course 2 I was fully engaged and felt more a part of the group's work. This certainly enhanced my understanding. 99741: I was only able to get the camera to work twice. When it did work--it was extremely awesome, and truly, a really helpful tool!! I absolutely enjoyed using it when I could. I thought that it removed a lot of barriers to learning online, and I could be more engaged with my classmates. Even though it only worked twice for me, I still benefited immensely from my classmates using the cameras successfully. Like I said, it made learning and engaging a lot easier and more fun. It allowed me to follow along, ask questions, and for us all to communicate with one another because someone could be drawing out what we were all discussing, and we could correct any misunderstandings or errors quickly. It made us feel more like a team, I think, and allowed us to think more collectively. I wish that I wouldn't have run into so many issues while using it. What would happen is

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			Zoom would freeze up and I would get kicked off because the Zoom application would have to close. However, I was operating with a Chromebook this term, and just so you know--encountered many, many (many!) technical issues (ie. Zoom troubles in general all the time) outside of not being able to use the camera. That is to say, that I believe my issues were definitely rooted in the fact that I was using a Chromebook, not the document camera itself. Overall, I think these cameras are essential to learning math online! I honestly am so grateful we had access to them this term! 105623: I really enjoyed having the document camera this term. I was able to figure it out and used my roommates HDMI cord, thankfully. Securing the HDMI cord was the part that made me the most nervous, just because I didn't really know what it was and I thought I would have to order one before class, but thankfully my roommate had one she lent me. I was usually the recorder this term because my document camera always worked, when sometimes my classmates' document cameras did not work. It helped me a lot this term. When I was the reporter, I found that my notes were clearer and more color-coded since I knew they would be seen by the class. Since I was the reporter often, it definitely kept me on top of organizing my notes for my future self to understand. I also appreciated the zoom and auto-focus aspects of the document camera because it could be difficult to configure on my desk some days. When others used their document camera, it helped me better understand when I had questions, or I was able to more clearly explain their work because it would match across all our group mates. Sometimes some group members would not have a working document camera, but would have an iPad they were working on and would share their screen. It was really cool to see work clearly that way too with their apps they could write on and add shapes to. I was quite entranced by the app, even though I do not have an iPad and will not be using it! My groups were adaptable this term, and the document camera was definitely a valuable tool for us to have! I even used the document camera for a non-math presentation once this term, so that was very convenient! I really appreciated it and will most likely continue to use it. 126663: The good old doumate camera. I have to say that it was so helpful to have. I know taking the first course of we

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			didn't have them and it was a bit challenging to interact and really feel like you were collaborating with one another without having something useful like the document camera. Although we ran into some issues with it , overall it was great to have. I believe it to have been super beneficial to my learning and an easy way for me and my classmates to collaborate. I loved seeing other people use their cameras in class because it was easy to see exactly all their work and thinking on paper. I know personally in all my breakout rooms we used the heck out of these cameras, we messed up and could erase our work and being able to see that was awesome, we would use colors so it was easy to define and see everything and we even would doodle and draw pictures as for some of us that worked best. It really gave me a sense of how each person learned visually. Through the errors and difficulties we had I was still pick the camera to use as this course was very impactful and beneficial and the cameras definitely added to the learning (besides [instructor's name] being an awesome teacher). 91630: I used this camera for the online Zoom meeting, small group discussion, group presentation, and video call. It helped me a lot during this most-remote period. During Course 2 class, I used this camera for attending the class, small groups discussion, and presenting the work to my classmates. For instance, when we are in the small group discussion, it would be hard for us sometimes to explain our feelings and thoughts in words, it would be better for us to show our classmates our process. Therefore, the document camera can help me mix the process and explanation together, which helps classmates better understand our ideas. Moreover, it would be easier for the desktops to using the document camera. For example, if I use desktop to have a Zoom meeting, it is better for us to have a camera, the document camera helps me solve this problem, makes me feel more satisfied with online class meeting. Secondly, document camera not only promotes our group discussion, but also helps to exchange ideas about mathematical problems. To be more specific, with the camera, classmate can easily show instructor and peers how they do with the questions while having different understanding and ideas. For example, when I was in the discussion group, we may have different ideas about the same question, usually it would be hard for us to tell in words as it is too abstract, instead, we can show them how we do and easier to exchange the ideas. In other words,

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			It saves the time for explaining the ideas, which makes the class much more effective. 90731: I think that this class would not be able to function as an online class without the use of the document camera. I have a few examples of this: Using the document camera to put up the problem set and have the facilitator read the question aloud to allow the group to maintain the same pacing. The best use I saw was having the reporter be the one doing the writing and the facilitator doing the reading. When explain different strategies for the same problem I was in groups that would quickly flash through multiple groupmates papers via document camera so that we could visually see what was being verbally explained. By having the group work off the document camera, it allows the reporter to be prepared to explain the group work back to the class. One of my groups had an ESL student in it and I could feel the student's hesitancy when explain concepts and yet when asked to explain via document camera the student was able to show really cool, new ways to look at the problems. I noticed that the students were not competent with the document cameras were also the students who were not virtually present except when forced to be. I have a feeling that it was a minimal effort on their part that was causing a problem with the use of document cameras. I found the document camera easy to use and I hate tech stuff. The document camera felt very low tech because it was just like using an overhead projector. 84708: In Course 2, I was able to share and explain my work in the whole class discussion and in break out rooms with my document camera. I would use my document camera with my fellow break out room classmates and we would be able to share and explain our mathematical work for that lesson. The document camera helped me a lot while being in a math class online because I was able to write out and show my work to my classmates and show them how I was understanding a problem. This also helped when I became confused on some lessons and my break out room partners would be able to share their document camera screen to explain how they got the steps to the answer of a problem. The document camera definitely supported me with learning mathematics especially in an

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			online mathematics class because I was able to see other's descriptions, explanations and answers while not being in the same physical classroom with one another. If we did not have the help of document cameras throughout this term I believe I may have struggled more on some lessons because I would not have the material to physically see others' explanations in the course. 71626: For me, using the document camera was really helpful this term. On the first day of class, myself and the rest of my small group all played around with our cameras and tested them out, and with my group members help I was able to figure out how to use my camera pretty easily. When it came to sharing my work with my group members, having the camera made it a lot easier to share math work that involved drawings/number lines/or shapes of any kind. Having the cameras also made it a lot easier for my group members to share their work with me, which was really nice. I can remember one day in particular when I was confused on how to go about drawing a 3D shape, but one of my group members was able to really easily turn her camera on and show me how she did it. Also, I ended up being the "reporter" a lot this term, and being able to use my document camera made it really easy to share my work with the whole class. Instead of having to have Professor Ruef scribe for me, I was able to just directly share my work with everyone, which I think helped me to present my work in a more clear and concise way. Overall, I'm immensely grateful for being given a document camera this term, and I'm confident I'll be able to use my document camera in the future to continue to support my learning via Zoom. 10484: I had a lot of fun with the document camera! I was able to set it up easily and start using it right away. The best use for it was for communicating with my small group members when we would be working through problems, especially if we were confused or disagreed. There were multiple times throughout a typical breakout room where one of my group members would need to share their work for all of us to grasp the concept. Oftentimes, X or X would share their work with me to aid in my understanding using the document cameras. Sometimes we would all have our cameras on so that we could compare and contrast our different methods for solving the same problem. In whole class discussions the cameras were a great tool for moving through people's work in an efficient way, and it was nice to see people's unique representations of the problems. The camera supported my mathematics learning by giving me a

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			communication tool during a time where communication is difficult. I was able to better express my ideas and confusions while using the camera, and it was easier for my peers to help me when they could see what I was struggling with. Overall, the document camera was a huge success for me. 110076: For Course 2, "The Foundations of Geometry Learning," I was able to use my document camera in small groups and in whole class discussions. Most of the other people in my small group were also able to use their document camera, and, in whole class discussions, I was able to see observe the ways in which both the professor and the other students in the class, used their document camera in whole class discussions. Using the document camera myself is something I would want to practice with a lot more if I myself were going to be leading a math class for students online because it is something that doesn't feel entirely natural, and there are so many different factors to consider when you are using it. Where is the camera? How much of the page can be seen? Is it in focus? Are you able to cover up parts of the paper that are not being focused on at the moment so the work that is the focus is able to be really looked at in detail? Can you see what you're doing while you do it? There's also something about it that feels like an out-of-body experience, where you're doing something physically on paper in your room, but then it is being projected via the camera onto the screens and into the rooms of all these other people, and you can see it happening on the screen, because you can see your physical object or drawing both physically in front of you and on the screen, and you can see other people reacting to it – it's like being transported or something – it's a lot going on all at once, and it doesn't feel entirely familiar. All that existential experience description aside, I found it beneficial to my learning because it facilitated the seeing, doing, and sharing of mathematical learning. One major way in which it helped is that it made it much easier to show & share what is happening with manipulatives when you have a document camera as opposed to when you don't. For example, when we were using the pattern blocks to make other shapes, or to show angles (the way in which different shapes could be put together to make 360 degrees, or 180 degrees, etc.), it was much easier to share and show that with the document camera. When using the unfix cubes to work out visualization, that was also easier to share and show with the document camera. Many times, in small group discussions, when a classmate

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			was trying to explain something, we could ask them, "Show us what you mean," or "Show us what you're thinking," and with the document camera, it was very easy for others to show, share, and understand what the other person was thinking. They could either share with us their work by projecting their paper, or they could draw it out in real time and we could see them doing so and, for me at least, that really illuminated my understanding. With math, it seems like there's only so much you can "explain" with words – it really is something that you have to see and do to understand, and the document cameras helped with that seeing and doing. I also think it was very beneficial from a future educator's perspective to start learning about the different ways in which you can use a projector screen as a teacher in the teaching of mathematics. Multiple times in class, Professor Ruef outlined the different ways in which a teacher might help students focus on specific elements of a problem, or parts of a worksheet, by covering up the other parts of the work, or the ways in which a teacher might prepare in advance for a math class, and reveal work already completed as they went through the different parts of the problem. It was very illuminating both to experience and practice these skills, and to see others work through them, learn them, and practice them. It demonstrated the complexities of teaching that students who have never thought about teaching might not ever pick up on otherwise. Outside of class, I have thus far experimented with using my document camera in meetings at work with my student workers and co-workers. When I am trying to explain my ideas or thoughts about something, it is my personal tendency to want to draw it out in some way and it has been difficult to find ways to do that in a virtual setting, particularly ways that are quick and relatively easy. Yes, there are online white boards and screen sharing that can happen, but it is very different to draw something on a screen than it is to draw something physically with your hands and share that. I've found it much quicker to plug in the document camera and use that to share a visual as I draw it out in person than I have found it easy to share a whiteboard drawing via a screenshare. When I'm thinking about explaining something, I look around and think, "What is something close by that I can use to get my point across?" I'll look for a pen, a piece of paper, a whiteboard, an example of an idea I'm trying to convey, which is often something that's just in my head. If you're a teacher teaching math, trying to get a concept across to a student, if you have manipulatives around you, you'd grab one of those. It is easier to

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			physically grab something than to virtually grab something, and so I think having the document camera available as both a learner and a teacher made it much easier in many ways to share, learn, and do math together in a virtual setting. 110510: I got a lot of good use out of my document camera this term. At first it was a little daunting and difficult to set up but after it was set up I had no issues. It was super helpful for me in groups and for presenting because I did all my work on paper instead of on the computer like some of the people in my group, so I found it especially helpful. I was able to present easily without having to have you scribe so I was learning some good teacher skills. And when we were working in groups and I would have a light bulb moment or my group mates didn't understand what I was saying I could easily flip it on and walk them through what I did. The only other small issue I had was that I did not get a macbook adapter so I had to find mine, which I already owned one so it wasn't a big deal, 111079: I was able to use my camera every time I was assigned and other times when I was not. I think the camera was very helpful in making sure the whole group was on the right track and making sure that we were all agreeing with the steps and how to properly work out and explain a math problem. My first group didn't run into any problems using the camera, we only had a problem with people getting their cameras or adapter to use their cameras which made it a little difficult for everyone to try out the cameras and rotate turns. My second group was much better at having our camera and using them on our turns and making sure we go through all the problems together. They really helped with learning how to explain things more to a group of people and it helped to double check that we knew what we were explaining or learning. Others using the camera helped support my learning by seeing how other people did steps to a problem or just mainly checking my work, which helped a lot. The cameras also helped us write out each other's ideas and it was helpful in letting everyone see that on paper and making sure we are all understanding each other and are on the same page. Overall I really liked being able to project my work not only to my small group, but to the class as well because I know I learned a lot from other people's work that was shared with the cameras, so I hope that other people feel the same way when I was presenting my groups work and ideas to the problems.

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			100130: I really enjoyed using the document camera, but I've been fortunate to use them before. They are incredibly handy tools to help with communication. So often in group work, we struggle conveying abstract ideas. The doc cam allowed us to materialize those ideas and communicate effectively about them. The tech side of things seemed to cause trouble for some folks. I have a tech background so setting it up, trouble shooting, and utilizing some advance features came easily. Like with other tech issues, it can be frustrating when others have difficulty, but mostly because I want to help. But that help usually takes more time away from the group or class. I think the doc cam came in handy during group work. There were even a few times where two or three of us would take turns displaying different ideas in the same breakout session. I felt it gave us the opportunity to work through problems and observe the steps to resolve them. I think the doc cams provided a unique opportunity to collaborate. Unlike in Course 1, in Course 2 we were able to share our ideas much more in-depth. Moreover, my experiences with the instructor working through issues prior and after class, the doc cam was incredibly useful. My instructor and I were able to really work through more complex math problems and concepts. Especially, with all my numerous questions. I think the doc cams can be a very useful tool, especially when distance learning. I know from my experience in the tech industry, the more ways to communicate, the better chance you have of conveying a message. It's my opinion that the education field should adopt this principle as well. We often speak about the different ways students learn. I know I'll be having more conversations about not just the methods of teaching, but also in the technology we choose as tools for those methods. 109844: With my current difficulties with my computer this term, I was unfortunately unable to have the doc camera work during zoom. Although, when I went home for a day I borrowed my moms laptop and it worked great with hers! It made me excited to maybe use this in future classes, or even in my future classroom! My teammates in my discussion

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			used their doc cameras plentifully, and that helped with the visualization of the mathematics they were doing, especially over zoom. It helped especially when I was having a hard time with the problem, and we were trying to work through it together. It gave a better sense of the experience we may get if we were in person when it comes to our learning and teamwork together. Overall, it's a great tool. 107736: Throughout this term I used my document camera regularly over Zoom during small group meetings. Personally, I loved using the document camera. It helped me explain my thought processes to my group members and practice explaining concepts while using a visual. A couple of times I even met with my dad over Zoom to receive help with my homework. I used my document camera so that he could look over the worksheet and see my work. Using the document camera was more helpful than simply sharing an image of work because I could show my thinking in real-time and modify my work if I needed to. It was also beneficial to see my classmates work when we shared our math during whole group discussions because we could point to specific ideas as we spoke, and erase or add to our problems based on feedback to make our work easier to understand. While using my document camera, I realized how helpful this tool can be for teaching. I plan on using it to record mini lessons for my students, teaching online, and possibly setting up a station in my classroom where students have access to the document camera to explain their work to partners. Last term I was tutoring a fifth grader with math for a field study and we always used the whiteboard feature on Zoom to draw visuals and explain our thinking. Now that I have used the document camera, I wish I had one when I was teaching this student because it was difficult to use the whiteboard on Zoom, and it would have been more effective to explain concepts if I could write on paper and share my screen. Since this is my last reflection I want to reiterate how much of a difference you have made in my learning. At the beginning of Course 1 I was dreading taking this course because I had always considered myself "bad at math" since middle school. I was doubtful that I would succeed in this course, and I was frightened to teach math to my future students in fear that I might not understand the concepts and, because of this, hinder their academic success. However, now that I have had you as my teacher, I know that it is 100% okay to make mistakes, and math really isn't as scary as I

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			had thought. Making mistakes is part of the learning process and part of the reason that I struggled with math in the past is because I was afraid to get a wrong answer, so I would give up. I want to show my students that making mistakes and trying your best is important, and that we can incorporate creativity and fun into math instead of being afraid of it. I think that it is time to break the math anxiety cycle and start instilling a love for math in future generations. If it wasn't for you, I don't know when I would have realized these ideas, and my fear of math might have prevented me from believing that I can be a great mathematician. 97181: I used the document camera we were sent quite a few times throughout the term. Initially, I'll admit, I was pretty skeptical about using them because of technical issues and also because I felt nervous about displaying my work on a camera. But I ended up appreciating it, and also finding value in using it to explain my thinking. Firstly, when I would use it as the recorder, it helped me to ask for help when I needed it because my work was on display. And because I was recording it, I wanted to make sure I really understood what I was writing down. Also, others could see my thought process and point out mistakes in my work which helped my own understanding. Sometimes when I record my work during class, I'm not super thorough with it and I end up having to go back and over things to remember what something I wrote down meant. So, using the document camera helped me to be more thorough and investigative with my class questions, which helped me understand the material in the future. Another aspect I appreciated was being able to see my peers work and be exposed to other ways of thinking. In Course 1 we would share ideas and methods, but mostly we would not show our work visually in our groups. Having that added layer in Course 2 was so helpful in comparing my work, and also making sense of problems I didn't understand. I appreciated it when someone offered to turn on their document camera so that I could see the way they were thinking about a problem. It felt like we were actually working together and collaborating, albeit virtually. 99979: Based on the entire quarter's study, the document camera has many benefits. First of all, it's convenient for us to sharing the problem set or lecture with our classmates. At the same time, it can but is not limited to math classes, we could use it during another class when we have some group projects. But it also has some limitations. For example, when we are having class, but we are not

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			taking the class at home, we might not use them. Also, since when using the document camera, you must download the corresponding software. If students are taking class within their smartphone (me), then the document camera is not helpful at all. However, I think the document camera is a good way that engaged students and professor to work together, which is important for comprehension and understanding. In addition, document camera could help me to avoid the idea that I can't express. Sometimes I might forget some words, or I don't how to pronounce the specific words, I could use document camera to help me with that. I just need to write down the idea that I want to express then my classmates and professor will see it. But there is also a problem, because this time the document camera was sent to us by the teacher rather than purchased by ourselves. In the following courses, unless the teacher has a sponsor, the students may not be willing to buy this camera. Since students might cost a lot of money on their textbook, I think this is the most serious problem that teacher needs to consider. Overall, this document camera is beneficial for studying and communicating with the class.
Interactive 2 Connecting Verbal and Visual	Code Count for Interactive 2/Replaces: 0	Code Count for Interactive 2/Amplifies: 10 105926: Receiving a document camera was such a treat. It made me feel like a teacher! Unfortunately, I was not able to use it this term for showing my work. Not for any bad reason, it's just that my work is done electronically, so I didn't feel it would be efficient to point the document camera at a screen. However, now thinking about it, I wish I would have at least tried. With that said, I look forward to getting an opportunity to put this document camera to use. I did enjoy getting to see the work of my classmates through their document cameras. It was fun to watch them walk us through their lesson packets while looking at their personal work and even their thought process through that work we saw. I am also just grateful to have gotten the opportunity to be a part of not only the document camera experiment, but also just this course and group of people. 92585: Honestly, I did not use my document camera that was given to me. I had many intentions of using it, but the biggest factors were that I had to quarantine for four weeks at my permanent home in California during the term and I got a new computer. Part of it was just forgetfulness while the other was me putting off setting it up until my new computer arrived and	Code Count for Interactive 2/Transforms: 2 106326: When I first received my document camera in the mail, I must admit that I was a bit skeptical and hesitant to set it up, mostly because I was worried that it would be difficult to use and expose me for how un-tech-savvy I really am. However, I was quite pleasantly surprised at how simple the setup ended up being. After I got the camera ready to go, I definitely experienced a little confusion when it came to actually using it in class (i.e., Is my paper facing the right direction? Is it focused?), but after the first few times, I felt pretty confident. It was a really good experience to be able to practice using tools that I will most likely need to use in my future teaching career. I mostly ended up using my document camera during our whole-class discussions, when I was the reporter for my group. I found it to be especially useful when talking about problems that had more visual elements, when actually showing my paper was essential to getting my point across. With remote classes, I often get bummed out because it feels like I'm missing out on what could be some really great learning experiences if the class was in person, but the addition of document cameras definitely helped me feel like I was getting as much as possible out of our class. Being able to share work with my classmates and see

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		then I went to California. I was also a little concerned with the space on my desk and did not want to write on the pad for the doc cam. It sounds a little cray, but I was afraid of messing it up. I wasn't sure if we were giving them back and wanted to make sure that mine was in pristine condition if it was returned. Overall, I do plan to use it and I am still debating whether or not I will take 410 (473) in the Fall. If I do choose to take it, then I will definitely use my doc cam then for anything that might be applicable. However, I loved seeing other people use their cameras during class. I think sometimes it can be hard to explain or scribe exactly how someone else did their work. Some of the personal strategy can get lost in the explanation. It was way more helpful for someone to share their work through a document camera than to just explain the problem, although that worked very well in its own way. The document cameras were extremely useful and I appreciated having them in our class. 84769: I was able to use my doc camera a few times in the breakout groups near the end of the term, and I actually really liked it. I unfortunately did not have a desk until about a week ago though so trying to get it to sit up before then was really hard. I actually found myself paying closer attention and learning more through my peers using the doc cameras as well. It made it a ton easier for me to understand the steps that they were taking and how their thinking was working. I think using the camera helped me get my point across as well. I found myself working harder on the problem I was working through on the doc cam as well. I also don't mean to sound weird but it almost made the problems easier? I don't know if it was because I just was more in the right set up or what but I really enjoyed it. I am super excited to use my doc cam more especially after getting a desk too! Thank you so much [instructor's name] for working that out for everyone and really caring about us this whole term. It really meant a lot. 93974: My document camera was very helpful. I used it multiple times throughout this term both within my Course 2 class and outside of the class. First, I was worried that setting up the camera would be complicated. I browsed through the instructions quickly. I opened up the camera without plugging it into my computer and left it on my desk. When we had class, I plugged it into my computer which had a USB port so it was easily accessible. I was worried that switching cameras would be complicated but it was easier than I had originally thought. The issue of the image being flipped on the screen compared to my computer was confusing. I solved this by physically turning the camera and asking my group members to tell me when the image was clear and normal. I did not use any of the buttons	their work made the experience of the class much more personal and engaging. I would absolutely say that the camera supported my learning in more ways than one. 106326: First, the experience of using the camera itself was a good lesson in techniques that will be very useful to me as an educator. Whenever someone used their camera in class, I found myself picking up on helpful tidbits, such as using a pencil as a pointer or covering up parts of the paper to make my work easier to follow. In terms of how the camera supported my learning in mathematics, being able to see the variety of ways in which my classmates represented their work visually was really valuable and helped open my eyes to ways of thinking about math that I wouldn't have thought of on my own. I also found it quite helpful when my small group members used their cameras to share their own work, especially if there was a particular problem we were confused about and wanted to work through together. Overall, I would say that having this document camera was absolutely useful for me, and will continue to be useful in the future. It's something I'm really grateful to have in my possession, especially as we move into another term of remote classes. I can certainly see myself using the camera in future classes, both math and not-math related. I think it will come in especially useful when doing things such as giving presentations. I also really enjoy doing work on paper as opposed to digitally when I have the option, so the camera will definitely come in handy in allowing me to share that! I'm glad to have had the opportunity to try out this camera, and I think it made the unfortunate necessity of remote classes a little bit better and helped me connect more to what we were learning.

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		on the camera and simply left it as it was. One of the main times that I used the document camera was during my small discussion groups. During this term, when I had a question for my group members, I easily switched my camera on Zoom from my Facetime HD Camera to the document camera. This made it easy to walk through the steps of my work. Next, I used the camera to show my work when I was presenting. When the work on my paper was busy and the document camera only had the full picture of my work, I would point with my finger or a pencil to show my classmates the specific work I was talking about. One time of note that I did use the document camera outside of my Course 2 class was during an advising appointment. I had a piece of paper, that I was referring to, that only I physically had. I wanted to show my advisor the parts of the paper that I was talking about so I plugged in my document camera. My advisor was impressed that I had the camera and was grateful that I was able to show him the paper I was referring to. Lastly, I believe that others using the camera has supported my learning because it gave me the opportunity to work through problems with my classmates in a visually supportive manner. During Zoom, holding up work and trying to write things out can be a lot to juggle. Plus, the process of writing on paper then holding it up to show people can be time consuming. Furthermore, if someone were to write out a problem, then try to verbally explain it, the written out work can be visually overstimulating. By having a document camera, it gave me a chance to see the work slowly worked out or made things within the screen more "calm". I am grateful to have had this resource. 94951: I did not use my camera for this class. I was able to set it up, but when I connected it to the computer it asked me to download some stuff and when I tried going to the site and reading the instructions I wasn't really sure how to download what I needed to so I never really got around to figuring it out. I don't know much about computers, the laptop that I have been using this term for class and schoolwork belongs to my partner, I should have tried harder to figure it out though. While I wasn't able to use the document camera for class, I do plan on using it next term. For my job I tutor students online through zoom, and it just dawned on me this week that using the document camera could be really helpful in explaining certain topics! I would say it was really helpful and great to learn from my peers through their document cameras. Seeing their original work always gave me a fresh perspective. Thank you for such a great term! 99048: I was able to use my document camera in small group and in class discussion. It was a lot easier to share thinking in small groups with the	

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		doc cams. We were able to sketch out our thinking pointing out what we were doing as we solved the problem instead of holding it up to the camera and trying to talk everyone through it. I found myself using the doc cam a lot to express my thinking in small groups. In the main class I would say it wasn't as big of a difference to be honest. Because you scribed for those who didn't have doc cams, we saw everyone's thinking anyway. 95316: When you first would bring up the notion of wishing all of us had access to doc cams in Course 1, I honestly had no idea that it would turn into something serious. You'd say something like, "oh man, this problem would be so much more fun to discuss if you all could show your work like me!" and I would think "yeah, that would be nice" but the thought would pass through and my brain would move on. At the end of the term, when you told us that you were able to grant us each a doc cam that would be sent in the mail, I was honestly a little bit taken aback and nervous. I've never been the most organized writer, and although I know that handwriting has nothing to do with quality of work, it made me a bit anxious to think of my peers looking into my soul through the scribbles on my paper. Of course, everyone in that class is a beautiful and kind saint and they did not express any form of disgust as I secretly expected them too. Granted, it was not as easy as that, I admit that in the initial new groups of the term I did not feel quite comfortable enough to take charge of our breakout room like that and portray my work on the big screen for them all to observe. But then, we somewhat reverted back to our Course 1 groups where I was reunited with the love of my life, X, who always made me feel very at ease and allowed me the space to share my thought process in a way that was absent of daunting. Despite what my parents believe because I am a Gen Z-er, I am not an incredibly tech savvy person and it took quite a few tries to make it all work, but eventually, I was able to get my doc cam up and running. I didn't share my work with it a whole lot; as you know, Z makes beautiful and somehow aesthetically pleasing work, so she would often be my scribe in our breakout room. I think that our class was the perfect space to sort of workshop the doc cam, to get more used to and comfortable with, so that I will hopefully have the confidence to use it in future situations (maybe the 410 class..?). Even though I ended up not taking full advantage of the camera, it was certainly amazing and helpful to see others use it. I feel like often, on the discussion board, there was a lot of not physical paper work shared and although it is incredible to see people make this online aspect totally work for them, I felt like the handwritten work was almost underrepresented in a way. That is until we started using these doc	

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		cams. Then I was able to see my peers' problem solving in the flesh and sometimes in real time if you were guiding them through a problem, which was really cool to witness. I know that I am not a very vocal and participatory student and even more so this last term, but the doc cams certainly gave this class an edge and I very much appreciated them. They made the breakout rooms even more interactive and I greatly enjoyed seeing my peers' work. 105412: The document camera was a good overall way to share our responses with the class. Personally, the only two issues I had with the document camera were not having an adapter for it that would fit my Macbook laptop and that the app InSwan would consistently disappear from my screen not allowing me to use the document camera. The first issue was an easy fix where all I had to do was buy an adapter from amazon and push my Recorder job to a further date. The second issue was a little more time-consuming. I have not found a way to download Inswan and make it stay on my laptop after I was done using it. Throughout the quarter, I re-downloaded the app when it was my turn to be the recorder so that I would be able to show the document camera on my laptop. Both these issues were not a big deal which is why in general I was happy to use the document cameras. A third issue that I personally had was that each time I used the document camera, my laptop would overheat within a few minutes. It is possible that this issue was solely due to my laptop being annoying. I could only use the document camera for a few minutes at a time although this did not take too much stress seeing as how I really only needed it to show my group my final response and have it open long enough for the class to review my answers. 94620: I was not able to use my document camera because I had broken my computer and the one that I was using couldn't connect to the document camera since I did not have an adapter. I did have some time using it and found it helpful to have the ability to live share the work that you were doing but also having the option to take pictures of your work. Although I did not have time to really explore the document camera and its features, I found it super helpful to see my peers using it. It was so helpful to see the work of my peers instead of them explaining it or having it be scribed for them. The cameras allowed us to see the whole work of the group/peers and be able to discuss about the ways that they had solved the problems. The use of the document cameras allowed my peers to be able to explain our work and be able to explain their way of thinking step by step. For me it was really helpful to see the different ways that my peers came up	

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		with answers and having visual representations of their work rather than them just explaining it out loud. In my group there were times when they would use their camera to show how they had approached the problem which was helpful when you would be stuck and didn't know how to keep going on a certain problem. The cameras were also helpful when we all didn't have access to manipulatives and so the other people were able to share the way that it would work using their manipulatives and we could see them through the camera. 105967: I was unfortunately not able to use my document camera throughout Course 1. I believe that the camera worked properly, I just ran out of time to familiarize myself with it and I ended up never really needing to use it since my peers had theirs, or I could rely on [instructor's name] scribing for me. I found it very helpful when my peers had their document cameras on and I appreciated the opportunity to see their work and thought process up close. I think having visual representations and working through a problem together via the document cameras would be helpful to young students as well and I valued the practicality of them. Especially when looking at drawings or other mathematical representations, it was much easier to understand when shown on the camera versus just verbally explained. Thank you for giving us the opportunity to use these cameras.	
Interactive 1 Mostly Verbal	Code Count for Interactive 1/ Replaces: 0	Code Count for Interactive 1/Amplifies: 0	Code Count for Interactive 1/Transforms: 0
Passive	Code Count for Passive/Replaces: 0	Code Count for Passive/Amplifies: 0	Code Count for Passive/Transforms: 0

Initial Coding Notes Examples:

I2: Tech is mediating student's interactions with own work--needs to be neater/color coded

I2: S is able to see colleagues' visual linked with verbal. Better version of the talk show?

I2: Student is able to see work or show work to others

I2: Able to connect visual and verbal; may still be "show and tell."

I2: Show and tell.

I2: Learned from seeing other's work; helpful in showing own work to tutees

I2: S is mainly an observer who appreciates seeing and hearing other's presentations. but doesn't rise to the level of connecting ideas (which would be C).

I2: Still show and tell. Still talk show.

I2: Show and tell, peers showing work, S showing work

I2: seeing and hearing links visual and verbal

C: Ss making connections between representations.

C: Increased S engagement and collaboration. Ss are interdependent.

C: Tech is mediating Ss' interactions with each other and tech. Tech is mediating pedagogy; Ss are driving pedagogy.

C: S controls features

C: because students are learning to use tech to better understand each other.

C: Ss are using tech to support interactive sensemaking. Ss are driving their own learning.

C: Ss are able to connect ideas. Ss are driving learning, not technology.

C: "Cool new ways" of making sense of problems; Ss are driving tech to drive their own learning.

C: Does this rise to the level of Creative because the student is deciding when to "flip it on" to support learning?

C: students working together, driving their own learning, collaborating.

A: Addition of colleagues' visual linked with verbal.

A: Pedagogy of explaining work is easier, but doesn't rise to the level of connecting ideas (which would be T).

A: Tech improved pedagogy (refined it) but didn't radically change it. Still talk show in breakout room.

A: tech refines the practice of doing work on paper

A: connecting visual and verbal

A: Gave a fresh perspective

A: course 2 was better than 1

A: Improved course, but still talk show format.

A: Tech refined or strengthened the pedagogy. Talk show.

T: Tech is mediating Ss' interactions with each other. Tech is mediating pedagogy; Ss are driving pedagogy.

T: New forms of S activity are made possible by tech

T: Shift from "talk show" to "round table" is implied by how students are using the cameras (teacher is not the center).

T: Can show things more clearly because of DC features,

T: Ss are able to interact in new and enhanced ways.

T: Pedagogy could not have been done without tech, Tech mediates students' interactions, and Ss mediate tech. Ss are driving tech. Round table.

T: Tech made pedagogy possible

T: Move from talk show to round table in whole class discussions

T: Talk show to round table

T: Round Table.

T: Talk show to round table

Jilk's Code Definitions:

Creative: Students drive the learning rather than the technology. Students are agentic in choosing how to use the technology to construct opportunities to learn. Students use the technology to generate artifacts from their learning.

I2: There needs to be evidence of learning in this category, however the technology mediates the interactions between students/tech or students with other students. Students use the tech in ways that help them make connections between verbal and visual representations.

Amplification: Teacher uses the tech to improve student outcomes, however pedagogy is not radically different from prior to tech being used. Pedagogy "refines" or strengthens an existing practice. This is the "talk show" metaphor where the agency for showing and explaining still exists with one person who uses the tech to show their work to other people because this is the common way of using the doc cam.

Transformation: This is when the pedagogy moves from "talk show" to "round table." The teacher uses the technology or uses pedagogy that supports students to use the technology in ways that are not possible without the tech. The pedagogy enables students to use the tech in ways that afford collaboration and co-constructing understanding.

Ruef's Code Definitions:

I2: while the camera improves learning opportunities by allowing students to show visual images, the essay depicts a "show and tell" use of the camera where a student shares visual and verbal representations while their colleagues observe. This description matches the "talk show" context of Course 1, but because students can share widely in small groups (break out rooms), it also marks an increase in students' interactions. This is true even for students who did not use their camera (or another method of sharing visual representations).

C: Students are driving technology to support their collective learning. Students are working collaboratively, which may include evidence of 1) interdependence, 2) comparing and contrasting multiple solution strategies; 3) use of different modalities (e.g., manipulatives).

A: The document camera improved the pedagogy by increasing interaction (more students sharing and talking in small groups/break out rooms). However, there is no evidence that students are connecting ideas, for example, comparing and contrasting. The essay's description of pedagogy more or less reflects a better version of the "talk show" of Course 1.

T: Shift from "talk show" to "round table." Instead of one person presenting or being interviewed by the instructor (who scribes for the student), students take turns sharing representations to make connections between different methods of solving. This happens in small group/break out rooms. Students are able to interact in new and enhanced ways.