

Making Revision Stick Online: Adapting Cowriting Strategies for Digital Engagement

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Abstract: This reflective essay documents the adaptation of an active-learning strategy in response to the spring 2020 global pandemic. We detail how we adapted it from its original form as an intentionally nondigital, face-to-face, team-based activity into a new, fully digital format. We articulate the active-learning methods driving the original design as well as its resulting learning outcomes. Although we worried the pivot into a digital format would undercut some of the original learning objectives, we argue the new format not only delivered those outcomes but generated additional outcomes and insights as well. We describe the activity's inherent pedagogical flexibility and adaptability across modalities and document how the pivot inspired us to interrogate our previous assumptions concerning face-to-face, team-based writing instruction and active learning.

Keywords: learning environments, active learning, online teaching, student writing, collaborative writing, collaboration, team projects, pedagogy.

In March 2020, as universities worldwide shifted in response to the global 2019 coronavirus disease pandemic, we found ourselves in the same situation as most faculty: scrambling to digitally adapt activities and assignments we had optimized for face-to-face instruction. Our biggest challenge was an activity we called “Sticky Revision,” a classroom-based, active-learning sequence that teaches students a process for team-based revision of a coauthored document. Expressly leveraging low-tech tools, such as sticky notes, colorful markers, and the physical space of classroom walls, Sticky Revision did not simply make use of physical tools; its entire pedagogy was predicated on a face-to-face learning experience. Cloud-based tools can compound the dynamics that complicate team-based writing projects, such as disjointed delegation, hesitance to critique peer writing, and fragmented integration of content. The interactive functions of these apps, meant to aid collaboration, can present additional barriers to teams already struggling with coordinating writing. Sticky Revision, then, was designed to address these challenges by temporarily moving teams out of the digital space. Its sequence and learning objectives relied meaningfully on replacing screens with low-tech tools and physical space to actively guide students in learning a set of cooperative writing heuristics that—once students gained competence and confidence in them—could be reimplemented online and used to engage more constructively in coauthoring work. How, we wondered, could an activity whose pedagogical value rested on eschewing screens possibly work online?

The pedagogical challenge of moving Sticky Revision online inspired an experiment in teaching and learning that allowed us to interrogate our assumptions about active learning, physical classroom space, writing instruction, and team-based practices. We found that the inherent pedagogical flexibility of this activity, when delivered with a specific set of digital tools replicating the visual, tactile, and mobile nature of low-tech tools, makes this learning activity a success online and

affords a framework for active-learning-based writing pedagogy that instructors can deploy across a range of modalities.

This article is itself the product of collaborative authorship. Before we each accepted administrative positions in separate writing programs at other large R1 (Carnegie classification) research universities, we were colleagues at the Indiana University (IU) Kelley School of Business, where we taught BUS-C204 “Business Communication,” the school’s lower division, intensive-writing course required for all business majors. The course focuses on “preparing student[s] to write strategic, effective, and ethical messages and to collaborate in global business environments” (Indiana University, 2019). In demonstration of these outcomes, the course requires students to work in teams to produce a 20- to 25-page business report responding to a “real world” case.¹

Miranda Rodak first designed Sticky Revision in response to the cowriting challenges presented by the case. After piloting a few early iterations, she shared her preliminary findings both internally at Indiana University, winning recognition with an “Innovate Award” by the IU Faculty Academy on Excellence in Teaching, and externally with a paper delivered to the international Association for Business Communication (Association for Business Communication, 2018). Beginning in spring 2019, Kelly Hanson adopted the activity in her own sections of BUS-C204. At that point we formulated a cross-disciplinary collaboration where Rodak, now having accepted a new teaching and administrative position in the College of Arts and Sciences, and Hanson, still teaching in the business school, would run the activity in their 2019–2020 classes. The online pivot in March 2020, however, caught us in two very different places in our courses. Because Hanson’s students had long been in teams and were already well into their business report whereas Rodak’s students had not yet formed teams and faced a different set of instructional challenges, we decided Rodak would jettison the activity (adopting an asynchronous instructional format for the remainder of the semester) while Hanson would lead the experiment in her courses to deliver Sticky Revision remotely.²

In what follows, we outline the face-to-face version of the activity, “Sticky Revision 1.0,” as it was originally designed and delivered in Rodak’s classes, including its original pedagogical rationale, learning objectives, and assessment data. We then articulate the challenges and our strategy in reconfiguring the activity during Hanson’s pivot to emergency remote teaching, including how “Sticky Revision 2.0” differs from its in-person counterpart and how this experiment necessarily challenged our original assumptions. Finally, we share the novel results this experiment generated. Sticky Revision didn’t simply succeed in the digital environment; it flourished. Its success shed light on the activity’s underlying pedagogical flexibility. It also helped us identify a different and better way to frame the relationship between writing and technology. While we had originally contrasted low-tech and high-tech tools, we came to recognize that this was an unnecessary dichotomy: What the activity models is the purposeful *choice* of technologies. In that sense, we extend André C. Buchenot and Tiffany A.

¹ As a multi-section, intensive-writing course, BUS-C204 is capped at 24 students. Most sections organize the class into four teams of six, and students submit a series of team-based assignments over the semester leading up to the final draft of the business report. Rodak’s teams were assigned following a system where students complete a Google form rating their confidence with a prepopulated list of skills; this was meant to ensure all four teams had an even distribution of students with confidence in four categories: writing, financial analysis, visual design tools, and interpersonal communication. Hanson’s students similarly worked in teams of six. However, Hanson had her students build their own teams around skills they deemed necessary to completing the project, following an activity described by Potosky and Duck (2007). First, students defined the skills needed to complete the course project and color coded them; then, they assembled a team with the goal of maximizing their team’s diversity of skills.

² By the time the pandemic forced a shift to remote teaching, Hanson’s teams had completed several team assignments, including a team-building activity, in-class activities on revising for style, and a team presentation. Serendipitously, Hanson’s teams had a full week’s notice before remote learning started and, thus, were able to use in-person class time to coordinate their travel plans, discuss best practices for remote collaboration, and create a plan to finish their project remotely.

Roman's (2019) argument that "understanding paper-based student writing as a technology—that is, as a socially situated, material object that mediates activity—draws attention to the affordances of these documents, affordances that might be used to create active-learning activities" (p. 97). Beyond making these affordances clear to instructors, as Buchenot and Roman addressed in their work, we contend that Sticky Revision also makes the range of technologies newly visible to students, empowering them to make strategic choices about the affordances that different technologies and interfaces offer at different stages in the collaborative writing process.

Sticky Revision 1.0: Cowriting in the Face-to-Face Classroom

The Pedagogical Challenge

Originally, Rodak designed Sticky Revision as an active-learning response to the complex set of interwoven challenges she saw writers confronting as they worked alongside peers in a large-scale document. Students, she realized, navigate writing anxiety at three distinct levels: (1) individual writing competency; (2) providing peer feedback; and (3) navigating collaborative technology. Each complicates the other.

At the level of individual writing competency, lower division (i.e., 1st-year and 2nd-year) students struggle mightily with revision. This is true when writing "alone"; it's exacerbated when writing in teams. Even as writing instructors design classes to guide students through a process-based approach to writing, where we scaffold discrete activities to model different forms of engagement at different stages of drafting, revision, and peer-review (Charney, 2002; Flower & Hayes, 1981; Jackson, 2020; Sommers, 1980), students frequently prove reluctant to fully take the bait. Once students produce a full draft that holds together, they often become unconvinced by our insistence that rigorous large-scale revision—the kind that moves beyond mere correction and requires creating new knowledge, reshaping the discourse, and overcoming egocentrism to achieve audience-based rhetorical goals—is a central, if messy and sometimes destructive, part of the process (Jackson, 2020, p. 167). In other words, to echo Steven King, we tell our students to "kill their darlings," and they, conditioned by word counts and page requirements, understandably respond with skepticism.³ Many students, particularly those lacking confidence in their composition skills, stick carefully to revising around the edges, correcting typos and minor grammatical errors and moving, condensing, or deleting a few sentences here and there. They worry that more substantial dismantling of their structure will pull threads, threatening to unravel the body of writing they've labored to assemble. If students dread pulling threads in their own documents, that dread magnifies in a team-authored document where the threads and the consequences are not theirs alone.

Second, at the level of giving peer feedback, few students in lower-division classes have enough confidence in their own writing to feel authorized to provide feedback to others. Again, even in the context of single-author essays, students regularly stall during peer-review activities. Feeling inadequate to the task of "smart" or "correct" feedback, most students struggle to share substantive feedback, instead scrawling bland, superficial comments in the margins of a peer's paper. That hesitation compounds on a team, where students worry about being perceived as critical of fellow teammates. Moreover, because teams typically delegate sections of writing, individual teammates question their authority to intervene in "someone else's" section. Indeed, without a strong collaborative preplanning infrastructure, individual teammates aren't deeply knowledgeable about the

³ While King helped make this line famous, the original idea came from Arthur Quiller-Couch's phrase "murder your darlings," which he shared during lectures at Cambridge in 1913 and later publicized in a style guide (Wickham, 2013).

content of other teammates' sections, making them all the more hesitant to critique or feel a sense of co-ownership. This keeps them from instigating big, important questions during revision.

Finally, at the level of technology, students often find themselves visually overwhelmed when they enter a collectively authored document, particularly in the early stages where ideas are nascent and the argument is not yet fully formed. Even if teams have been guided in generating a group outline, still they tend to default to “collaboration by stapler,” agreeing on an idea (often vaguely articulated) and then parceling out sections; each is written in isolation and then merged together through cut and paste. This “Frankendoc” can challenge inexperienced cowriters. Where to even begin the revision process? On top of this cognitive fatigue, Google Docs' frenetic visual environment can create additional barriers. With five or six separate editors working at once, colorful name tags flash with each coeditor's cursor, and parts of text begin moving, disappearing, or lagging as students revise. Comments clutter the margins as students wonder whether the issue has been sufficiently resolved to clear them.

This does not negate, of course, the powerful benefits cloud-based software affords writing instruction. Tools such as Evernote and Zotero allow students to collectively gather, sort, synthesize, and cite research. Storage platforms such as Google Drive, OneDrive, and DropBox allow students not only to assemble files but also to attach threaded, #hashtagged comments tracking thoughts, questions, plans, and debates. Most importantly, Google Docs provides unmatched support for synchronous and asynchronous collaborative writing with its host of features, including real-time edits that “manifest themselves almost simultaneously in the text,” a historical record of revisions that can be rolled back to earlier versions, a commenting function for asynchronous coordination, and a chat function for synchronous discussion (Kittle & Hicks, 2009, p. 529). But even as these tools make possible behaviors that writing instructors value—such as “transform[ing] the writing process from a solitary exercise into a community-oriented learning experience” (Dougherty, 2015, p. 66), “reinforc[ing] writing as a recursive, fluid process” (Collett, 2016, p. 2), and encouraging more active, ongoing peer-review practices (Andrichuk, 2016)—they equally present challenges our pedagogy must confront. We tend to think of our students as “digital natives,” intuitively capable of leveraging technology; but throwing inexperienced writers and collaborators into a shared document to construct a cowritten draft leaves them with a host of challenges and barriers, including questions about “how to provide explicit but non-intrusive feedback across members, coordinating member foci, articulating task process” and navigating “practical desires...for clearer organizational structures and leadership roles” (Mehlenbacher, Kelly, Kampe, & Kittle Autry, 2018, p.200, 205) within this decentralized space. The result, too often, is a breakdown in communication and a critical lack of alignment between the collaborators. Students default to sticking narrowly within the comfortable parameters of their own individual spaces within the shared document, engaging in few interventions or constitutive behaviors that drive larger integration and cohesion. Worse, students who already struggle with their individual writing confidence and/or who already feel marginalized in a group hang back, which results in just a few dominant voices driving the document.

The Instructional Response

Sticky Revision sought to alleviate these challenges by opening a safe instructional space where students could comfortably engage in productive debate about large-level structural issues in their writing, including questions such as: *Do we need this section? How do these big ideas connect? Is this evidence persuasive or do we need additional research?* To make these questions accessible and reduce the trio of anxieties, Rodak envisioned a hands-on classroom-based activity that would teach students to pull back from the splintered Frankendoc and engage meaningfully in a collaborative decision-making process that could realign communication, generate a sense of communal ownership that would

override perceived fears regarding individual attachments, and formulate a shared revision plan that inspired individual and collective confidence. She created what we now call, in retrospect, “Sticky Revision 1.0,” a multi-day, face-to-face series following these steps:

Day 1. Step 1: Overview discussion. Students arrive with a collaboratively authored draft that includes the Introduction and the first two body sections detailing and supporting their solution to the case project, which we, adapting Barbara Minto’s (2010) pyramid principle, call the “What” and “Why” sections. Class begins with a brief discussion of writing as a recursive process, introducing students to the idea that, throughout this process, writers must toggle between “macrolevel” concerns such as structure and argument and “microlevel” concerns such as prose, transitions, and unpacking evidence. The discussion introduces students to the idea of temporarily leaving the technology of the document to leverage other technologies, such as low-tech “whiteboarding,” which can support more collaborative behaviors at different stages in the recursive process.

Day 1. Step 2: Pitch the thesis. Teams are given a large sticky note and set of markers; they are asked to “represent” their thesis (the proposed idea) using any combination of text and images they think communicates it clearly to an outside audience (see Figure 1). The objective of “pitch the thesis” is to draw attention to gaps, abstraction, and vagueness in the current iteration of the thesis through discussion and debate as teammates work to articulate their idea to the audience. The paper and markers provide an active and alternate method for students to cognitively engage with their thesis, allowing them to depict relationships that might have proven difficult to capture in words in their original draft.

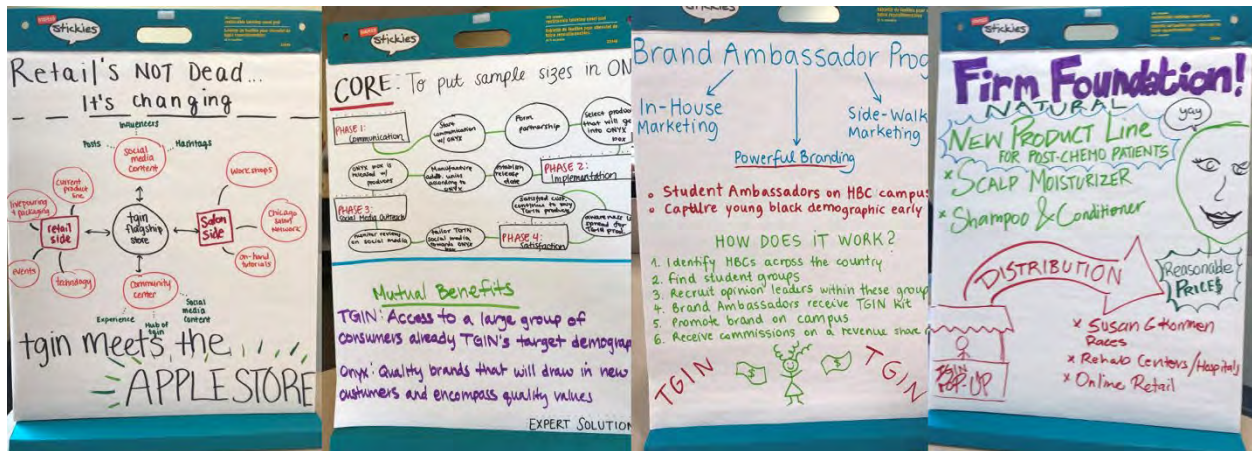


Figure 1. Examples of “pitch the thesis” from Rodak’s Business Communication course, spring 2018.

Day 1. Step 3: Gallery walk. Each student gets a small pad of sticky notes. As a team, students walk to neighboring teams’ giant sticky notes, where they discuss the team’s proposal, articulate questions, objections, reactions, or support and leave their classmates with these comments in a series of sticky notes (see Figure 2). Teams rotate until they have responded to everyone. The objective of “gallery walk” is for teams to collect feedback that will help them understand how outside audiences respond to their articulation of the central thesis, including potentially seeing gaps or benefits that the authors themselves didn’t identify.

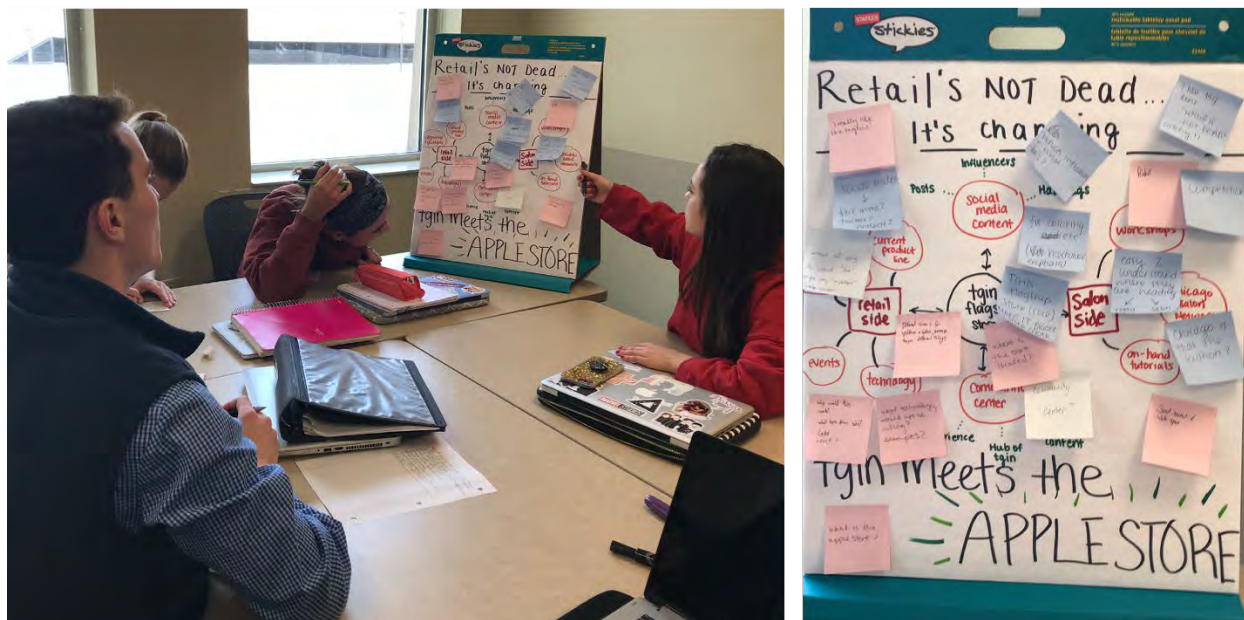


Figure 2. Example of “gallery walk” from Rodak’s Business Communication course, spring 2018.

Day 1. Step 4: Revision plan. Teams are given the remaining time in class to return to their stations, process all the feedback they received, and discuss what revisions they might make to more clearly communicate their central idea. The objective of “revision plan” is twofold. First, it helps students begin shifting from individual to collective ownership of the writing process, an important cognitive move given the likelihood that Day 1’s incoming draft was written by having delegated sections to individual writers and with little attention to cohesive integration. Second, it models for them a best practice of collaborative revision.

Day 2. Step 1: Pitch the thesis again. At the beginning of class, teams repeat Step 1 from the previous class, visually representing their thesis. The objective of “pitch the thesis again” is to help students recognize how much more effectively they can now collectively articulate their idea. This step also gets their main idea back up on the wall, which sets up the rest of Day 2’s emphasis on organization.

Day 2. Step 2: Identify main arguments. With the thesis on the wall, students now write each of their main arguments in support of the proposal, with one per large sticky note mounted on the wall (see Figure 3). The objective of “identify main arguments” is to instigate debate: *Which are our central arguments? Do we agree? Which are our supporting arguments? Do we agree?* This step generates vigorous conversation and productive disagreement. It also fosters experimentation as teams try moving arguments into a different order or contemplating how adding or cutting an argument might shift the overarching structure. The instructor moves between teams, helping teammates formulate their disagreements and encouraging them to move sticky notes around to represent the relationships between claims.



Figure 3. Example of “identify main arguments” from Rodak’s Business Communication course, spring 2018.

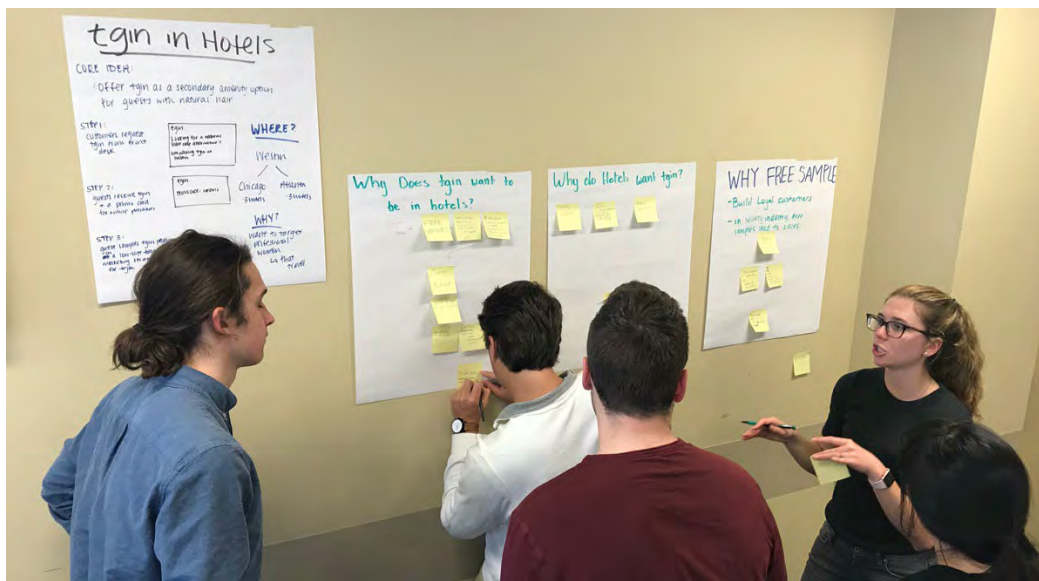


Figure 4. Examples of “supporting arguments” from Rodak’s Business Communication course, spring 2018.

Day 2. Step 3: Identify supporting arguments and evidence. With a top-level outline physically established, students write each supporting argument and important piece of evidence as one small sticky note; these are placed on the larger “claim” sticky note they support (see Figure 4). The objective of “identify supporting arguments and evidence” is to provide teams an easy, low-stakes space to collectively move their ideas around without threatening to “unravel” their draft. As teams debate

where different elements go, what their purpose is, or whether they even belong, the instructor can move between teams and encourage students to experiment with ideas. If teams aren't sure where an idea belongs, they can stick it on the wall between arguments (notice the dangling note in Figure 4). Or, they can begin clustering stickies that represent similar ideas and ask themselves whether any note represents redundancy. As ideas shift, visual gaps reveal structural gaps in logic or argument, as some large sticky notes remain empty while others attract the majority of smaller evidence stickies. This step continues shifting students toward a collective ownership: Outside the space of the Google Doc and no longer attached to the words drafted in isolation, the entire team takes more collective ownership of the argument and its structural components.

Day 2. Step 4: Compare and plan. In the final portion of class, teams are asked to compare their wall against their draft. What's different and potentially more effective about this new structure? What needs to happen in the draft to reflect this new thinking? The objective of "compare and plan" is to generate consensus and confidence in the coauthors as they prepare to return to the digital space of their Google Doc and implement large-scale structural change.

It bears noting that Sticky Revision 1.0 very deliberately asks students to enter the activity after having submitted a draft. This choice is, in part, what facilitates students making the all-important metacognitive shift of detaching from the individually authored, delegated pieces to now taking a collective sense of ownership of the entire document, regardless of who authored what. Such a shift is critical to making students feel more comfortable and motivated to propose and challenge revision ideas at the micro and macro level throughout the document. This sequence also allows the instructor to intercede directly in the hands-on process, importantly teaching and modeling the kinds of experimental and thought-provoking questions students need to ask themselves (and each other) throughout the process. Finally, this sequence models a new set of tools and strategies students can adopt to create a safe, concrete space for visually identifying gaps, instigating debate, and forging real, robust revision plans with collective agreement. The mobility of the sticky notes allows students to feel safe experimenting with organizational changes—trying something out and debating the merits of the change without fear of disrupting or unraveling the work that has come before.

The Learning Outcomes

A comparison of drafts evaluated before and after the activity as well as student feedback gathered from a classroom assessment technique demonstrate that Sticky Revision contributed to improving student learning and writing. Team-authored drafts were due at the start of class on Day 1. Teams then used the feedback and work they generated over the 2 days to revise and submit a second draft at the beginning of the next class following Day 2. The two sets of drafts were evaluated with a standard grading rubric, according to the two interconnected criteria upon which teams struggle most and that Sticky Revision intended to address: having a clear, focused thesis/argument and cohesively advancing/supporting that argument over the course of the draft (i.e., thesis + organization). On both criteria, every team's draft demonstrably improved. On the first criterion, the thesis became more focused and consistent between the two drafts. While the majority of teams scored "competent" or "weak" on the original draft, the majority scored "strong" or "excels" on the revision (see Figure 5). Indeed, while there were zero teams achieving at the highest level on the original draft; conversely, by the revised draft, there were zero teams achieving at the lowest level. On the second criterion, organization, drafts saw an even more dramatic improvement. While zero teams scored either of the top two categories—"excels" or "strong"—on the original draft, every team moved into the two top categories with the revision.

Criteria		Excels (A)	Strong (B)	Competent (C)	Weak (D/F)
Purpose/Thesis: Draft explicitly, consistently advances a clear, focused, specific purpose	# of teams meeting this level on the draft due <i>before</i> activity	0	4	5	3
	# of teams <i>after</i> activity	5	4	3	0
Argument Organization: Paragraphs coherently scaffold a set of connected claims supporting the thesis and answering the audience's questions in a logical order	# of teams meeting this level on the draft due <i>before</i> activity	0	0	9	3
	# of teams <i>after</i> activity	2	10	0	0

Figure 5. Evaluation of drafts from Rodak's Business Communication course, spring 2018.

Perhaps more importantly, however, students articulated their own learning in language that emphasized collaborative communication, improved cohesion, collective ownership, and confidence in pursuing revision. At the end of Day 2, students were asked to respond to two questions on a routine self-reflective exit slip: (*Question 1*) Specifically, how did or didn't this activity help your team better organize your argument and identify areas for revision in your draft? (*Question 2*) Specifically, how did or didn't this activity help your team collaborate and communicate better?⁴ In vivo and focused quantitative coding methods were used to identify patterns in the students' reflections. Five dominant trends emerged.

Trend 1: Students identified one or more specific positive learning outcomes. Of 58 students who responded,⁵ 57 reported specific positive learning outcomes on Question 1. A few representative responses include: "We were able to find our core ideas, which led to a complete restructure of our draft," "I can't explain just how useful this activity was...we were able to come up with a single sentence that synthesized our idea, therefore allowing us to go back and revise our draft," "our parts of our draft were not connected, and we were able to fix this problem after [the activity]." Similarly, 56 students reported positive learning outcomes on Question 2, including comments such as: "By writing our ideas out and talking about how they were connected, we were able to have an honest debate about what we wanted to do moving forward," "during this activity, I feel as if everyone thought that each team member was on the same page, however it was quickly realized that they weren't," and "instead of one team member working on just one area of the project, it forced every team member to work on every section together. Together as a team we all worked together to identify

⁴ As part of Rodak's larger emphasis on self-regulated learning (Brown, Roediger, & McDaniel, 2014; Nilson, 2013), she routinely asks students to submit exit slips and other reflective assignments accompanying in-class activities and out-of-class assignments. These are intended to prompt students to reflect not only on *what* they are learning but also on *how* and to what extent it is effective. This, in turn, fosters greater awareness of their learning processes for better future adaptation and application.

⁵ Rodak taught three sections capped at 24 students; by this point in the semester, following the withdrawal deadline, 64 students remained in the sections. Of those, 6 students were either absent or failed to submit their exit slip, leaving 58.

areas and ideas that needed enhancement.” Of all the comments, there were only three outliers: one student had a negative response to Question 1, indicating the activity felt rushed, and two students had a neutral response to Question 2, indicating that they felt their teams already had strong communication skills, noting, for instance, “I think my team has really effective communication skills, so while this was another opportunity for us to show that, I feel that we did not develop them that much.”

Trend 2: Students expressed new confidence in moving forward with revision. More than 30% of the students expressly used the language of “confidence” and feeling empowered to move forward with revision. They made comments such as: “I loved this activity! It made writing and revising the draft so much easier because we were finally all on the same page. This, in turn, gave us much more confidence in our idea,” and “I now feel much better moving forward, knowing the necessary revision and strategies myself and my team will use,” and “it was very difficult going into the actual drafting phase [before the activity]. Once we went through the activity it was easier to see what we were actually trying to say and how to explain it.”

Trend 3: Students commented on the technology/materiality of their tools. Almost 40% of students expressly addressed some way in which the shift in tools unlocked an aspect of the writing and learning process for them. Many students commented on the freedom afforded by the sticky notes, such as: “[The activity] let every person express certain things and stick it on the papers even if not everyone had thought of it before” and “putting the little sticky notes on all that we wanted in the why section I think helped us communicate the best. This way we knew exactly what pieces of information we still need to answer and what other information we want to put in our why and where it all is to be grouped.” As one student put it: “We have been debating the structure of our argument since day 1 of writing the outline. This activity was the first time that we were able to all see the benefits of each structure.... I think doing the activity physically allowed us to come to this consensus because we could easily move parts around and see it differently than before.” In addition to calling out the sticky notes, students contrasted the surprising benefits of these tools against their digital tools. One representative comment was: “[This] was a very helpful collaboration activity because seeing it on the wall forced everyone to participate and not hide behind their computer screens, like we do when we meet”; and another was: “The disconnect [among us became] obvious, so it was nice to have in-person debate, rather than over groupme.”

Trend 4: Students responded in a register of visual language. More than half the students (55%) used one or more visual metaphors or phrases to describe how the activity helped them engage individually and/or collectively in the revision process. Students reported that the activity gave them “a bird’s-eye view” of their argument, helped them “see the big picture,” and visually revealed gaps in their argument and structure. One representative student noted: “Organizing the ‘why’ section in a visual flowchart helped me create a mental blueprint. Visualizing each step in order is extremely helpful in solidifying what I’m actually going to be writing about.” Another said the activity “helped visualize what evidence and statistics we might need to [back up] certain things because we could easily see what related to the questions and what holes...need to be filled.” This pronounced strand of language in the responses points very clearly to an awareness of the shift in technology. Whether or not they specifically named any of the technologies (high tech or low tech), these students were explicitly commenting on the technology of “whiteboarding” by contrasting its visual affordances against the scrolling document. The students expressed a dawning awareness that moving out of the document and into another space inspired a form of collaborative work that freshly enabled more strategic collaboration and then reentry back into the document.

Trend 5: Students commented on feeling active and engaged. Over 67% of students explicitly stated feeling actively engaged by this form of in-class activity. One representative student noted: “We were all fully involved in the activity from the very start to the very end,” and another commented: “I have

never seen our team so engaged before.... Everyone knew what we were talking about and everyone gave their opinions.” Students consistently used the word “fun,” such as one student reporting: “I think it was a very fun way of going about our revisions and it helped not only my team but everyone in the room to become engaged in class.”

Sticky Revision 2.0: Cowriting in the Digital Classroom

The Pedagogical Challenge

Sticky Revision’s success in the face-to-face classroom depends on a complex set of activities, tools, and experiences, all of which had to be changed in the emergency shift to remote teaching. We feared the elements that made Sticky Revision so productive would be lost—its simplicity, its tactile mobility, and, of course, its shift away from screens. As we debated the possibility of whether the activity could even work online, we realized that eschewing screens was no longer an option. Students would have to be on computers to collaborate remotely, using video conferencing software and digital collaboration tools to write. This meant successfully adapting Sticky Revision for remote learning hinged on finding a tool that could replicate the original activity’s face-to-face experience and maintain its pedagogical power. We, therefore, identified three key problems to solve:

Basic digital collaboration. Before everything else, we needed to figure out how students could best collaborate digitally during class meetings: Did class meetings need to be synchronous? Which tools would best replicate the experience of huddling with teammates face-to-face? Companies frequently have successful remote teams—how could students replicate this experience in their own groups with limited resources?

Digital sticky notes. We needed to find a digital tool that could replicate the experience of a team brainstorming with sticky notes. Sticky notes (and their mobility) offered an easy, intuitive technology that made structural revision seem accessible. We wanted the activity to be about the learning, not about navigating a new tool. Thus, adapting the activity online required an equally intuitive and accessible tool, one that would similarly support the ease of quickly writing down ideas and moving them around.

Simplicity. We needed a tool that didn’t add unnecessary barriers. We didn’t want students to pay money, create an account, or download and install new software. This consideration was driven by equity concerns, as well as by Cognitive Load Theory (CLT; Kirschner, 2002). CLT posits that learning takes place by storing knowledge in long-term memory. However, processing instructions to create this storage is the domain of short-term or “working” memory. While long-term memory offers unlimited storage, working memory is limited and can be easily overwhelmed. Following CLT, we had to ask ourselves: “How can [we]...assure that the limits of the learner’s working memory load are not exceeded when he or she is processing instruction?” (Kirschner, 2002, p. 3). We couldn’t risk adding extraneous load in teaching students yet another new technology (the very thing Sticky Revision’s low-tech bent was meant to alleviate), especially when their mental bandwidth was already taxed by a global health emergency.

To take Sticky Revision online, then, we needed a tool that would resolve all of these problems. To kick off our search, we consulted resources created by Mosaic: Indiana University’s Active Learning Initiative, including its curated list of digital collaboration tools, “Free/Fremium Techs.” Ultimately, Hanson narrowed down testing to Dotstorming, Miro, Padlet, and Jamboard. Each of these tools allows users to collaborate and create a single “board” on which text, notes, images, and media can be posted and moved around.

Of these options, Padlet best fit our criteria and seemed the most intuitive for unfamiliar users. Padlet is a cloud-based collaboration tool that offers users a digital bulletin board where they can add

text and media in sticky-note-like posts (See Figure 6). Padlet’s highly visual interface allows students to easily move posts, color-code ideas, and connect posts together with arrows to visually represent their relationships.

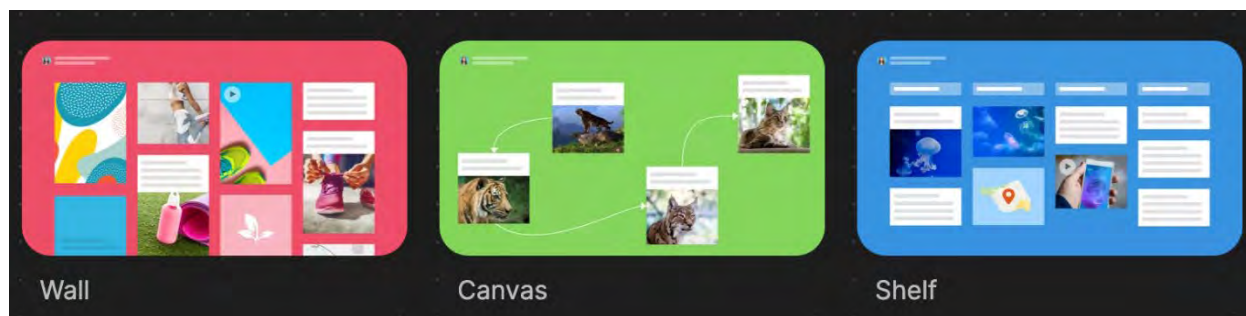


Figure 6. Sample visuals from Padlet, showing different ways to post content (Padlet, n.d.).

The Instructional Response

With the new tool in place, Hanson set about adapting Sticky Revision to work remotely with five simple updates:

Update #1: Digital tools. Much like its face-to-face counterpart, Sticky Revision 2.0 leverages simple tools: Padlet’s digital replicas replace sticky notes and markers, while breakout rooms on Zoom, the video conferencing platform, and webcams mimic the physical communal space of the classroom. Critically, Padlet still moves students out of the abstract, sometimes debilitating space of Google Docs by helping them visually identify gaps, instigate debates, and forge real, robust revision plans. In short, both tools retained the value of their face-to-face counterparts.

Update #2: Build familiarity and lower cognitive load. One of the greatest assets of Sticky Revision 1.0 is that students know intuitively how to use sticky notes. These simple tools feel familiar and require almost no explanation. As a result, their cognitive load is low. To be effective online, Sticky Revision 2.0 required a similarly low cognitive load. To accomplish this, Hanson built her students’ familiarity with Padlet in a few simple ways.

First, Hanson taught students how to use Padlet with a low-stakes, daily activity called “question of the day.”⁶ By the time students used Padlet for Sticky Revision—an intellectually difficult activity—the tool was already familiar. Next, Hanson made Padlet easy to access by linking it within her course’s learning management system (LMS). This meant students weren’t wasting time or mental energy trying to create and share a digital document. It also meant the instructor had access to each team’s Padlet board so she could observe their work without the hassle of screen sharing. Finally, Hanson used the LMS to create transparent instructions and a consistent format for every virtual class meeting so students knew not only what they needed to do, but also *how* and *why* they were doing it (Winkelman et al., 2016). This structure was a key part of moving complicated writing activities such as Sticky Revision online: Students arrived to class each day primed for active learning in an online space and with a clear understanding of behavioral expectations (see Figure 7).

⁶ Hanson learned about question of the day from fellow instructor Kaitlin Guidarelli, who used it to build community in her face-to-face courses through IU’s Student Academic Center. The activity asks students to share answers to a low-stakes question (Where is someplace you’ve never been but want to go one day? If you had 25 hours in a day, what would you do with that extra hour?, etc.). Hanson and Guidarelli worked together to adapt question of the day for online settings using Padlet in March 2020. Guidarelli piloted an asynchronous adaptation, while Hanson ran it synchronously. In both adaptations, the activity helped build class community.

In-Class Writing Work

For today's class, your team will be working on your argument. We'll actually use Padlet for this as well. Instead of posting a fun answer to our QOD, you'll use Padlet to outline and move around evidence and claims. Think of it like a wall of sticky notes to workshop your argument structure and present Proozy with your most convincing claims.

To move through this workshop, you'll follow the [instructions](#) (I'll go over these before we move into breakout rooms). We'll also take a look at a [sample](#) I made to give you an idea of how you might break down an argument using Padlet sticky notes. You can reference your A13 Report Outline and pull information from that into the Padlet.

Once you and your team are ready, click on your team's Argument Workshop Padlet below:

- [Team 1, Daily Dealers](#)
- [Team 2, TMBK](#)
- [Team 3, Prooz It or Lose It](#)
- [Team 4, C20 Consulting](#)

Figure 7. Screen shot of Sticky Revision 2.0 daily assignment and Padlet links in the learning management system from Hanson's emergency remote Business Communication course, spring 2020. QOD = Question of the day.

Update #3: Standalone instructions. The face-to-face version of Sticky Revision relies meaningfully on instructor coaching and verbal interaction to guide students through steps in real time. The online version, however, requires a different structure because instructor engagement is limited when students are working in breakout rooms. Hanson's students benefited from a PDF of stand-alone, step-by-step instructions and from viewing a model at the beginning of class (see Figure 8). These instructions prompted the important work of debating and arriving at consensus. For example, asking teams to narrow their focus to just three main benefits in the "identifying main claims" step (e.g., "Discuss: What are the TOP 3 benefits your solution offers [the client]?") led students to ask tougher questions of their work: *Is this the most important point? What are we actually arguing here? Do we even need this paragraph?* As teams came to a consensus, they added notes to their Padlet. Thus, as their discussion progressed, the Padlet began to take the form of an outline for their next revision, much as it had done on the classroom wall in Sticky Revision 1.0.

Figure 8. Instruction slide for the “identifying main claims” step of Sticky Revision 2.0 from Hanson’s emergency remote Business Communication course, spring 2020.

Update #4: Streamlining Sticky Revision. As described above, Sticky Revision 1.0 was designed as a 2-day activity. Because of time constraints with the shift to emergency remote teaching, as well as constraints with the ability to collaboratively make digital drawings, Hanson decided to cut the “Day 1” portion and focus, instead, on getting students to think about their organization and argumentative claims. She also moved the activity earlier in the course schedule to account for some unexpected changes in the university’s calendar.⁷ Thus, in spring 2020, Hanson’s students completed Sticky Revision 2.0 just after they drafted a detailed report outline, but *before* they had written a full rough draft with complete paragraphs and full sentences. This was much earlier in the writing process than we had used this activity in the past. Given how central the timing of drafts was to Sticky Revision 1.0, the efficacy of this shift—dictated by external forces—surprised us. Because student teams were working remotely, moving the activity earlier ended up being one of the most pedagogically beneficial changes. During emergency remote teaching, some of Hanson’s teams had time-zone differences of more than 12 hr. Her students had to divide up their drafts and delegate parts. In this remote setting, Sticky Revision helped students better understand the whole and how their individual part would be contributing to it before they wrote their individual sections. In other words, this activity helped build a greater sense of collective ownership and understanding early on in the drafting process, which ultimately improved teams’ subsequent conversations about structure, argument, revisions, and claims.

Update #5: Instructor feedback. In face-to-face versions of Sticky Revision, the instructor circulates the classroom, engaging teams in discussion and giving them verbal feedback. For Sticky Revision 2.0, Hanson put her teams in breakout rooms and initially remained in the main Zoom meeting to observe their Padlets and monitor progress. Once teams had created some content, she gave each team some written feedback by adding notes to their Padlets with her name, questions, and suggestions (see Figure 9). Only then did she begin circulating between breakout rooms to talk to teams, give verbal feedback, and answer questions. Since instructors can’t easily respond to immediate

⁷ To give students time to move home and instructors time to move courses online, IU extended spring break by a week, which resulted in canceling a full week of classes in March 2020. Thus, adapting courses online also meant adapting to a shorter semester.

questions while rotating through breakout rooms, these written comments ensured all teams had some feedback early in the activity. Later, when students left class, these notes offered a digital archive of their team conversations and instructor feedback, which they were able to reference as they wrote their full draft.

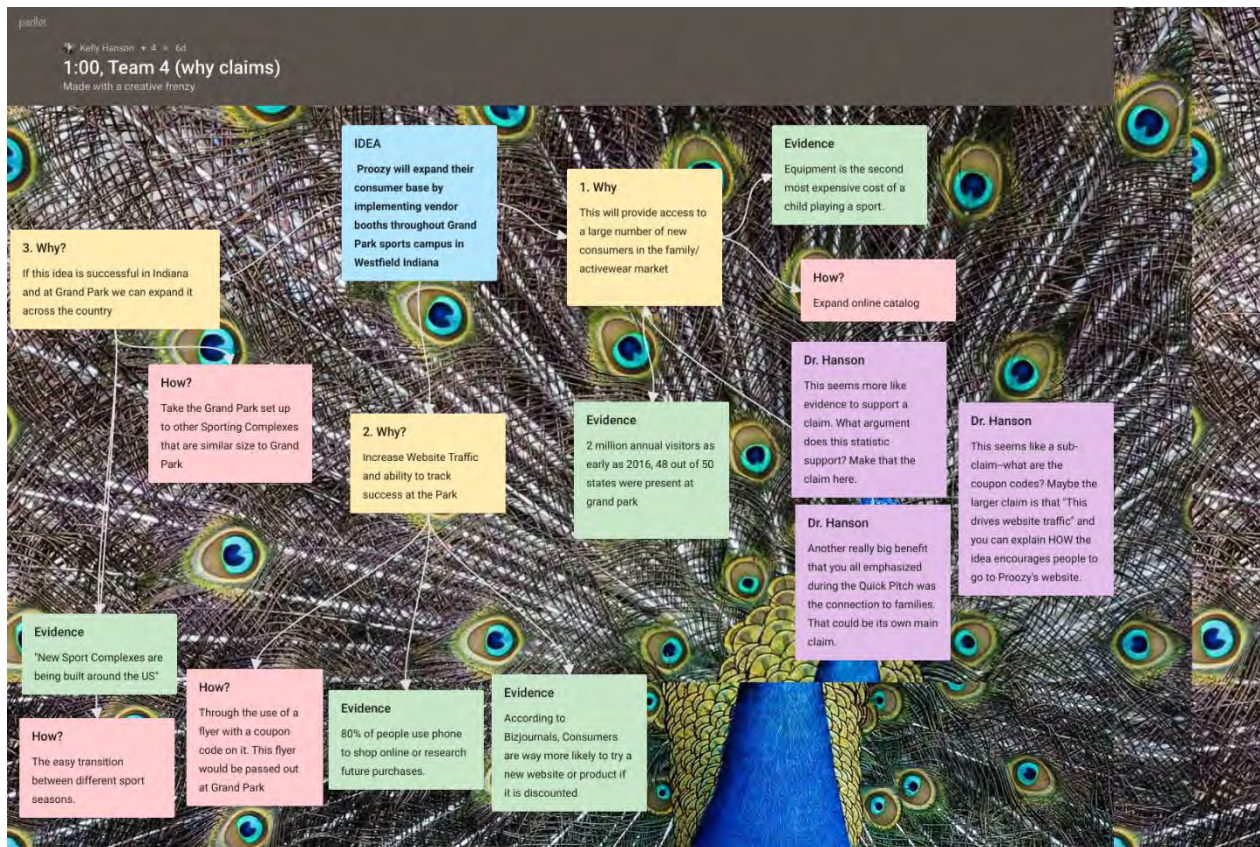


Figure 9. Examples of Sticky Revision 2.0 Padlet from Hanson’s emergency remote Business Communication course, spring 2020.

Conclusion

While we initially worried that moving Sticky Revision online would undercut its core learning objectives, adapting it not only served those objectives but also prompted us to reevaluate our assumptions about technology and its place in the writing process. Students (and instructors, for that matter) default to the technologies they know (e.g., Google Docs) or the ones preinstalled on their computer (e.g., Microsoft Word) without necessarily questioning what the technologies do or how to use them to facilitate different stages in their learning and writing. Sticky Revision 1.0 taught this awareness by moving students between low tech and high tech, thereby making visible for them the deliberate choices they could make to support different kinds of work. This visibility made the activity portable; beyond a one-time in-class activity, students could take this set of tech-savvy collaborative strategies forward with them into other classes and professional settings.

What we realized in hindsight, however, is that low versus high was not the important binary; instead, the critical binary that emerged was between, on the one hand, the textual page as a technology, and on the other, more visual and mobile technologies or interfaces. We realized (anew) that revision requires mobility of text and ideas, which sometimes necessitates leaving the document. Whether low tech or high tech, what’s needed is a tool that allows visual manipulation of ideas. For

example, even though Padlet is a high-tech tool involving screens and cloud-based collaboration, it is still a different kind of tool from Google Docs. Padlet is highly visual and allows users to easily (and with less anxiety) move chunks of text or ideas around. Google Docs, by contrast, excels at word processing and has more powerful options for creating documents overall. But it is based on the visual organization schema of an 8.5 × 11-inch sheet of white paper, which limits its use for breaking up text and moving it around. To lump these tools together as “high-tech” or as “screens” misses the opportunity to teach students that all technologies should be chosen deliberately in light of the kind of intellectual activity or mediation they afford.

This epiphany underscored for us how much flexibility was inherently built into Sticky Revision and could be leveraged across a range of instructional modalities and at different stages in the writing process. While originally designed for face-to-face courses, Sticky Revision can work equally well in online settings including hybrid, “HyFlex,” and fully online courses. In our adaptation, the activity still required synchronous interaction among teammates; however, with some tweaks, it could also be adapted for asynchronous online courses with a team-based project. Still, because it relies on meaningful debate, teams would likely need to complete the activity together to get the most out of it.

Furthermore, we learned that Sticky Revision works at different stages of the writing process, with the caveat that where it works best depends on modality. For instance, in the face-to-face classroom, we found the activity works best after teams have completed a working draft because it helps them first recognize and then break out of the “collaboration by stapler” mode. By contrast, we learned that remote teams, collaborating under more difficult constraints, benefit from the activity earlier because it helps them organize their argument and evaluate their claims before they begin writing in earnest. During spring 2020, this helped mitigate one of the major challenges of remote teamwork: asynchronous collaboration. When teammates work across extreme time-zone differences, they can often only “collaborate by stapler.” Sticky Revision helped guide them through this remote drafting process; they better understood the whole in which their parts would eventually fit. During one-on-one student meetings during office hours, as well as in discussions with teams in Zoom breakout rooms, Hanson observed that students generally had a better idea of their team’s entire argument, rather than just their own part, which we found remarkable given the emergency remote conditions.

The students’ final reports in spring 2020 were not necessarily any stronger than students’ work in previous semesters, but neither were they necessarily worse; they were of comparable quality, though many student teams struggled to effectively edit for style. While this observation might suggest that Sticky Revision 2.0 helped students as well as its in-person counterpart, the global crisis added too many variables for us to make a fair comparison and arrive at any conclusive claims regarding learning objectives and student work. By far the most useful lessons we learned were on the instructional side: This experience suggested to us a different way of thinking about what tools we use to teach collaborative writing, when such tools and interventions work for remote versus in-person teams, and how we might use such tools to create a space for students to have productive conversations about their ideas, even in the face of extreme challenges. And while we cannot make strong claims about the relationship between Sticky Revision 2.0 and the writing it supported, we do think that the quality of the work we saw taking shape first on the Padlet boards and later in the team conversations during synchronous class meetings and office hours suggests some promising directions for continued thought and study.

Ultimately, the global pivot to emergency remote teaching challenged us to reimagine an activity we once believed required the physical space of the classroom to facilitate movement between low-tech and high-tech tools. What initially began as a “make do” moment—an attempt to “hack” an activity under pressure—became a catalyst for reevaluating our assumptions and discovering

additional flexibility for when, how, and why the activity can be used. Turns out, Sticky Revision is more flexible and pedagogically powerful than we realized; we just needed to move beyond our high/low binary to see it.

Epilogue

In June 2020, Kelly Hanson switched jobs, moving from a faculty job at IU's Kelley School of Business to an administrative position at the University of Michigan's College of Engineering. Her experience of adapting Sticky Revision for emergency remote teaching in March 2020 provided a foundation as she guided faculty to adapt to long-term remote teaching during Fall 2020. It has also provided a rubric for her own classes as she adapts other writing activities to work online. As this article goes to press, she is planning to pilot her own version of Sticky Revision 3.0 when her computer science students create a team presentation in April 2021.

In fall 2020, Miranda Rodak taught IU's first undergraduate course explicitly focused on collaborative writing strategies (ENG-W 241 "Collaborative Digital Writing"). Proposed and approved before the pandemic, this course intended to use active-learning classrooms—supported by IU's Mosaic Initiative—to teach the integrated set of writing competencies, digital literacy, and teamwork skills necessary to collaborate online and off. Stripped, however, of the classrooms meant to act as incubator, Rodak brought to this challenge the insights she and Hanson derived from Sticky Revision 2.0. In particular, she pressed framing deliberate choices of media and interface in relation to the cognitive and collaborative needs at hand. She iterated her own Sticky Revision 3.0 as one feature in a larger portfolio of active-learning-based writing-instruction activities, all of which enlisted her students in a more metalevel project of experimentation and technology analysis than she'd originally planned when proposing the course.

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