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ABSTRACT

Journalism can serve as a generative disciplinary context for developing civic and information literacies needed to meaningfully participate in an increasingly networked and mediated public sphere. Using interviews with journalists, we developed a cognitive task analysis model, identifying an iterative sequence of production and domain-specific cognitive constructs of journalism expertise. We diagnose common discrepancies between professional practices and typical youth journalism pedagogies, and offer suggestions for teaching participatory politics and civic literacies through journalism.

Journalism as model for civic and information literacies

Recent technological developments have altered the nature of both literacy and citizenship (Hobbs, 2010; Jenkins, 2009). Civic engagement is increasingly mediated through Internet activity—signing online petitions, circulating political memes, or tinting one's Facebook profile photo the color of the latest solidarity flag (Cohen et al, 2012, Soep, 2014). In turn, educators are beginning to conceptualize possible models of civic learning in the digital age (Kahne, Hodgin, & Eidman-Aadahl, 2016; Zuckerman, 2014). What are the knowledge, skills, and dispositions that young people require to navigate information and advance their civic goals in the context of networked publics—publics restructured by networked technologies (boyd, 2014)? How can educational institutions support young people to develop these skills? In this article, we argue that journalism production can serve as a generative disciplinary context for developing civic and information literacies needed to meaningfully participate in increasingly networked and mediated public sphere. Using interviews with expert journalists, we developed a model of the journalism production process and experts' cognitive constructs that support them to engage in journalistic work. This model enables us to map the processes and skills of journalism production to frameworks of civic and informational literacies. It can also help designers and educators better diagnose challenges and solve emerging problems involved in teaching and learning journalism in different contexts.

Conceptualizing convergence of civic and information literacies

Scholars of civic media, youth culture, and learning are converging around concepts like connected civics and participatory politics to describe new forms of networked political engagement. These practices, more so than traditional forms of civic participation, are characterized by their culturally embedded and interest-driven expression. They include:

- seeking, collecting, analyzing information from a wide variety of sources—what Kahne et al. (2016) called "investigation", and Soep (2014) called "information foraging;"
- creating original content that advances creators' perspectives, often using interactive transmedia storytelling techniques and multiple cultural influences—what Kahne et al. (2016) called

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"production;" Soep (2014) referred to "creating content worlds" and Ito, Soep, Kligler-Vilenchik, Shresthova, Gamber-Thompson, and Zimmerman (2015) described "creating hybrid narratives;"

- selectively sharing information to different audiences and engaging in dialogue and feedback—what Kahne et al. (2016) referred to as "circulation" and "dialogue & feedback" and Soep (2014) called "hide & seek;"
- using one's social network to recruit others to a cause or action—what Kahne et al. (2016) called "mobilization" and Soep (2014) named "pivoting your public;" and
- designing tools, platform, and spaces to advance public good—what Soep (2014) called "coding up" and Ito et al. (2015) called "cross-cutting infrastructures."

According to Soep, these kinds of activities require new literacies like *digital imagination*, *critical design literacies*, *constellation thinking*, and ability to make sense of and manipulate the many emerging forms of representations, such as infographics, data analytics, and interactive maps (Soep, 2014). Scholars are only beginning to characterize these new literacies, and need more research to understand what they look like and what kinds of learning environments might effectively support their development. Up to this point, these frameworks have been based on studies of *ideal*—well-resourced and already successful—informal programs and online settings such as Harry Potter Alliance, which organizes mostly middle-class fans of the Harry Potter series in civic actions around social issues (Jenkins, 2012). However, we know that "these connections between participatory culture and politics don't necessarily form automatically and can be actively brokered by peers and adults, and through organizational infrastructures" (Ito et al., 2015, p. 11).

As a result of the limited scope of prior research, we do not yet have in-depth analysis of the instructional challenges that might arise in teaching these practices in different institutional and cultural contexts. Furthermore, we do not have concrete design principles for what learning environments might need to look like to support children and youth to develop these skills both within and outside of the constraints of school. If young people's current and future civic activity is likely to be entangled with their cultural interests, media ecologies, and social connections, then we must rethink whether we can teach literacies like civics, reading, and writing as separate subjects and instead consider models that converge and engage these spheres of activity together in authentic disciplinary contexts.

Journalism production as domain for developing civic and information literacies

We can help young people develop converging digital and civic literacies through journalism. Based on our design experiments and studies, we find that journalism is a generative, academically rigorous, disciplinary context for fostering and refining many of the skills articulated by connected civics and participatory politics frameworks.

Journalism as a practice has many of the same goals and dispositions as the civic and information literacies we want to develop. To make journalistic products, journalists must be informed and critical thinkers, question and attribute sources, explore opposing views, and consider their own perspectives and biases. Journalists must be effective communicators, with strong writing, reasoning, and argumentation skills, and increasingly, digital production skills (Dvorak, et al., 1994).

Recently, journalism education has begun to acquire a reputation as a new Liberal Arts degree, valuable beyond just training for a journalism career (Gillmor, 2010; Shaffer, 2014). Even before the current digital and new media shift in US journalism and communication, educators recognized the valuable skills embedded in journalism: at the college level, researching, interviewing, and writing skills could prepare students for law or business schools (Schaffer, 2014); in high school, a student journalist could straddle "the arts and the sciences, using the investigative skills of the sciences and the powers of communication—linguistic and graphic—of the humanities" (Dvorak et al, 1994, p. 22), while using higher-order critical thinking skills, such as analysis and evaluation. Students who participate in journalism projects at the high school level become more informed, self-actualized, and collaborative, thus developing attitudes critical for democratic participation (Clark & Monserrate, 2011). Now, student journalists further have opportunities to learn digital skills and mindsets useful for entrepreneurship and innovation, such as leadership, project management, and audience engagement (Schaffer, 2014).

Further, many of the contexts studied in the youth participatory politics research already involve journalism production. Youth Radio, an Oakland-based organization that Soep directs, engages young people in producing nationally distributed radio stories. Movements like the Harry Potter Alliance, KONY2012, and Dreamers, researched by Henry Jenkins and colleagues, use media production and circulation as one of their main strategies for building awareness, recruiting members, and influencing political change (Kligler-Vilenchik & Shresthova, 2012). These organizations do not always call what they do *journalism*; instead they might draw on multiple media genres, including entertainment and music video tropes, as well as activist organizing strategies. Hobbs & Cooper Moore (2014) lament that this sometimes makes youth media projects difficult to watch—as they defy audience's genre expectations. In fact, one of the reasons we are interested in clarifying the practices and conventions of journalism is to be able to address this dilemma in youth media and to encourage more genre-conscious production. The goals and practices of the journalistic craft (research, content production, circulation, etc.) are at the heart of youth media activities. By conceptualizing these practices as journalism, or journalism-like tasks, we can develop shared language and models of the kinds of cognitive and collaborative practices, as well as supportive infrastructures, that enable rich civic engagement. From there, we can extract design principles for building learning environments that help youth and communities effectively develop skills of participatory politics and connected civics.

In our own work developing journalism programs and curricula, we found that by producing community journalism youth develop powerful civic identities, skills, narratives and relationships like the ones described in participatory politics framework (Ferman & Smirnov, 2016; Lam, Chang, Smirnov, & Rosario-Ramos, 2015; Smirnov, Ferman, & Cabral, 2015). Learning scientists have also begun to think about journalism expertise as a more general model for developing information and disciplinary literacies. Polman, Newman, Saul, and Farrar (2014) proposed using journalism production in middle- and high-school contexts as a way to develop scientific literacies. They suggest that researching, framing, and interpreting journalistic stories about science is perhaps a more useful way to help students become scientifically literate citizens in the present and future than traditional science learning activities. Other scholars have demonstrated that public understanding of science is an aggregate result of dynamic framing moves by different actors (scientists, journalists, and the public) throughout a complex research and publishing the process (Davis & Russ, 2015). Therefore, incorporating journalism production into science education, in addition to activities such as lab experiments that resemble science practices more directly, can help students develop meta-cognitive awareness of the epistemic practices involved in constructing scientific claims (Polman et al., 2010; Polman et al., 2014; Polman, Newman, Farrar, & Saul, 2012). We contribute to these theories by extending journalism production as a learning context to develop civic and information literacies, as well.

Need for expert model of journalism

Upon review of prior studies of journalism expertise, we find that there is a paucity of usable models to inform instructional design or diagnose problems in teaching and learning journalism production in different settings with different constraints. The theories of participatory politics and connected civics clearly articulate the civic and informational literacy learning outcomes we want to develop. However, we now need models for the kinds of *instructional designs* that could help us achieve those goals. We propose journalism as a disciplinary context to teach civic and information literacies. In other words, if we want to support youth to develop the skills of participatory politics and connected civics, we should teach them journalism production. By stating this hypothesis, our emerging task as researchers, educators, and instructional designers is to articulate the knowledge, activities, and infrastructures involved in journalism production. Understanding these practices will allow us to set concrete goals for teaching and learning of participatory politics.

Despite its social influence, cognitive and learning scientists have not studied journalism as rigorously as other disciplines such as reading, science, math, or history. Anderson (2008) argued that "journalism, in its various forms, is clearly among the most influential knowledge-producing institutions of our time" (p. 249); yet it has received little attention from scholars in either sociology of knowledge or cognitive

science. Although some scholars have studied journalism expertise as a genre of writing (Andersen, 1987; Hatfield & Shaffer, 2010; Pitts, 1982, 1989; Schumacher, Scott, Klare, Cronin, & Lambert, 1989; Steinke, 1993) and semioticians and linguists have made significant contributions to our understanding of news as a form of discourse (Cotter, 2010; Montgomery, 2007; Van Dijk, 2000), we still don't have a shared understanding of the larger production processes and core constructs of the discipline from a cognitive perspective. The cognitive studies of journalists that do exist focus primarily on the process of *writing*, neglecting the phases of research, reporting, circulation, or even idea generation, which is a necessary step in producing a piece of journalism. Promising research on science communication reveals the complex distributed dynamics involved in journalism production and reception (Davis & Russ, 2015), suggesting further need to study cognitive aspects of the field beyond the published artifact.

From the studies that have been done on journalism expertise, we know that it is a nonlinear, iterative, problem-solving process. For example, Beverly Pitts (1982, 1989) used think-aloud protocols with journalism professionals to develop a model of the journalism writing. Pitts discovered that journalists spend a significant amount of time crafting the lead (alternatively spelled *lede* or *leed*), which then helps to frame the rest of the story. Steinke (1993) conducted a protocol analysis with five science journalists and found that professional discourse knowledge—information about genre conventions and principles of the discipline—plays a much greater role in writers' process than knowledge about their audience. Schumacher and colleagues (1989) compared thinking and length of pauses of undergraduate journalism students engaged in writing either a news story or an editorial piece. The authors found that students struggled with, and were much slower at, writing an editorial, which lacked the formulaic inverted pyramid structure of the news piece. Their study demonstrated the important influence of explicit genre-specific constraints on the writing task. Although these studies can help inform understanding and teaching of journalistic writing, they are of little help for structuring other aspects of the practice, including idea generation, research, reporting, and editorial collaboration.

An interesting perspective comes from Zvi Reich, a sociologist of journalism who theorized that journalistic expertise is a unique form of "bi-polar interactional expertise" (p.347), manifested in the ability to interact with both experts who produce knowledge in other domains (e.g., scholars, policymakers) and in translating that information to the public, or "interacting" with the audience (Reich, 2012). Reich said: "Journalists are sandwiched between sources with superior knowledge and primarily lay audiences, and are thus engaged in vertical mediation between sources and audiences" (p. 347). Reich's theory suggests the journalism may involve a cognitive and procedural system that is distributed across actors and artifacts and posits a question that may be investigated empirically: What are the knowledge and skills that are produced and practiced in the movement between the different discourse communities of sources, publication outlets, and audiences?

To develop a model for civic journalism curriculum that is grounded in authentic disciplinary practices (Edelson & Reiser, 2006), we need to conduct additional research to fill the gaps in literature summarized previously.

Methods

We undertake a task analysis study to investigate the following questions:

- What domain-specific cognitive processes and constructs do professional journalists use to gather, organize, and present information?
- What are the implications of this cognitive model for designing learning environments for developing civic and information literacies?

Our project is undertaken with several assumptions derived from cognitive science theories: (a) There will be a generalized procedural model of journalism production that involves goal states, a plan for accomplishing the goal, operations and strategies activated by the plan, and objects (both cognitive and material) used and manipulated as part of the task process (Johnson, Johnson, Waddington, & Shouls, 1988). This is the model we aim to articulate through a cognitive task analysis (CTA); (b) expert journalists will have domain-specific knowledge structures related to the tasks of journalism production, including taxonomies that describe possible object properties and cognitive representations activated in

the moment in order to accomplish strategies (Chi, Glaser & Farr, 1988); and (c) journalism production appears to be a distributed cognitive system that involves multiple actors, objects and complex actor-object relations (Hutchins, 1995; Reich, 2012; Davis & Russ, 2015). Although this article is focused on describing an individual journalist's cognitive process, for the purposes of building a model that helps us design civic journalism learning environments, we need to also attend to aspects of this larger system.

Research team

As a research team, we have a range of prior experience with journalism production and education. The first author has a background in media and communications and has worked as a youth media educator; she previously developed and led a public access youth news show in Philadelphia that combines broadcast conventions with other entertainment and youth cultural genres (Ferman & Smirnov, 2016; Smirnov et al., 2015). The second author is trained as a professional journalist and has designed and taught several youth journalism programs in Chicago. The third and fourth authors served as Principal Investigators (PIs) on a design-based research project to teach journalism production to students with immigrant backgrounds (Lam et al., 2015). Despite having designed and implemented interesting and variously successful journalism education initiatives, we felt we needed to understand more about the tacit aspects of the disciplinary process known by professional experts. We had designed our previous interventions based on our assumptions or textbook knowledge of the field and were lacking the tools to analyze the challenges we were encountering in supporting youth journalism production. Similarly, we lacked the principles to articulate why certain solutions we developed seemed to be working, which ultimately prevented us from identifying which essential aspects to replicate.

Setting and participants

Data for the CTA comes from interviews with five expert journalists. We defined *experts* as individuals who are or had been employed as contributors by a professional journalism outlet. The researchers recruited a convenience sample of journalists from personal and professional contacts with a range of experiences: a science magazine writer, a freelance reporter who focuses on issues of immigration, a staff writer for an alternative weekly paper in a major US city, and a lifestyle magazine writer. For another collaborative study investigating the representational practices of youth documentary storytelling, a journalism professor with expertise in broadcast media was interviewed on several occasions by Lam on the processes, techniques, and conventions of documentary storytelling, as well as more in-depth concepts related to the specificities of representing different social perspectives in documentary work (Lam et al., 2015). We analyzed a portion of one of the interviews to validate and elaborate our task analysis model across a range of journalistic genres. The final sample included two female and three male journalists, who were racially and ethnically diverse.

Because our ultimate goal was to use the interviews to build a model to inform design of civic journalism curricula, we intentionally sought out participants with experiences reporting on issues of public concern (rather than breaking news reporters). When asked what they saw as their goal when creating a journalistic product, all five journalists said they aimed to inform the public about important issues, either through relatable human-centered stories or clear interpretations of scientific research (See Table 1).

Procedure

We conducted cognitive interviews to inventory tasks and knowledge of experts (Clark, 2004; Crandall, Klein, & Hoffman, 2006; Ericsson & Charness, 1994; Ericsson & Simon, 1980, 1993; Jonassen, Tessmer, & Hannum, 1998). During the interviews, participants were asked to define their goal when creating a journalistic product and outline their process of accomplishing this goal step by step, from idea generation to distribution (see Appendix A). J-5 did not follow this exact protocol (see details in the following)

Table 1. The Study Participants Were Five Civic Journalists With a Range of Experience.

Study Participant	Years Experience	Publication Expertise	Stated Goal of Their Journalistic Product
J-1	6	Former staff writer and translator for consumer health magazines in China, Taiwan and Hong Kong	Inform and educate the public, in an appealing way, about new and relevant science information
J-2	34	Publisher of an online storytelling network for immigrants; freelance magazine writer; journalism professor	Help the public connect to stories about the lives and experiences of immigrants and refugees from multiple access points
J-3	5	Staff writer for urban alternative weekly newspaper; Regular freelance writer for international investigative news outlets	Uncover important information the public should know about by shining a light on power imbalances or the people on the losing end of society
J-4	33	Former newspaper reporter; former writer and editor of lifestyle magazine; current freelance writer and journalism educator	Inform and engage public in a human story that relates to a larger social context
J-5	30	Broadcast news journalist, producer of short-form news documentaries and journalism professor	Inform public on important topic or situation by fairly representing opposing views

but was also asked about goal and process of documentary production as part of the interview. We recognize that the journalism production cycle includes other activities beyond our proposed scope, such as ongoing source cultivation and audience engagement. We specified the start and end points of *idea to distribution* as a way to narrow our interview conversation.

Note that three of our informants are professors at a top-ranked journalism school. All three have had extensive industry experience before joining the academy, and continue to work on freelance assignments regularly. However, prior cognitive research has shown that how people describe a process when they teach it may be more idealized than what they actually do in practice (Basturkmen, Loewen, & Ellis, 2004). To probe into the journalists' own expert knowledge, rather than their educator constructs, during the interviews, we asked our informants to talk about specific examples from their own work. While conducting our first interview with J-1, a former staff writer for a health magazine, she began organically to refer to a specific story from her magazine about the controversies surrounding a new medical treatment. We found it useful to use this piece as an anchoring example for the entire production process. Subsequently in our interviews, we asked J-2, J-3, and J-4 to provide a recent journalistic piece that they had produced to refer to as an example. J-2, whose work focuses on immigration and refugee issues, brought in a short piece published on the web covering a naturalization ceremony of someone he had been profiling for a larger magazine editorial; this enabled us to probe into both a completed product and into the middle of J-2's current production process. J-3, a staff writer for an alternative urban weekly newspaper, shared his article investigating local police corruption that was just printed in his publication. J-4, an experienced lifestyle magazine writer and editor, shared a recent piece for a university alumni magazine that reviewed several university research projects related to immigrant issues and experiences. J-5, a broadcast journalist who had done short-form documentaries aired in news programs, followed a different protocol designed and implemented by Lam that did not explicitly refer to a recent piece that she produced. Instead, J-5 was asked to describe and reflect on the process and conventions of documentary storytelling, and was prompted to talk aloud about three documentaries chosen by the researcher. Throughout the interview, J-5 also frequently referred to the process and decision making principles in her own work.

Although our aim was to develop a generalized genre-crossing model of the journalism process, we found using a specific piece of the participants' own work as a prompt helped to make the experts' practices more concrete, and to surface common language that journalists use in practice. For example, we would ask how a journalist chose to include a particular quote, or how he was able to obtain the anecdote in the article's leading paragraph. Then, to understand the cognitive structures that might support the journalism process, we asked the participants how they knew when they got the right quote or chose the right *lede*—opening paragraph—for their example story. Throughout the interview process,

the researcher would periodically sum up the previous process steps articulated by the journalist to check if important steps were missing and whether the order of production phases was accurately recorded. Each interview lasted between 1 and 2 hr, and was audio- or video-recorded and transcribed by the researchers. Due to an error made by the interviewer, the original video interview with J-3 was not audio-recorded, but the participant was sent and approved the researcher-collected field notes. J-3 was also observed several times in the process of reporting on and writing journalistic pieces by the first author and was interviewed again after the model was developed to verify the CTA and check for any missing steps. These follow-up experiences allowed us to validate and elaborate J-3's professional process, as well as the overall journalism process model.

Analysis

To analyze the interviews, we parsed the transcripts and notes using participant terms to develop a breakdown of the goals and specific tasks involved in the journalism process. At first, these generally matched conventional ideas about what journalists do, such as *come up with an idea* or *write a pitch*. From this analysis, we created a separate CTA models for each of the participants, with his or her unique production process. A CTA is a hierarchical representation of operations involved in accomplishing a complex task and the cognitive structures that enable someone to perform the operations (Clark, Feldon, van Merrienboer, Yates, & Early, 2007; Crandall et al., 2006). Each operation is specified by a goal, which is attained by specific actions. We then used analytic induction (Becker, 2008)—a systematic examination of similarities across phenomena—to triangulate across our subjects. From the individual CTAs, we created one general model that could account for individual plans and professional practices, but would also include enough detail to describe each of our participants' paths to creating a journalism product. This nonlinear model includes labels that aim to more precisely describe the goals and processes involved in the cognitive process of journalism production. For example, as we reviewed participants' descriptions of how they come up with an idea, we realized that it involved a combination of ongoing process of *scanning and filtering* various sources of information for potential newsworthy ideas, and iterative steps of *selecting* and *framing* a candidate story. Within each of these steps, journalists described performing specific actions, such as evaluating the validity of potential interviewees for the story, or considering possible angles to frame what might be compelling to the audience of a particular outlet. This example illustrates our analytical trajectory to describe each task with enough specificity to help us think about the different concerns that would come up in teaching journalism production. We iterated on this model and checked it against our own data, examples of expert and student pitches, follow-up observations of journalist practices, and journalism textbooks. We met to discuss challenges and disagreements between the data and the models and revise the diagrammatic representation of the model to capture our evolving understanding of the journalism process. We also wanted to understand what domain-specific cognitive constructs journalists have that help them accomplish different tasks, such as problem categories, schemas, or mental models that have been documented in other disciplines. To determine these cognitive constructs, we drew on parts of the interview where we explicitly asked journalists to describe how they knew something (e.g., what makes a good story, whether the final draft is *tight*, or whether a quote would engage the reader). We identified three cognitive structures that appeared to influence journalism production: (a) domain-specific *evaluative criteria* used to make decisions at different phases of the process, (b) a *generative story schema* that guided the planning, reporting and writing phases, and (c) *an internalized audience mental model* activated in the process of selecting and framing ideas, and reviewing and revising drafts.

Finally, we formatted our analysis into a hierarchical cognitive model that includes goals, subtasks, cognitive structures, and artifacts produced at each phase, a form we thought would be most appropriate for instructional design. Again, these phases are not necessarily linear, though they are structured in a logical sequence: planning tends to precede reporting, although planning goals also get activated throughout reporting, narrativizing and review phases. Revision might activate the need to replan or even reframe or reselect a story. Depending on the experience of the journalist and timeline of production phases may take more or less time, be skipped altogether, or involve multiple iterations.

The resulting model, although produced from descriptions of journalists talking about their own processes, is not the same as how a journalist necessarily thinks about or would describe her own process. Because expertise is highly complex, the explicit task-related structures experts have and are able to articulate are likely to describe behaviors—what they do—rather than deeper conceptual analysis involved— how they know the right thing to do. A journalist would not say "and then I activate my cognitive story schema to guide reporting"—as researchers, we wish that's what subjects would say! Instead, they might say "and then I go do interviews." This poses a problem when experts become teachers, because they might be blind to lack of domain cognitive structures of novice learners (Hinds, 1999; Nathan & Koedinger, 2000; Nathan & Petrosino, 2003; Nickerson, 1999). Our model, therefore, aims to account for that expert blind spot by providing a more precise articulation of the processes, knowledge structures, and conditions of the journalism production process at a meta-cognitive level. Although the general model might not veer off significantly from conventional ideas of what journalists do, what is surprising and important for instruction is that some of the tasks take much more time than we expect; and, consequently, knowledge related to performing those processes is richly developed in ways we might not anticipate.

Results

In this section, we present the CTA model of journalism production, describing each of the major phases with examples from the data and the key cognitive constructs that support journalism expert thinking. As with other areas of inquiry and knowledge production, real manifestations of the journalism process are iterative and full of idiosyncratic variations based on the individual or community of practice. However, our abstracted generalized model is useful for informing design of learning environments that can develop the key epistemic, procedural, and collaborative practices of the domain. Professional journalists work in situated distributed systems influenced by different goals and local constraints (Hutchins, 1995). As a result, each of our experts would have a slightly different plan to produce their journalism products. This plan is nonlinear and reactive to the constraints and emerging demands of the particular expert's workflow. Additionally, each person brings their own idiosyncratic experience to structuring the details of their work (such as note-taking techniques or preferred software). However, we argue that, despite the differences in particularities of order or intensity, each expert nevertheless activates the cognitive processes described in our model.

We have decomposed each phase by specifying its goal and fine-grained operations involved in accomplishing the goal, the cognitive constructs developed or activated at different moments, and process artifacts produced at each phase. An illustration of the model can be seen in the following, with a detailed table of phases, tasks, constructs, and process artifacts available in the Appendix. The model and table can be used to design, sequence, and orchestrate journalism learning instruction. For experienced journalists, the model can help to make explicit the tacit knowledge they take for granted that novices do not have. For educators with no journalism experience, the model can serve as a starting place for guiding unit design.

Based on our analysis, journalists engage in seven top-level cognitive processes while generating, reporting, and writing their stories (See Figure 1).

Scan and filter

Journalists continuously scan and filter, surveying the environment for potential story ideas by attending events, following local political or scientific developments, talking with community members to gather *tips* (information clues), and monitoring publications in the competing market (newspapers, magazines and websites that serve the same demographic and focus on similar topics) to note both popular and un- or underreported subjects—what J-3, an investigative alt-weekly reporter, called getting the *scoop*. J-1, the science journalist, says that to come up with story proposals, she would look at scientific journals, using a list her publication had of journals considered more "valuable and informative," and "read through the abstract or, like, every issue regularly" looking for the ones relevant to her magazine's goal. To scan and
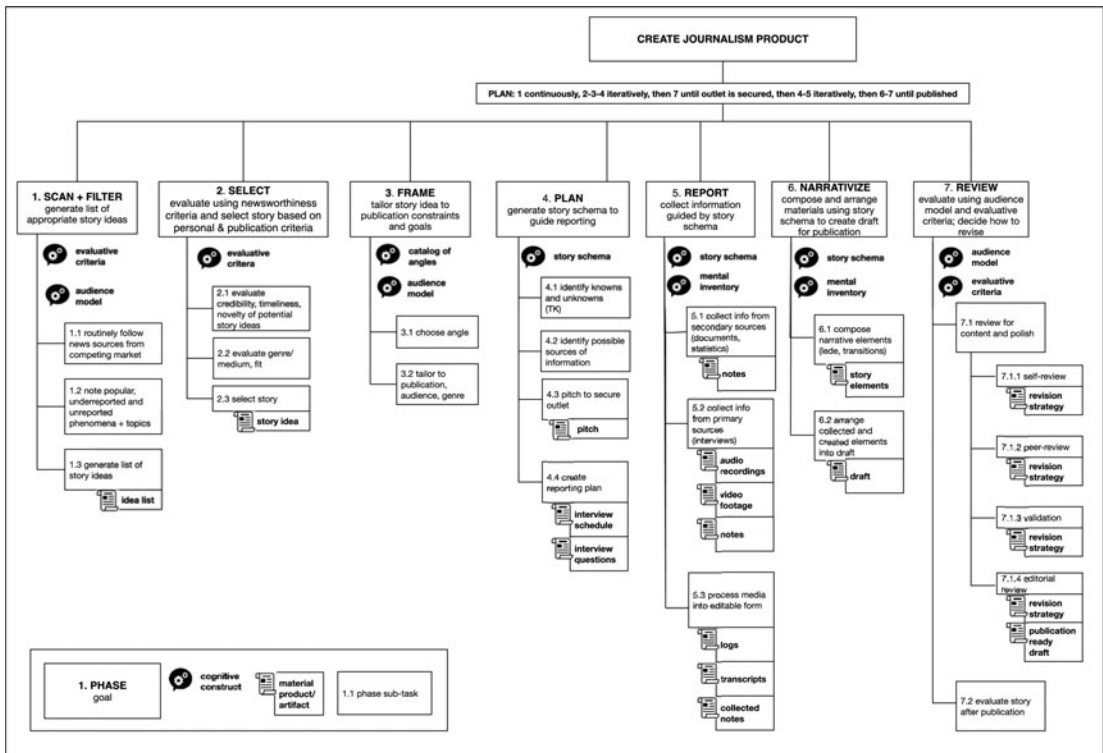
Figure 1. CTA model of journalism production process, including goals and subtasks, constructs, physical artifacts produced.

filter, journalists interact with many possible sources of information, editors, and external media outlets, and produce memory-aiding artifacts in the process, such as jottings of possible story ideas. J-1 said that at her magazine, story idea generation also happens collectively in editorial room meetings:

> So the first one is, not necessarily done by myself alone, sometimes I would discuss with my chief editor, or he would consult one or two more journalists in that field, and it's like if any of us stop, eh, spot an interesting topic, we like forward it to each other and see if this is valid topic for us to work on. And then if there is an emergen- like a great, huge news going on, then I guess, it is, then we won't ask each other about our take on that, it's just a necessary piece for us to report on.

Journalists may also scan and filter their everyday environment and activities for possible story ideas. Describing how he came up with the idea for his short article on a naturalization ceremony, J-2 said:

Ok, so this story is, first of all, it is an event. Not something that happens every day. It was an immigrant getting naturalized at a ceremony that for him is going to happen once in a lifetime. And so I wanted to be there. And in some sense, I was thinking when I walked in, maybe I'll write a story.

In other words, although he planned to attend the event anyway, he wasn't yet sure that it would be worthwhile to write a story about it. However, J-2 was moved by the events of the naturalization ceremony and what he learned about his focal subject at the event led him to conceive another story direction for a larger magazine piece. Thus, the first step of coming up with a story idea is simply looking at information or events in one's everyday life as potentially story-worthy—an evaluative process we discuss in phase 2.

Throughout this continuous work of scanning and filtering, journalists also develop and refine their knowledge of discursive and genre conventions of the discipline, and develop a sense of readers' knowledge and expectations by experiencing what it is like to be readers of journalism themselves. These constructs aid them in later phases of the process. As J-3 said, "You should wake up every day reading your news if you're writing the news" and claimed the reason he knew "how to write newspaper

articles with zero training" (he never had formal education in journalism) was because he had read so many.

Select

Out of the many constantly available story ideas, journalists in our sample select a story (subjects, events, or phenomena) to follow further by evaluating its reportability. Selection is a more rigorous level of filtering than in the scan and filter step and is based on both general newsworthiness and specific publication criteria. For J-3, these *newsworthiness* criteria include asking oneself: Is the story interesting? Is it important? Is it timely? He also quickly evaluates how hard the information he will need for the story will be to obtain:

> If some random person calls me with an interesting story, for me to verify that it's real, requires a lot of work. If a lawyer that I know well contacts me the same story, I pretty much trust that they're telling the truth about it from the get go. I have at least four or five stories that I'm kind of interested in right now, but I haven't had time to look into it because it will be complicated to figure out.

For J-5, a broadcast journalist, selection includes evaluating whether a story is appropriate for a broadcast medium: "I think first and foremost, you've got to think about what the topic is, and is it a visual topic. Before we go anywhere, we need to know: What are the visuals?" Print and video journalists make decisions about what's newsworthy and relevant based on the goals of their outlet. J-1 looks for topics that "have implications in [reader's] everyday life and whether it's useful." For example, a story about hazards of radiation affects more of her readers than a story about astronomy. Alternatively, editors may assign a story to a journalist or select from several options presented by the journalist. Among our participants, J-4 was assigned to report the story for a university alumni magazine. In this case, the editor, not the journalist, went through the selection process to determine whether the story was worth reporting.

Frame

Story selection is further refined by framing. During this process, journalists tailor the story idea to their specific genre and publication by applying a particular *angle*—one way to interpret the information gathered. The journalists we interviewed had common angles they tended to use in their stories. J-1 often focused on "conflict of interest" or "benefits versus side-effects" of new pharmaceutical discoveries. J-3 was interested in illustrating how social inequality is reproduced, by writing stories on urban policy, education, and the criminal justice system. J-2, working on immigration issues, wanted to explore the way different communities experience similar issues, such as health care decisions or the notion of *home*. An angle is thus a way to frame the story within a larger context or theme to make it relevant to an audience. As J-4 says:

> You still want your lens to be open enough to help your readers understand that yes this is a story but it's embedded in the context of this other thing, so you also want to reference this other thing, that other phenomena that puts in the news.

For example, his story about several university researchers studying immigrant experiences and identity was framed as an underreported conversation on the stressors and stereotypes that immigrant adolescents face. Because the piece is targeted to university alumni, the frame includes both the larger context of media coverage on immigration and the noteworthy contributions of the specific university's faculty.

Journalists we talked to all seemed to have a common repertoire of typical angles that they frequently use in the framing process, drawn from journalism conventions, publication goals, and personal ideologies. J-1 said that typical angles for a consumer health review story include "benefits versus side-effects," "conflict of interest," or "impact on society." J-2 tended to use angles, or what he called "notions," like "meaning of *home* and exile" or "connections between different immigrant groups" for his pieces. J-3, an

investigative reporter, shaped his stories to address ways that "inequality is reproduced" across domains of education, politics and criminal justice. Further research focusing on this aspect of expertise could help us understand the range and conditions for this form of knowledge within different subgenres of journalism (e.g., science, investigative, political).

Each journalist had a slightly different process for applying an angle, however. J-1 said that at the beginning of a story, she pursued several possible angles at once, by following multiple *leads*—potential sources of information. According to her, determining the angle worthy of committing to would require collecting at least three pieces of supporting evidence or three supporting leads. J-3 similarly "followed the trail" of multiple possible leads or sources, for example by reading court records or talking to lawyer acquaintances. In that process, he discovered a $250,000 lawsuit the city government had recently settled that involved a police officer, which led him to develop a unique angle for his story: While other news reports about this incident asked, "Did [the officer] do it or didn't he?" J-3 chose to ask, "If he keeps doing it, why is he still a cop?" By asking this different question, he *framed* the information through the angle of institutional corruption, rather than an individual abuse of authority. As evident in these examples, finding the right angle might require engaging in some light *reporting* (see phase 5); conversely, a frame might also shift after or during the *reporting* as the journalist discovers new information, or while *narrativizing*, as the journalist sees new connections between data. While these processes may be simultaneous or even involve similar actions, we propose that different primary goals motivate decision-making and activities at each phase. For example, J-4 talked about connecting his story about university researchers working on issues of immigrant adolescents to a conversation that is "in the air" right now about immigration reform. Although that may sound like he's *selecting*—evaluating whether the story is a worthwhile or newsworthy one to tell—in reality the story about the researchers' ongoing work is already selected and assigned to him by the editor. Instead, at this stage, he must make it sound newsworthy and relevant by applying a particular angle. He says:

> Here's the news angle . . . the conversation that the country is having about immigration reform. And that's how you are, that's how you're sort of teasing out stories. So you've got news in that . . . immigration is a topic that is, um, sort of in the air right now, that everyone is discussing; you've got people who are doing work in this area, and interesting work that the readership of this magazine might want to uh, to uh read about.

J-4 said that for his story, he worked on "massaging" the angle with his editor. J-1, J-2, and J-3 also referred to adjusting the framing in collaboration with an editor, often in the process of negotiating a pitch or assignment during a meeting or email exchange.

Plan

As they are framing their stories, journalists begin to plan, identifying knowns and unknowns they will have to communicate, brainstorming possible sources of information, such as people to interview and documents to consult and developing a reporting plan and schedule. Our analysis suggests that during this phase, journalists construct a kind of generative story schema that will guide their reporting.

We define a generative story schema as an approximate mental structure of the types of content the finished story is likely to include. In this phase, journalists might start to write down notes, create lists of possible subjects they could talk to, or develop interview questions. They also begin to construct a mental schema of the kinds of moments they will want to observe.

The generative story schema can be thought of as a kind of specific adaptation of journalistic *story structure*. Journalism textbooks often describe these common structures, such as the classic inverted pyramid, which foregrounds the most important details of the story—the "who, what, where, when"— and then fills in the background and contextual information, making it possible for the reader to know the key facts even if s/he does not read the entire story (see Figure 2). Other classic models of organizing a journalistic story include the kebob (which evenly intersperses vivid anecdotes with contextual details on a structural *skewer*), the martini glass (with the cup of the glass presenting information in an inverted pyramid structure, the stem offering a chronology of events, and the bottom of the glass offering some kind of *kicker* or closing point). See Harrower, 2007, for elaborated illustrations of these models.
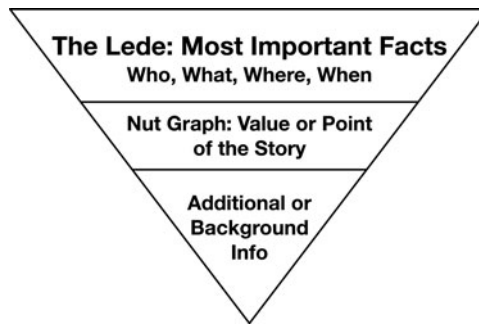
Figure 2. Classic Inverted Pyramid Story Structure.

These story structures are different configurations of the key journalistic elements, including the *lede*— an opening hook to a story; and a paragraph that succinctly presents the *nuts and bolts* of the pieces—what some journalists called the *nut graph*; and various supporting details of the story. J-2, J-3, and J-4 mentioned these traditional elements; J-1 talked about specific requirements for introduction and conclusion to include in her short health information articles. J-5 didn't talk about ledes or nut graphs because her interview was focused on documentary, which might have different terms for similar conventions, such as beginning with establishing shots. Beyond these common elements, J-2, J-3, and J-4 also referred to the convention of collecting and writing *illustrative scenes* for their stories; J-2, J-3, J-4, and J-5 talked about starting a piece with a representative character—what is sometimes called *the face*. J-1 didn't mention these as relevant conventions in her process because her work tended to be more short-form and sourced primarily from press releases and phone and e-mail interviews with experts. Aimed at informing consumers about novel scientific and medical findings, J-1 was less focused on engaging readers with long feature articles, which include more everyday voices and narrative storytelling conventions.

Scenes are vivid descriptions that situate the story in a particular time and place. A face is a character that personifies the issue. For example, J-2, describing a story he was currently in planning phases for, painted a potential story flow that went like this:

> There will be moments [during reporting], for sure, that the light bulb will go off and my notes will have a circle around it or an asterisk. That will be in the piece unless something odd happens. I want it there. And, in fact, so much so that I will contrive ways to get there in a story, so that it's there. . . . So I also think of scenes. So there will be multiple scenes, and for that, I can only, if I were writing the pitch piece now, I would be saying, there will be a scene in the blah blah blah. I will be capturing a scene of him and this brigadier general meeting with somebody. I will capture a scene when [subject] first walks into the camp and blah blah blah. I captured a scene of—I will capture a scene of him saying goodbye to somebody. I say, you know I said before I'm going with him to [home city], I'm going to be with him at his church . . . there will be a goodbye scene.

Here, J-2 says he will "contrive ways" to construct the scenes starring the story's subject. He imagines depicting this in his future narrative, which suggests that planning a journalistic piece involves constructing a mental schema with particular slots for specific kinds of "moments in time." Consequently, reporting is not simply discovering what's out there, but is a process of gathering information that will fit into the guiding schema that includes a face and other characters, a number of scenes, and supporting facts. In the planning stage, the journalist starts to anticipate or imagine what some of these specific elements might be and how they might be obtained. What's interesting is how specific these anticipated scenes are—tied to particular locations, participants, and activities, thus helping the journalist construct his reporting plan, which includes following his subject along to various places in order to record the scenes.

Similar to scene-planning, in this phase journalists also identify possible sources of information, including people to interview and documents or data they might want to consult. These sources varied based on the kinds of stories and publications the journalists were working with. J-1 said that for a story about a new medical treatment, she would consult the press release from the medical company, compare it with the published research findings, and call up government officials and doctors to comment on the

treatment's effects. J-2 listed several institutions specializing in immigrant and refugee information as his go-to sources, such as United Nations High Commissioner for Refugees and Migration Policy Institute, and the census. He said he would also want to talk to writers and scholars writing about the notion of home and exile, as well as interview local community anchors in the area he is reporting about. J-3, who frequently reports on criminal justice issues, consults court records and talks to lawyers but also to sociologists and historians of urban issues. J-4, for his story about university researchers, would look to curricula vitae (CVs) and research publications before interviewing the scholars in person. J-5, a broadcast journalist, plans where she might go to shoot B-roll (supplemental footage that may be edited over interviews or narration): "[You] begin to research the places where you might go and actually shoot the B-roll, so it's almost as if the B-roll, the visuals, tend to drive the story topic."

Even our limited sample reflects the extent to which planning is genre- and issue specific. In other words, journalists are expert at developing a schema in the genre they most typically work in. J-2, having worked most frequently as a print and radio journalist, says that in envisioning a story during planning, he often finds himself "defaulting to the medium you're most comfortable with":

> I choose stories because I can envision how I'm gonna write it or how it's going to sound. That if I were thinking of a different medium, I would either do the story completely differently or not do that story. I can picture journalist, me including, going oh my god, I can just hear that story. And if you're not doing audio, that doesn't help a lot.

A working story schema is necessary for journalists to pitch their story to their editor. A pitch is either a formal or informal artifact of the planning phase. J-3 said that before investing significant time in further steps, he would first talk through story idea or pitch with the editor of his paper. In a full-time position like his, a pitch might just be a casual conversation with an editor about the direction of the story. But, when J-3 freelances for other publications, a pitch would be more formal and developed. In other words, the pitch is the public-facing version of the personal plan, developed at this phase, which guides what journalists will do in reporting, an early stage "test" of the story frame. As J-2 said:

> What I'll do is put together an outline, that sets out, in my head, as close to conclusive—not conclusively, presumptively. Presumptively where the story is going to go. Because then somebody could tell me back, why are you going in this direction? Or . . . that's great, I'm fascinated. You need that, you need an element here with such and such.

In other words, J-2 describes how he might test his story schema with colleagues or an editor. However, neither the pitch nor plan needs to be the final outline of the story, which will inevitably change based on the data gathered in the reporting. Instead, the generative story schema is like in itinerary for a trip—a plan for collecting memorable and surprising moments.

Report

Guided by their schema, journalists *report*, the disciplinary term for gathering information from primary and secondary sources. As explained previously, journalists already anticipate the kinds of things they might want to include in their story, and collect information according to this story schema (see Figure 3). To report, journalists will conduct interviews on the phone, collect statistical or historical data, and go out into the field to record scenes. As mentioned in the previous sections, these scenes can help to situate the future reader in a time and place of the story. J-4, a freelance writer, describes his note-taking style when he is in the field or interviewing:

> I really try to note everything, I mean I really try to take down the color of the walls, . . . counts of the bodies in the room, the desks, the whatever, I mean I really try to take down, to record as much about that environment, and what's going on as possible, um, I take notes on what people are wearing, and you know, I really am just trying to capture as much as possible. . . . I actually love doing that part and trying to recreate scenes. And then when you know when I don't feel that I have it all, then I call people back and say you know this may seem like a silly question but what color was that desk that you—or what color was that chair? . . . Cause you're trying to, to recreate this as faithfully as possible.

J-4's method almost resembles an ethnographic practice. However, whereas ethnographers try to collect a rich body of data over a sustained period of time from which to draw patterns during analysis,
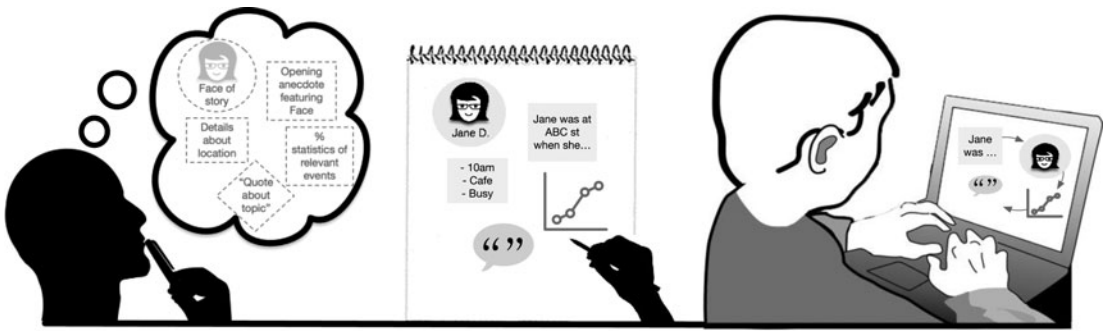
1) In the **PLAN** phase, journalists develop a generative story schema anticipating likely scenes that they will gather and the types of details they might observe and record

2) During **REPORT** phase, journalists collect expected and unexpected scenes, statements from interview sources, documents, and other forms of possible supporting data

3) As they **NARRATIVIZE**, journalists iteratively order the material gathered in report phase into a more traditional journalistic structure, composing transitions between elements

Figure 3. A model of the story schema in the process of planning, reporting and narrativizing.

journalistic scene-gathering may be more strategic and less exploratory. In the process of gathering materials, journalists seem to be mentally plugging in the information they have already collected, testing it out as a potential opening paragraph (a *lede*), a vivid scene, or a powerful quote, thereby monitoring their progress and making decisions about what further data to collect. J-4 said that during reporting:

> I try to make sure that I have some scenes. You know, I've been asking along the way—and you know, again, it's like a quote, when you get a good scene, you sort of know that you've got a good scene but sometimes you amass a lot of good scenes and they don't all make it in the story, but along the way, you're paying attention to what a good scene is, you're listening as people are recounting scenes to you, for what good scenes are so you're taking a mental inventory of that along the way, to sort of have a good understanding of what you have

The journalists are evaluating the quality of their reported data as they go. J-2 described how being at a naturalization ceremony made him able to capture a beautiful scene when new citizens hand their green cards over to the judge and receive a naturalization certificate:

> To me that captures the part about an immigrant's life that most people don't think about, the part called *the green card*. . . . So, you know, a person has a green card all these years and you are now handing it over to the judge; your lifeline is that green card. I don't need that life. I get a better life. . . . You know, I had no idea there would be that moment in time unless I was there. That—what does—do people throw their green card in the garbage can? No, they hand it over to the judge! How cool!

This example illustrates how the process of reporting—observing, interviewing, researching—brings unanticipated moments or scenes as well as quotes. J-4 says about quotes, "As soon as you hear a good quote you know that THAT is the quote, you just know you're gonna use that quote." J-3 confirmed this during a validation interview: "Yeah, something goes off in your head when you know there's a quote you're going to use, definitely." J-5, describing the process of video production, called this a moment of finding the *money byte*—a quote or sound byte that is particularly striking. She said: "We call that the money byte, that is, you're doing the interview, and you hear something, and you go, [makes clapping sound], that's it, right there, I definitely have to make sure to use that."

As such, journalists might have a cognitive representation of their data, and especially the particularly useful bits, while they are reporting their stories. J-4 called this a *mental inventory*, a term that we think works well as an expert cognitive construct. Becausse working memory capacity is limited, each journalist we interviewed also had a different personal process for recording his or her findings in the reporting process—for creating a physical inventory of data. Most collected either audio or video recordings of their interviews. J-2 assembled all his various notes in a long Microsoft Word document, which became a kind of scannable and searchable database of all the information collected thus far. J-5, a broadcast journalist, had a systematic process of logging and transcribing footage using video editing software. In other words, journalists maintain physical and digital inventories of their reported material; however, they are continuously collecting and scanning a mental inventory of what they know and need to know

and pre-identifying possible quotes and scenes to include in the final piece. Both inventories are likely to be more expansive than what is included in the journalistic product, however. As J-4 said, quoting one of his editors, "If you use more than a third of the material that you've gathered, then you underreported a story. Because you really want to feel as though—particularly with magazine writing—that you're an expert in this world."

Narrativize

As journalists gather enough data to develop some expertise (or begin to feel pressured by a deadline!), they start to narrativize the material they generated in the reporting phase by arranging it into a logical order and combining it with additional generated material that they compose—introductions and conclusions, transitions, graphics, or voice-over script. J-2, J-3, and J-4 talked about using a standard convention of writing an opening scene or anecdote, a moment in time that hooks the reader into the story. According to J-4, "Knowing what the opening scene, the opening anecdote or opening [para]graphs are is essential." Because they collect multiple scenes in the process of reporting choosing the right one to illustrate the story and engage the reader from the beginning might be a challenge. This journalist's account confirms the findings of Beverly Pitts (1982, 1989), who showed that composing a lede can take sometimes up to "one-fourth to one-third of the total writing time, and is the part of the process in which the most concern is given to planning and goal setting" (Pitts, 1989, p. 17).

In J-3's interview, he said the goal of the lede is to give a miniature taste of the whole story. We asked him to retrace the structure for his story on police corruption. It starts out with several paragraphs depicting a scene of a police brutality incident through the perspective of a source who witnessed the event. The story then cuts to what J-3 calls the "chase sentence" (or nut graph)—a paragraph that contains the article's main claim: This police brutality story is not an isolated incident, instead it is a symptom of a larger problem. The opening scene is then connected to several analogous cases supported with evidence from other sources and court reports. Then the text broadens out to the larger institutional problem— the lack of punishment for abusive cops. As J-3 explained that the second half of the story isn't about the title cop at all. Rather, the officer is *the face* of an article about institutional corruption.

The aforementioned narrative technique—starting with the face—is something that J-2 told us is becoming more common among publications like New York Times and Wall Street Journal: "They're all leading with individuals, with the face of the story." For his projects on immigration and refugees, he said a face is "an individual, not 140, not 50,000 immigrants. . . . We're talking about an immigrant experience through one person." J-4's interview echoed this sentiment: "People want to read about other people and not necessarily about programs and policy." J-5 also talked about a common convention of starting journalistic documentaries with the face, a person who represents an aspect of the bigger problem. In contrast, J-1's short, 300-word articles for a consumer science magazine did not have a *face* lede. Instead, she said her introduction needed to be short, introduce the angle, and build on public's previous knowledge without any overly difficult or discipline-specific words.

Pitts's (1989) and our participants' accounts also indicate that although story schema construction and goal setting happen before reporting, a *replanning* process takes place during lede writing based on the actual material collected in reporting. Narrativizing involves adjusting material collected during reporting with the anticipated story schema that includes conventional journalistic elements, such as *face, nut graph,* and *scenes,* situated within a larger social frame—or the story's *angle*, assembled according to the publication criteria (See Figure 3). J-2 described how a magazine story format guides the way he thinks about organizing his anticipated reported material into a narrative draft:

> So you've got the small, the larger context. And now I gotta bring people into the story. . . . I don't want any paragraph to go by without somebody saying, "I didn't know that. I didn't know that." But that's a little bit different than every couple of paragraphs having somebody say, "I gotta read on." . . . So I gotta build in some kind of drama or story development throughout the piece . . . at a certain point in the piece you want a really dramatic change. And so, I don't know what that will be right now, but it'll be there. You know I will tease something in the beginning.

This described writing plan is different than J-2's reporting plan, which anticipated particular scenes that he will collect. Here, instead, he emphasizes transitions and surprises realized via the story's arc,

focusing on the reader's experience, and thinking about the ways he will arrange his text for maximum effect.

Other rules for the narrativizing phase mentioned by our participants included: intersperse own text with quotes (J-3), do not stack quotes one on top of another (J-4), offer little summaries or sign-posts along the way (J-3), and when facts are uncertain, hedge by attributing the information to the source, using words like *according to* and *allegedly* (J-2, J-3). None of our journalists reported making a formal outline during their writing process (J-4 said he explicitly didn't write one). Instead, they used their pitch, story schema, notes, and transcripts to assemble their reported material into a draft.

Review

Throughout all six of the aforementioned phases, and after they have a draft, journalists activate a review process—a revisiting of the existing text and potentially returning to previous phases. We distinguish between evaluation and revision activities in this phase. Evaluation is needed to assess information gaps (J-3 marks these with bold letters *TK* for *to know*) or stylistic issues such as clarity of language and chronology, and enables the journalist to set a revision strategy. Revision involves literally revisiting another phase of the process (e.g., journalists will rereport, renarrativize, or reframe their story to revise). This stage also involves both internal cognitive elements in the form of an *audience model*, and a distributed system including family, friends, and the publication or documentary outlet's editorial staff.

For example, while narrativizing, journalists may realize that they are missing some details or facts that could support their story. Rather than pausing to find this missing information right away, J-3 puts *TK* (for *to know*) in bold letters as a placeholder where the information would go. As such, he is remaking and specifying the generative story schema. Similarly, J-4 may call a source to obtain a missing detail when he is writing a story. For example, for his piece for the alumni magazine, he chose an anecdote told to him by one of his sources as the story's opening lede. The scene was a story about an undergraduate student's experience being stereotyped as an immigrant. Because J-4 was getting this scene indirectly, he called his source (the student's professor) to ask more questions about "what kind of student was she" and the situation she described. This example illustrates the review phase as an iterative process of re-visiting prior phases of the production process.

In their cognitive model of the writing process, Flower and Hayes (1981) emphasized the importance of *the monitor*—a kind of switchboard operator between other writing activities, including goal-setting, planning, composing, and revising:

> As writers compose, they also monitor their current process and progress. The monitor functions as a writing strategist which determines when the writer moves from one process to the next. For example, it determines how long a writer will continue generating ideas before attempting to write prose. Our observations suggest that this choice is determined both by the writer's goals and by individual writing habits or styles. As an example of varied composing styles, writers appear to range from people who try to move to polished prose as quickly as possible to people who choose to plan the entire discourse in detail before writing a word. Bereiter and Scardamalia have shown that much of a child's difficulty and lack of fluency lies in their lack of an "executive routine" which would promote switching between processes or encourage the sustained generation of ideas. Children for example, possess the skills necessary to generate ideas, but lack the kind of monitor which tells them to "keep using" that skill and generate a little more. (Flower & Hayes, 1981, p.374-5).

We propose two cognitive constructs to elaborate the idea of the monitor. First, journalists have a set of evaluative criteria against which they compare their drafts. One mentioned by J-3 was "tightness"—a feeling of efficiency of words and ideas. Another was "polyvocality"—a sense that the story has multiple voices. J-5, a broadcast journalist, had a similar criterion of a sense of fairness and inclusion of multiple perspectives (see Appendix D for full list of evaluative criteria across subjects). Based on our journalists' descriptions, the review process involves a lot of "moving the blocks around" to help "the reader understand what you're talking about" (J-4). This is where we see Reich's "bipolar interactional expertise" come into play as journalists move between the material they've collected from sources, their notes, and perceived audience reception (Reich, 2012).

The idea of the reader, who was evoked during the selection process to evaluate whether a story would be relevant or interesting, appears to be backgrounded in the planning and reporting but returns during narrativizing and review. To monitor themselves using the evaluative criteria, we hypothesize that journalists activate a projected typical reader (or viewer), what we call an internalized audience mental model. To do this, they read or view their draft as if through the perspective of an average person. Our participants all talked about, and seemed confident in, their mental construction of this average person. For example, J-5, a broadcast journalist, described that she knew how to pick the right *soundbyte*—a quote from a video clip—when it sounds "in a way that the average person is going to understand it. And remember it." When asked how she knew that the average person would understand it, she said: "Well it's my opinion, really. . . . It's what I think the average person is going to remember and walk away with." During a similar question sequence, J-2 at first claimed that if he conducted a survey the quotes he picked for his final piece would be chosen by the greatest number of people as the best ones. However, he then immediately questioned his own logic and claimed that even if he was wrong about the quotes others would pick, his choice would still be right because he is "more literary." In other words, like Steinke (1993) showed, although journalists may justify their word choices and compositional decisions by evoking their knowledge of the audience, in reality they most often rely on their own experience and professional self-trust. As J-3 said, what made him confident in knowing a good potential story was his experience being "an avid newsreader." When deciding whether to write an article, for example, J-3 asked himself whether he, himself, would want to read this story, and whether he thinks it's interesting, trivial, or new. However, because of J-3's own political beliefs, he was often interested in things that wouldn't necessarily appeal to the general public. For example, he shared that he chose to cover a story on the Governor's upcoming legislation about "pretty boring future issues," because it was a way to "give [the readers] their spinach," to explain and expose how the world works to readers with the necessary information upon which they can act, whether that action is voting or protesting.

Journalists don't just anticipate the reader, they also aim to educate the reader, to "give them their spinach." The journalists in our sample tended to imagine the average reader as needing to be educated about facts, emotionally engaged through relatable stories, and actively convinced of the information's credibility. For example, J-2, writing a story centered on Southeast Asia, hypothesized his audience expectations in the following way:

> If you were to literally poll people, say tell me everything you know about Burma, you would get a mispronounced Aung San Suu Kyi and almost nothing else and maybe something to do with Buddhists and that would be about it. That's my notion. And you have to think that way—who's my audience, what do they know. What kind of detail do I have to give them?

Despite his claim, J-2 doesn't literally poll people about their existing knowledge. Like J-3 and J-5, he projects and extrapolates from his own exposure to the news. J-4 said that as a freelancer, he can get a sense of a publication's audience in its submission requirements and media kit:

> Every magazine has a really clear sense or idea of who their audience is, who they are writing for. And they kind of blare that, blast that everywhere. You can go, you know, to their web site and find their guidelines for freelance submission, you can look at their media kit on the web site; the media tells you who their audience is. And any good freelancer knows to look at all of those things. 'Cause when you're—as a freelancer, when you're pitching stories, part of your pitch is saying, this piece is right for your audience, because. You know. Your readers would want to know about this because. You've got to demonstrate that you have a really good understanding of who those readers are.

This challenge of anticipating what the audience knows and will respond to makes the distributed nature of the editorial process particularly important. Journalists need others (colleagues, editors, or trusted friends) to take on the role of a reader who is not as intimately familiar with the piece. Several of our subjects mentioned asking friends and partners to act as a reader of a draft (J-2, J-3). J-2 told us that when teaching, he uses his students as a proxy for a larger audience they might be writing for by asking them what they know and find interesting, and thus teaching the self-as-average person model. We also had the chance to observe J-3 working on an article as he requested that his domestic partner read a final draft of his piece because he worried that it might too detail heavy to keep the reader's attention. In a follow-up interview, J-3 said that his partner reads almost everything he writes:

Often, I think she sees blind spots or undeveloped points. She's a very structured and sharp thinker. In some ways, she can also be a bit to my left and so helps me think through any criticism I might get from that direction, see whether I agree with it or not, and make changes (or not) accordingly.

Colleagues and partners, in other words, provide alternative perspectives that the journalist might have missed. Additionally, editors can point out similar problems and rearrange pieces of the story to make the entire article more readable or clear to someone who is not as immersed in the information as the journalists themselves. J-4 described the how having an editor from his publication read his work helps him reorganize his story elements:

You know you get married to a scene, you just can't let it go, you use it, and then you get deep in the story and realize it's just the wrong start. You have to start over. And a lot of people don't have the discipline to do that, which is what editors are for. . . . So editors will tear up your lede and say, "That's actually the wrong start, your lede is buried, there's a scene down here—this is really what your lede is," and editor will sort of move it around for you.

As other research has shown, editors do not just tweak or rearrange, they may request or make significant changes or additions (Vandendaele, De Cuypere, & Van Praet, 2015). For example, J-1's editor asked her to interview another source and provided her with a contact. In the next round of reviews, the editor might rewrite sentences and correct grammar and spelling mistakes. Journalists said that, typically, their editors will revise two or three drafts in the review process, although the editorial review process may need to be studied via more direct observations rather than retrospective reports.

Additionally, publications might also have other staff members to manage other aspects of the review process, such as fact-checking. After the journalist submits a final draft, J-3 said the fact-checker will circle everything that's a factual assertion and will try to find it themselves or ask him where he found it, adding that *The New Yorker*—a highly editorial magazine—rereports their stories from scratch. In other words, journalists do not view the fact-checking process as an accusation of their potential inaccuracy; rather, they welcome it as an additional verification. J-4, writing for an alumni magazine, lamented:

This is the first time I've actually worked for a magazine without a fact checker. Which makes me nervous, actually. Not that I depend on fact-checkers—I actually try to act—I've always tried to act as though I didn't have a fact-checker, even when [I] had one. But I think everyone can always have use a fact checker. . . . Now, but what they do do, because it's an alumni magazine, they actually send the piece to the subjects prior to publication. So their faculty members get to see this. So that's kind of their fact checking process.

In addition to fact-checking, a piece may undergo revision by copy editors who edit for punctuation and grammar and web or design editors who might edit the piece to fit space and production requirements. Although this particular type of editorial team is more common of print and online text-based publications, broadcast and digital stories may also undergo a distributed review.

Our subjects' description of the editorial review process emphasizes the collaborative and distributed nature of journalism production. Although only the author appears on a story's byline, the editor, fact-checker, friends, spouses, and subjects of the story themselves might influence the form and structure of the final piece (see Figure 4).

What happens after publication

Although it was not the primary focus of our interview, we asked the journalists in our sample what happens after they are done with the editorial process and the piece goes to print, sensitive to the fact that the process of distribution has also become more distributed in the digital age. Depending on the nature of the piece and the outlet, journalists might have more or less involvement after publication. J-4 said that sometimes new changes have to be made to the text to fit in with layout constraints of various media formats. J-3 often promotes his own work online, such as by sending out recent work to a personal e-mail list and posting links to his articles on social media. Sometimes after publishing a story, he gets asked to do a radio or TV show appearance to talk about the topic. J-3 also indicated interacting with readers' comments, which often include tips for future stories. For example, during our interview, he said he was working on the third story on the same issue—police brutality—because people keep responding with new information. His experience reiterates the cyclical nature of the journalism process and the

Figure 4. Journalist interaction with different actors throughout the production process.

multiple stakeholders involved. J-1 told us that although her magazine didn't receive many comments from readers, after the magazine's publication the staff gathered for an evaluation meeting during which they compared their coverage of stories to other similar publications, suggesting an orientation to a larger competitive ecosystem (see Figure 4, stakeholders).

Discussion

The model we present herein summarizes (a) the generalized seven-phase journalism-production process; (b) cognitive constructs experts use to make decisions, guide their data collection efforts, and revise their work for publication; and (c) the process artifacts that are created throughout the different phases. Each phase is characterized by typical distributed interactions with other publications, potential information sources, editors, and colleagues involved in the production process. These relationships are summarized in Table 2.

We conducted the study of journalism expertise to better understand how journalism production can help students develop the skills necessary to participate in digital and civic activity. In the following, we suggest how the journalism production phases may map onto the theoretical skills articulated by the youth participatory politics theorists: investigation, dialogue, circulation, production, and mobilization (Kahne et al., 2016).

Investigation

Kahne et al. (2016) wrote that one of the core practices of participatory politics is the ability to "analyze and evaluate information in order to learn about and investigate pressing civic and political issues"

Table 2. Connections Between Youth Participatory Politics skills and Journalism Production.

Youth Participatory Politics	Journalism Production
Investigation	In the Scan + Filter phase, journalists routinely follow relevant sources of information. In the Report phase, they seek and collect information from primary and secondary sources.
Production	In the Plan, Report and Narrativize phases, journalists envision and produce content that brings together diverse sources of information and potentially media
Dialogue and Feedback	In the Review phase, journalists go through cycles of dialogue and feedback with peers, fact-checkers and editors in order to improve clarity and style of their pieces.
Circulation	After publication, journalists send their work through custom email lists and share on social media
Mobilization	In the Plan and Report phases, journalists mobilize their social and professional networks to collect quotes, scenes, and information relevant to their stories. In the Review phase, journalists activate their friends and family as test readers.

(p. 9). Although there are many learning models that involve investigation and research, from a traditional research paper to action civics projects that engage youth in survey making and analysis, we propose that the investigation practices of the journalism discipline can be particularly powerful. Journalists investigate in different ways throughout all the phases of the process. In the *scan and filter* phase, they routinely follow relevant news sources of information. Journalists read the news, attend events, and follow topical media sources daily. In this way, investigation is a habit; journalists are tuned in to the stream of information in their field. For youth, developing this investigation skill could involve helping them curate a newsfeed, possibly through social media platforms they already use, such as Facebook or Instagram.

Journalists also engage in investigation in the *plan* and *report* phases. They *follow the trail* or possible leads, such as J-3 talking to lawyers and reading court records as he develops the story schema, and then more rigorously, by conducting interviews and field observations during reporting. Our study did not go deeply into the practices and skills of interviewing; this strategy is nonetheless powerful in that it forces journalists to gather the perspectives of stakeholders at multiple levels of the issue—people affected by the issue, people who study it, and people in power. Furthermore, pursuing the journalistic values of *polyvocality* or *multiple sides of the story* can be a strategy to avoid confirmation bias—seeking only the information that already supports one's existing beliefs. Having to reconcile potentially conflicting information could prompt youth to engage more deeply with an issue, to make sense of its complexity. Therefore, we suggest that to engage in journalism to develop practices of participatory politics, educators could help youth:

- curate digital channels that aggregate information streams on political or social issues of interest;
- develop routines for regularly scanning and digging deeper into personally intriguing topics, such as by talking to people affected by the issue or researching a credible source; and
- use participatory digital channels (like Twitter and Facebook) to solicit and conduct interviews with issue stakeholders.

Production

Kahne et al. (2016) argued that new digital tools create opportunities for youth to "contribute to the flow of information and shape the narrative around civic and political issues" (p. 11). Learning the journalism production process can enable youth to contribute to the flow of information via a socially respected and recognizable genre. Knowing simple story conventions like starting with a face or a vivid opening anecdote, following the lede with a nut graph that summarizes the point of the story, and then zooming out to a larger social problem, could help youth produce media texts that are engaging and relatable to larger publics (Rheingold, 2008). By learning production tools of journalism, such as vivid note-taking, audio- and video-recording, and editing, youth can more clearly and convincingly communicate their important and underrepresented perspectives (Smirnov et al., 2015).

We recommend that educators use journalism as a model to support this participatory politics practice by:

- teaching youth to produce within the genre conventions of journalistic texts, using face, lede, nut graph, angle, and scenes as anchoring elements;
- teaching youth the practices of reporting, including audio interviews, vivid note-taking, and collecting video b-roll; and
- encouraging youth to draw on their lived experiences and access to community and family members to gather vivid stories that connect to larger social issues.

Dialogue and feedback

Kahne et al. (2016) proposed that youth today have more opportunities to engage in dialogue in more public settings, such as comments sections of online news sites, where they can learn about multiple perspectives and provide feedback to the elites on issues of public concern. Having demonstrated the distributed nature of journalism production through our study, we highlight the dialogue and feedback

opportunities in the *frame* and *review* phases. In the *review* phase, journalists get feedback on their article from multiple stakeholders, including colleagues, editors, friends, fact-checkers, and sometimes the subjects themselves. Although Kahne et al. (2016) emphasized giving feedback to powerful elites as a key participatory politics practice, youth are not likely to develop this ability without an appreciation for a culture of feedback more generally—the sense that ideas and even official texts are always under construction and public review. As journalists in our study illustrate, taking a particular angle on a story in the *frame* phase, such as exposing conflict of interests in new medical breakthroughs (J-1) or highlighting institutional corruption (J-3) is itself a form of public feedback to those elites. Thus, educators can leverage journalism production for participatory politics by:

- encouraging youth to produce journalistic stories that critique dominant views by considering and taking up social justice angles; and
- developing a culture of feedback-giving in the learning environment, by creating multiple opportunities for peer and instructor review, and for fact-checking each other's work.

Circulation

Kahne et al. (2016) suggested that circulating news and information through digital tools can involve youth in "shaping the narrative" (p. 6). Although expert journalists rely on the publications to carry out circulation work, our informants also reported using social media tools such as e-mail lists, Facebook, and Twitter to circulate their own published stories. Youth tend to already be connected to social networks. Civic educators can leverage journalism practices and youth social media habits for participatory politics by:

- involving youth in strategically curating and posting civic and political content that might be interesting to their existing social networks; and
- asking youth to pay attention to reactions to their content, such as likes and comments, to recognize the way circulation is itself an influential journalistic practice.

Mobilization

Finally, Kahne et al. (2016) were enthusiastic about mobilization as one of the skills of participatory politics. Mobilization—organizing others for action—might include activities like starting an online group to discuss an issue, planning a protest, or a creating a crowdfunding campaign to support a cause. Journalism production involves mobilization in the *plan*, *report*, and *review* phases, especially. Journalists develop and draw on social resources such as lawyer acquaintances as potential sources that might provide a valuable quote for their piece; later, journalists draw from their networks of colleagues and friends to act as proofreaders and editors. These acts of *mobilization* are small, but not insignificant. Like feedback, learning to ask others for information or editorial help is a way to activate one's social capital. Becoming skilled and comfortable with this practice can eventually encourage youth to mobilize larger groups for action.

Educators can thus use journalism as a model for mobilization by:

- helping youth recognize and identify the many perspectives and forms of expertise they might have access to in their existing family, community, or social network; and
- encouraging youth to draw on their friends and social networks as potential sources and editors.

Earlier, e we suggested some ways the practices and activities grounded in the discipline of journalism map to the theoretical constructs scholars believe are necessary for participating in civic and digital life. By specifying these practices, we can put theory of youth participatory politics to the test of design research: to see how current existing and designed environments are supporting or failing to support the learning of participatory politics skills and dispositions within the domain of journalism.

Discrepancy analysis

We are particularly concerned with how the model can be used to help us diagnose what is difficult about teaching and learning skills of participatory politics, and imply ways for how we might improve

instruction and infrastructures to help learners develop journalism skills and dispositions. In our experience with designing, implementing, and observing civic journalism curricula in and out of school contexts, we see several discrepancies between the way professional journalists work and the way journalism production is often taught (including in some of our own interventions). This model has helped us to identify these discrepancies, as well as to propose and begin to implement possible corrections.

Discrepancy #1: No publication outlet

Although some teachers and youth programs engage students in journalism production activities such as authoring op-eds or broadcast-style videos, they do not always intend for this work to be published in an existing publication outlet. This may be the case when the school or the program does not already have an existing outlet (like a school newspaper or news show). Instead, teachers focus on helping students develop general journalistic conventions. However, our findings suggest that this may be a mistake. Our study demonstrates that journalists develop, select, and frame their ideas with specific outlets in mind, by considering the outlet's existing content, intended audience, and genre constraints. These criteria function as a critical problem-setting device that helps journalists develop a viable story schema and plan reporting. In other words, the infrastructures in which journalists work help them both develop and apply the cognitive constructs relevant to the production process.

Possible solutions

To create a more authentic learning experience, more effort should be invested in developing a dedicated public outlet for student work or building relationships with existing outlets. An example of the latter is Youth Radio's relationship with National Public Radio that enables its youth-produced stories to have a national audience of intergenerational listeners. In our own work, we have developed special dedicated outlets for youth-produced journalism, such as a youth public access television news show (Ferman & Smirnov, 2016; Smirnov et al., 2015) or a school-based online publications built on Wordpress and Weebly platforms (Smirnov, 2015). Developing and running an outlet takes a different set of skills and time demands than just producing a single journalism piece. However, serving on an editorial team can provide additional opportunities for developing digital and design literacies, and professional knowledge for youth and educators involved. For novice producers, it would help to make these criteria as explicit as possible and to provide different models that interpret the same genre conventions in a variety of ways.

Discrepancy #2: Lack of convention knowledge

Our journalists are immersed in their working worlds. To think like a journalist, they wake up to reading the newspaper and checking current events and publications in their field. In contrast, when youth begin their first journalism project, they might not already have years of experience being journalism consumers, which would attune them to typical conventions of the discipline. As a result, they might have difficulty evaluating what would make a good story or planning a story schema to guide their reporting. Many existing news literacy curricula focus on comprehension and bias analysis of current events, rather than helping learners develop an eye for what makes an effective story, or showing examples of work created by students' peers.

Possible solutions

Showing and deconstructing previous examples of student-produced work can help learners make criteria and structures of journalism products more explicit. A dedicated outlet (see *discrepancy #1*) can provide a great archive of variable quality content that novices can aspire to produce, at an appropriate skill level. Graphic organizers like storyboards can also guide learners through externalizing and visualizing their story plans. We also recommend the possibility of introducing journalism through video production. Although it's more resource-intensive in some ways, the production and editing phases of video-making productively externalize the cognitive processes of collecting and arranging footage into a coherent narrative. For example, whereas students often struggle with writing down detailed notes or exact quotes from their interviews, the process of video recording enables them to capture these things on an external material. These processes are analogous to the interviewing, scene documentation, and

narrativizing phases of print journalism. By engaging in a more technologically distributed production process of video-making students can develop the cognitive tools that can potentially transfer to other forms of reporting and production.

Discrepancy #3: No audience model

An important cognitive construct that surfaced in our study is the internalized audience model, a projected average reader or viewer that journalists evoke during selection and revision phases of the production. Without a specific outlet and prior experience consuming significant amounts of journalism, students will not have a clear concept of this average reader nor the knowledge of how to apply it to revise their own work. However, this does not mean that students are not attuned to the idea of audience-specific communication. As members of social worlds and users of online social media, young people are continuously making deliberate decisions about how to express themselves verbally and aesthetically to be interpreted as a certain kind of person by others (Gee, 2007; boyd, 2014).

Possible solutions

Drawing parallels from students' experiences with social media communication to the novel challenge of journalism production can help make their tacit knowledge more explicit and build connections across disciplines (Lee, 2001; Vygotsky, 1978). Although addressing discrepancy #1 should help specify the targeted and potential audience for youth-produced work, we also draw on research on mental models (Johnson-Laird, 1983, Oura & Hatano, 2001) and suggest providing novices with direct experience with audience members through interviews and focus groups. For example, students can conduct interviews with a member of the target audience about their interests and media consumption preferences. Our pilot studies demonstrate that this can be an effective way for novices to internalize and apply more nuanced ideas about audiences. Alternatively or additionally, students can conduct focus groups in which target audience members view and provide feedback on drafts or rough cuts. Peer and expert feedback that specifically evokes potential audience reactions can also help learners develop and apply an audience model.

This is not an exhaustive list of all the possible challenges educators and designers might experience in developing learning environments grounded in journalism production, but the three discrepancies we see as most common in student environments, and most critical to address. We have suggested a combined approach of developing infrastructures (i.e., dedicated public outlet) and instructional strategies (i.e., peer-editing, audience focus groups) to create an authentic learning context for developing the skills of participatory politics.

Conclusion

Research conceptualizing new forms of youth civic literacies and practices motivates the need to design robust institutional infrastructures to increase all young people's capacities to connect, create, and mobilize around civic causes; educate themselves about ongoing issues and current events; recognize and manage potential misinformation; and engage in productive discussions with others that hold different points-of-view (Cohen et al., 2012; Hess, 2011). Findings from participatory politics research suggest that these infrastructures need to look more like the complicated networked ecologies youth participate in online than the fragmented experiences of typical classrooms (Ito et al., 2015). If young people's current and future civic activity is likely to be entangled with their cultural interests, media ecologies, and social connections, we must rethink whether we can teach literacies like civics, reading, and writing as separate subjects and, instead, consider models that converge and engage these spheres of activity together in authentic disciplinary contexts.

In this article, we have argued that journalism production can help students develop skills of civic and information literacies by engaging youth in authentic production, dialogue, investigation, mobilization, and circulation practices. By illuminating the cognitive process of journalism production and constructs employed by experts to select, plan, and revise their products, we have shown the way civic and information literacies can be situated in an existing academic and professional domain. Although we believe

our model of the journalism cognitive process is robust, it is based on a limited sample of five journalists and, therefore, should not be generalized to all forms of journalism professionals or genres. Further studies are needed to probe into the black boxes of journalism cognition, such as the workings of the internal audience model or mental inventory developed during reporting. However, our model builds on and extends previous work on journalism expertise. Similar to previous research (Pitts, 1982, 1989), we find that journalism production involves nonlinear short-term goal setting and problem solving, and that the process of writing is not disconnected from other phases of production, such as reporting or story generation. This model has important implications for how to teach the process of journalism production. For example, Pitts (1989) argued that the common practice of having journalism students write from fact sheets might be inauthentic, because the more common disciplinary task involves gathering information, managing it in one's mental inventory and figuring out how to select the most appropriate story direction out of the many possible options. Thus, Pitts suggests that:

> The best writing experience comes when students write from their own information gathering experiences. The story on the Friday night dance in the dorm may be weak in news value, but it may teach the students much more than the story of the big fire in New York written from a fact sheet. (Pitts, 1989, p. 19)

Improving our understanding of the domain-specific aspects of expertise enables us to draw on existing learning sciences theories and methods to adapt them to the specific cognitive demands of this discipline. Like Pitts, we argue for designing journalism learning infrastructures that more closely resemble authentic disciplinary practices. As such, we have defined three discrepancies between the professional conditions that support expert practices (such as well-defined publication outlets with clear target audiences and genre constraints) and the way journalism production is typically taught. We recommend that civic journalism programs situate instruction in the seven phases of authentic journalism production, such as by simulating a newsroom or by partnering with existing publication channels and editors to publish student pieces. We are currently implementing and evaluating these principles in schools and community organizations through design-based research experiments.

Acknowledgments

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Appendix A

TASK ANALYSIS INTERVIEW PROTOCOL

Introduction. The purpose of this interview is to document and describe in detail the expert practices used in creating journalism products. Please consider a typical experience in creating a journalistic product from start—idea conception—to finish—publication and distribution. You can provide examples from specific stories and experiences to enrich this description, but we're interested in documenting and analyzing frequent, typical situations, rather than exceptional ones.

When you think about creating a journalism product in the medium you work in most (e.g., magazine article or a newspaper article), how would you describe the overall performance goal of creating a journalistic article in your particular medium? If there is more than one general goal, what are the others? Please describe how you accomplish this goal step by step. Try to give enough information in your description so that a novice trainee could perform the task. Keep in mind the "how to" descriptions are usually mixes of actions and decisions. Please note when a decision must be made. How do you choose between alternatives? What the sequence of tasks trainees should be able to perform and the kinds of routine problems should they be able to solve if they have learned each of the main tasks or problem solving required for this job. If possible, start at the beginning. What is the first task they must handle? What has to happen when the job or first task begins?

Follow-up questions. Ok, so when you're doing STEP X, how long does it usually take? What are the substeps of this step? Do you work alone or collaboratively with others; who? How do you make decisions about what to include or how to proceed? Can you give an example from your journalistic piece of the process you went through to accomplish STEP X?

If participant uses unfamiliar or discipline-specific term. Can you tell me what TERM X is in your own words? Can you give me an example from your journalistic piece of TERM X? How do you evaluate whether TERM X (e.g., nut-graph, quote, scene) is a good one? Can you give me an example of a good one?

After each step. Okay, so you've done STEPS X, Y, Z that you've described, what do you do next?

Appendix B

0. GOAL: CREATE JOURNALISM PRODUCT

1. **SCAN+FILTER**
goal: generate list of appropriate story ideas
1.1. routinely follow news sources from competing market
1.2. note popular, underreported and unreported phenomena + topics
1.3. generate list of story ideas
2. **SELECT**
goal: evaluate using newsworthiness criteria and select story based on personal + publication criteria
2.1. evaluate credibility, timeliness, novelty of potential story ideas
2.2. evaluate genre + medium fit
2.3. select story
3. **FRAME**
goal: tailor story idea to publication constraints and goals
3.1. choose angle
3.2. tailor to publication, audience, genre
4. **PLAN**
goal: generate story schema to guide reporting
4.1. identify knowns and unknowns (TK)
4.2. identify possible sources of information
4.3. pitch to secure outlet
4.4. create reporting plan
5. **REPORT**
goal: collect information guided by story schema
5.1. collect information from secondary sources (documents, statistics)
5.2. collect information from primary sources (interviews)
5.3. process media into editable form
6. **NARRATIVIZE**
goal: compose and arrange materials using story schema to create draft for publication
6.1. compose narrative elements (lede, transitions, etc.)
6.2. arrange collected and created elements into draft
7. **REVIEW**
goal: evaluate using internalized audience model and evaluative criteria to decide if/how to revise
7.1. review for content and polish
7.1.1. self-review
7.1.2. peer-review
7.1.3. validation
7.1.4. editorial review
7.2. evaluate story after publication

Appendix C

Journalism Cognitive Constructs	
Cognitive Construct	Description
Evaluative criteria	a checklist for assessing the publish-ability of a story; first in terms of topic/relevance (newsworthiness) and second in terms of quality, flow, rigor
Audience model	a mental model of an "average reader" that journalists simulate in order to evaluate how interesting or engaging a story is during story selection and draft review
Story schema	a dynamic schema for narratively organized known or anticipated story information, such as scenes and quotes
Mental inventory	a journalist's internal log of known information, such as quotes, statistics, scenes, and information s/he still needs to collect
Story structure	schema of the structural elements and their organization in a story within the producer's genre, such as lede and nut graph
Publication criteria	constraints specified by publication outlet, including word/time length
Source list	list of potential interview sources who might have relevant expertise and experience to the story being reported

Journalism Process Artifacts	
Process Artifacts	Description
Story idea list	list of all possible story ideas
Story idea	selected single story idea that will be pursued
Pitch memo	a memo to an editor that includes story idea, its relevance to publication, and outline of possible scenes, quotes, sources that will be included
Interview questions	list of questions to ask sources
Interview schedule	dates and times when interviews will be conducted
Notes	recordings from secondary and primary sources; may be handwritten or digital
Logs	video footage labeled and organized according to the content it contains
Transcripts	verbatim transcriptions of interview recordings
Narrative elements	components of the story structure; e.g., lead, opening scene, face, nut graph, background, quotes, soundbytes, ending
Draft	the pieces of the story in narrative form
Revision plan	markings made by journalist, editor, fact-checker or others that mark necessary or suggested revisions such as unknown information (TK for To Know), re-ordering of quotes, etc.; a revision plan sends journalist back into one of the phases before review; s/he re-frame, re-plan, re-report, re-narrativize or even re-select a story
Publishable draft	draft approved by editor as ready to publish

Appendix D

Journalists' Sample Angles, Sources and Evaluation Criteria			
Journalist Informant	Sample Angles	Possible Sources	Story Evaluation Criteria
J-1 **Health journalist** *Goal*: Provide public with valid and relevant science information	☐ Benefits vs Side Effects ☐ Conflict of Interest ☐ Impact on Society	☐ Other publications ☐ Experts (scientists, doctors) ☐ Government Officials ☐ Official Press release	☐ At least 3 supporting sources
J-2 **Immigrant storyteller** *Goal:* Help public connect to the lives and experiences of immigrant / refugees. Story with multiple access points.	☐ Effect of immigrant communities ☐ Connection to other immigrant communities ☐ Connects to universal experience ☐ Nature and meaning of "home" ☐ Exile and displacement	☐ Someone who is experiencing the issue ☐ Ethnic publications ☐ Census Data ☐ Subject Experts (authors, scholars) ☐ "Community Anchors" – local shop owners, church leaders, etc	☐ Personalized with a face – a person who's experienced/been impacted by the issue ☐ Reliability to other communities ☐Dramatic teases ☐ Emotionally evocative ☐ Connects to larger human themes
J-3 **Alt weekly investigative reporter** *Goal:* Uncover important information the public should know about; tell through evocative story (explain and expose how world works)	☐ How injustice occurs ☐How inequality is reproduced	☐ Other publications ☐ Public documents ☐ Public officials ☐ Scholars, experts ☐ Census Data	☐Dramatic opening scene ☐ "Tightness" ☐ Polyvocality – sense of multiple voices
J-4 **Editorialist** *Goal:* Engage public in human story that related to larger context	☐ What does this mean for the world? ☐Impact on society	☐ Main subjects of the story ☐ Colleagues/Relatives ☐ Census ☐ Official documents (web sites, curricula vitae (CVs), publications) ☐ Government Documents	☐Humanizing ☐ Clarity of chronology ☐ Narrative consistency ☐ Engaging
J-5 **Broadcast journalist and documentarian** *Goal:* Tell a story about a social issue so that people know more about it than they did before. Provide alternative viewpoints.	☐ Advocacy for an important issue ☐ Why is this issue the way it is? ☐ Who is affected by this issue? ☐ What are different points of view on the issue?>	☐ People who've experienced the issue ☐ People who witness the issue ☐ People who study the issue	☐Visual ☐ Fairness – opposing points of view represented ☐ Visuals match narration ☐ Repetition – same point is re-iterated in different modes and examples