CHAPTER 17.

TEACHERS AS EDITORS, EDITORS AS TEACHERS

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The Writing Across the Curriculum movement has always envisioned two complementary uses of writing in all subjects: "writing to learn" and "learning to write in the disciplines" (McLeod & Maimon, 2000). However, the role of the teacher in each case is quite different. McLeod and Maimon (2000) describe it this way: in writing to learn assignments, which are often ungraded, the teacher can respond as a "facilitator rather than a judge" (p. 579). Yet when responding to student writing designed for communication, they say that content area teachers should "act as the professional already involved in the conversation of that [discourse] community, helping the novice, the student, enter the conversation" (p. 579). Their advice is aimed at professors of higher education, those for whom writing is often an integral part of their own professional obligations and identity. But what about high school content area teachers who may not be part of the conversation themselves? How do they respond to student writing when the writing may be as foreign to them as it is to their students?[1]

These questions framed our work with high school science teachers who sought to incorporate the genre of science news into their courses. In this study, we examine how a professional science news editor and high school teachers respond to student writing in order to understand the values and priorities each bring to bear on student work. These questions guided our work:

- How do teachers respond to authentic genres in content-area classes?
- How does teacher response compare to the responses of a professional editor?

THEORETICAL FRAME

A survey of the field reveals three areas of research that inform this study: writing across the curriculum, genre study, and authentic writing. The past several decades have seen an explosion of research into the uses of genre study as a teaching and learning tool (Bawarshi & Reiff, 2010; Fleischer & Andrew-Vaughan, 2009; Herrington & Moran, 2005; Soliday, 2005).

This work has expanded the notion of what kinds of writing are appropriate in content-area classes to include genres beyond disciplinary articles (Herrington & Moran, 2005). While much of this work has focused on higher education, research in K-12 settings has suggested that writing in authentic genres—i.e., those which have meaning outside of school contexts—increases student learning and motivation (e.g., Lindblom, 2004; Parsons & Ward, 2011; Purcell-Gates, Duke, & Martineau, 2007). In addition, some previous research has looked at how content-area teachers respond to student writing, particularly "writing in the disciplines," i.e., writing in academic genres (Bazerman et al., 2005).

Drawing together the concepts of writing to learn, writing in the disciplines, and genre theory, Bazerman (2009) articulates a "view of how genre might interact with both learning and development, using a Vygotskian lens, considering genres as tools of cognition" (p. 130). Based on Vygotsky's theory that learning precedes development, Bazerman (2009) argues that new genres are first learned—often with difficulty—and only later, with repeated use, do the genres transform a person's way of thinking and seeing the world:

> we then learn not just to talk but to learn the forms of attention and reasoning which the language points us toward. The words of the field become associated with practices and perceptions, changing our systems of operating within the world (p. 135).

Bazerman's (2009) theory offers a reason for choosing particular genres in the classroom and for requiring students to grapple with these genres repeatedly. Within this framework, teacher comments on student writing can serve to focus student attention on certain aspects of the genre while downplaying others. Although decades of research have repeatedly found that student writing ability does not rapidly improve due to written comments (e.g., Gee, 1972; Knoblauch & Brannon, 2006; Sperling & Freedman, 1987), researchers and theorists have considered teacher comments one avenue for understanding the relationships teachers construct with students and the priorities they set for student work (Bazerman, 1990, 1994; Connors & Lunsford, 1993; Lunsford & Straub, 2006; Sperling, 1994). Some research has shown that college professors view student writing from a disciplinary perspective, especially when compared to English teachers (Faigley & Hansen, 1985), yet few studies have looked the comments of high school content-area teachers or at those of teachers using genres with which they do not have personal expertise.

Bazerman (2009) posits that the "practices and perceptions" of a field can be learned and then internalized by writing in genres of the field. For the purposes of this study, the editing and comments on student papers are considered "boundary objects" (Wenger, 1998) designed to facilitate this process by connecting one community of practice (that of students) with another (that of professionals in the field). Novice student writers do not initially belong to the community of practice that produced and continues to reinvent the genre the students are attempting; "brokers" (Wenger, 1998) provide feedback which could help students understand and participate in the new community of practice. The articles produced by these novice writers evidence more problems than any reviewer could reasonably address. Examining how a professional editor and teachers respond to papers—what they attend to and how, as well as what they do not address—can help us understand the kind of brokers these reviewers are trying to be, the issues they are prioritizing, and the kinds of connections they seek to emphasize.

CONTEXT OF THE STUDY

Data for this study were collected through the Science Literacy through Science Journalism (SciJourn) program, a National Science Foundation-funded project which introduces students and teachers to the concepts of science journalism in order to improve student science literacy. As part of the project, students propose, research, and write science news articles and then submit these articles for possible publication in a newsmagazine for teens (*SciJourner* and scijourner.org). Articles are reviewed by science editor Alan Newman, a PhD chemist with 20 years of professional journalism experience. Since 2008, the SciJourn grant has included over 3,600 high school students in urban, suburban, and rural schools.

As we introduced the SciJourn idea to students and teachers, standards for assessing writing became necessary. We first looked to popular writing standards already in use, specifically the Six Traits Writing Model (Spandel & Stiggins, 1997); however only one of the six traits specifically addressed content, and we sought to build a discipline- and genre-specific set of standards. We turned to experts, in this case practicing scientists, science journalists, science journalism editors, and classroom science teachers—all of whom would be considered scientifically literate. What did these experts attend to as they read both professional and student science journalism articles? Table 1 lists the standards developed at the time of this study.[2] The SciJourn standards make clear the parallels between the qualities of a scientifically literate individual[3] and the qualities of a

successful science news article. The genre of science news was deliberately chosen as a vehicle for improving student science literacy because of these parallels. In other content areas, other authentic genres could be identified for use.

Table 1. SciJourn standards

A scientifically literate person is able to …	**A high-quality science news article …**
… find and assess the credibility of information about a scientific topic from a variety of perspectives.	… includes multiple, credible, attributed sources from a variety of stakeholders.
… judge the implications and importance of new technologies and scientific discoveries.	… contextualizes information by distinguishing between embryonic and well-established science and noting the political/ethical/economic implications of a story.
… understand how science affects him/her personally.	… makes science information relevant to readers.
… fact check both big ideas and scientific details.	… is factually accurate and forefronts important information.

The SciJourn standards were created not only to represent the way experts think about science news articles, but also as a tool to help non-experts improve their reading and writing of science news. We distributed these standards to teachers who participated in our professional development training and made them publically available on our teacher resource site (http://teach4scijourn.org). Our hunch was that teachers, like the non-expert writers studied in the 1980's, tend to overlook writing problems that experts recognize (Hayes, Flower, Shriver, Stratman, & Carey, 1987) and define revision as fixing problems at the word or sentence level (e.g., Bridwell, 1980; Faigley & Witte, 1981; Sommers, 1980).

METHODS

Professional Science Editing

We began by analyzing a sample of Newman's edits on 50 first-draft student papers written in 2009-2010. The authors were in high school, taught by five different science teachers during the pilot year of the project. The classes varied in difficulty from basic to honors courses. The sample was designed to represent the variety of students, courses, and teachers involved in the project at that time.

We initially worked with a pilot sample of nine student papers. We used a qualitative coding process (Merriam, 2009), first marking all edits[4] with a descriptor. Next, these descriptors were grouped together and refined into codes. We then compared the codes which emerged from the data to the SciJourn standards; many of our codes were encompassed by these standards, but a significant number were not. We grouped together the codes which fell under the SciJourn standards into a category called "content;" these were edits about *what* was being said (or what was omitted), not *how* it was being said. The remaining codes were grouped into two categories, (1) form and (2) coaching. Any edit that addressed the writing itself, including edits about the structure of a news article, were coded as "form" edits; often these were insertions, deletions, or direct rewrites of the text. The third category, "coaching," was made up of all edits that seemed more characteristic of a teacher rather than a professional editor and included comments such as compliments and explanations; if a coaching edit had to do with a specific content or form feature, we double-coded. We developed our initial codebook and then two researchers jointly coded a set of papers to establish clear definitions of terms (see Appendix for a list of codes and examples). Once the categories and codes were established, two researchers coded a set of identical papers to establish inter-rater reliability and then divided the remaining papers between the two researchers. Interpretations and findings were discussed with Newman; these discussions created a check on the researchers' interpretations and served as a means of triangulating data.

Initial Teacher Tendencies

We next wanted to know how teachers who were not trained in science journalism respond to student science news stories. We used three student sample papers and asked twenty-two teachers to edit two of them as a pre-test on the first day of the SciJourn professional development workshop. Each teacher received one paper that had been judged by Newman to have publication potential and one that had not. Once we collected their responses, we analyzed their edits using the same codebook we had developed for Newman's editing. A comparison of average edits made by Newman and the teachers can be found in Figure 1. As part of our analysis, we also looked at observational field notes we had taken during the professional development workshop; these notes included the teachers' comments and reactions to the editing assignment as well as the length of time they took.

FINDINGS

The Science Editor

Early on in our analysis of Newman's editing we noticed that he responded to papers he saw as potentially "publishable" in *SciJourner* differently than he edited papers where he saw no such possibility. To determine whether or not an article was publishable, we relied on Newman's explicit reference to publication, always found in a holistic comment at the beginning of the article (we did not attempt to compare or judge the quality of the articles ourselves). Out of the 50 paper data set, 17 included a specific reference to the possibility of publication; the remaining 33 we categorized as "non-publishable."

The main difference evident in Newman's edits related to issues of form. Publishable and non-publishable papers both received a similar number of content edits (on average 21 and 19, respectively), but in potentially publishable papers Newman made twice as many form edits as he made on the remaining papers (19 compared to nine). For articles with potential to publish, Newman made nearly as many edits on form issues as he did on content (see Figures 2 and 3). On publishable articles, he also made nearly twice as many coaching edits (nine compared with five), offering compliments (four) and explanations of his changes (four).

The fact that all of the papers received nearly the same number of content edits suggests that Newman considered content key. However, the content edits themselves were different in the two types of papers. For example, papers in

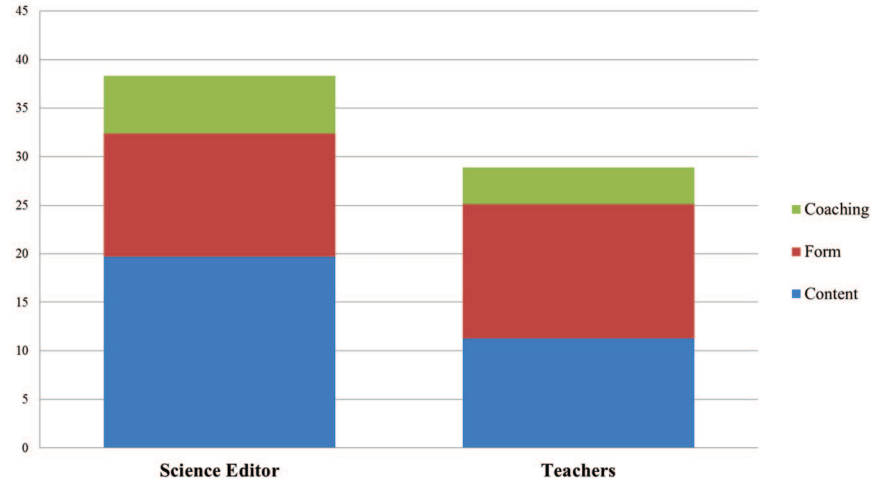

Figure 1. Average number of edits, science editor versus teachers

both groups had similar edits about sources of information, e.g., "according to who?" or "says who?", but non-publishable papers also had edits that often questioned the credibility of unattributed information (e.g., "where did you get this information?" and "where did you read this?"). Perhaps more importantly, both groups had edits about factual accuracy, but in potentially publishable papers these edits were more likely to be specific questions or suggestions (e.g., "did you look for any up to date numbers on how many have died?") while in non-publishable papers these edits often pointed out errors (e.g., "they don't use chromatography for fingerprints").

If we view these edits as boundary objects, Newman appeared to be trying to introduce *all* students to a community of practice where content is critical, but the emphasis was clearly different. Publishable articles elicited content edits

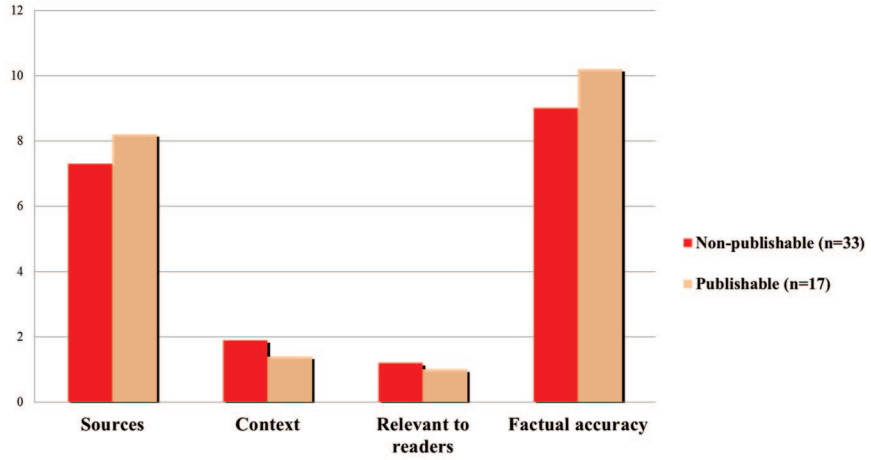

Figure 2. Average number of content edits by a science editor

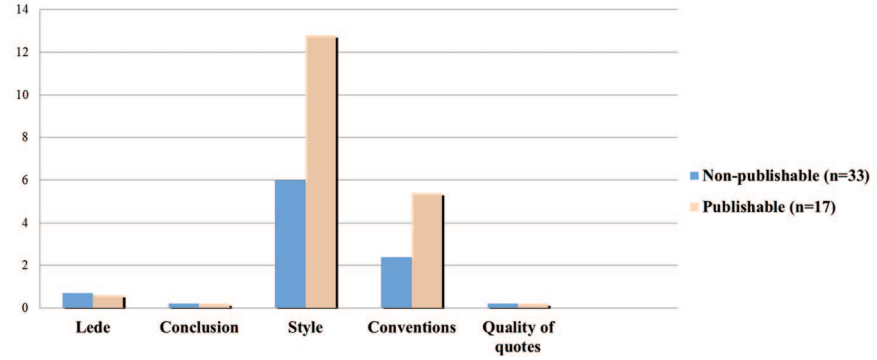

Figure 3. Average number of form edits by a science editor

that were "fixable" with additional legwork whereas content edits in non-publishable articles tended to point to larger problems that could only be addressed by changing topics or starting over. Writers of both kinds of papers could potentially learn something about the values of science journalism (the goal of the boundary object), but it seems writers of publishable articles were recognized for understanding issues germane to science literacy such as credibility or context—they just needed to dig deeper—whereas the authors of non-publishable articles were asked to re-frame their thinking.

In addition to content, a publishable article also must meet criteria of form. Perhaps unsurprisingly then, publishable articles received additional form edits, many of them deletions or direct rewrites of text. However, for students just learning the genre of science news, Newman seemed to consider form far less important than content.

High School Science Teachers

Prior to participating in the SciJourn professional development, the teachers responded to student articles very differently than Newman. Despite offering fewer overall edits than Newman (29 to 38), the teachers made more edits about form (14 to 12, see Figure 1). The teachers also made fewer kinds of edits, particularly within the categories of content and form (see Figures 4 and 5). For teachers, "content" was typically equated with factual correctness. The science editor, on the other hand, commented on a wider variety of content issues, particularly issues regarding sources; questions about sources of information rarely appeared in teacher responses. We also found the teachers' emphasis on form to be of interest. When Newman addressed form, his focus was more often on issues related to journalistic style, not on mechanical correctness. In contrast, the teachers tended to correct typographical and grammatical errors that the science editor either ignored or only marked once.

The number of times a recurring error was marked was also notable. For both mechanical and factual errors, the teachers were more likely to mark the same issue again and again (e.g., whether or not the name of an element should be capitalized), while the editor was more likely to edit the error only once or twice. When the teachers made a form edit about the article as a whole, they tended to fall back on terminology from the five-paragraph essay popularly taught in schools (e.g., asking for a thesis or a concluding paragraph), despite the fact that they had been told these were news articles. Finally, teachers' coaching edits tended to be nonspecific and complimentary (e.g., "Good start.").

As boundary objects designed to help students affiliate more directly with a community of practice, the teacher edits did not seem to highlight issues related to science literacy in the same way that Newman's did. Their emphasis on correctness—whether correctness of mechanics or facts—seemed designed to connect students to a community of practice specific to high school classrooms, particularly those operating in an assessment-dominated climate. One researcher noted that some of the pre-test articles seemed to be edited as if they were problem sets or test questions with a single correct answer. Whatever their reasoning, the teachers marked "mistakes" in a way that the editor did not.

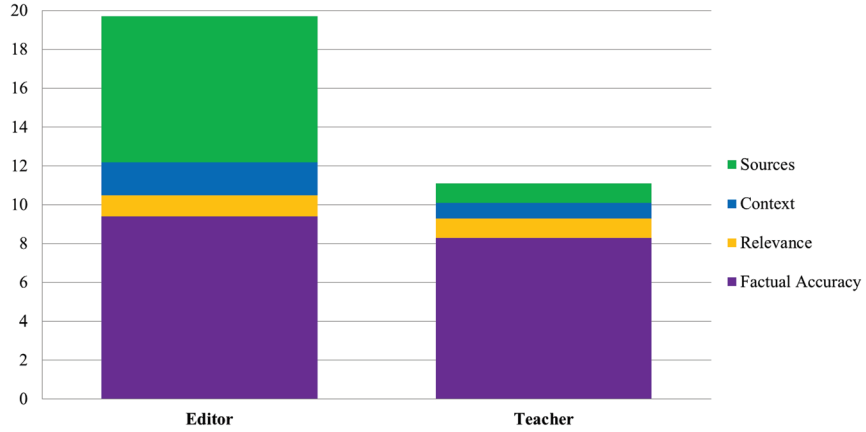

Figure 4. Average number of content edits by code, science editor v. teachers

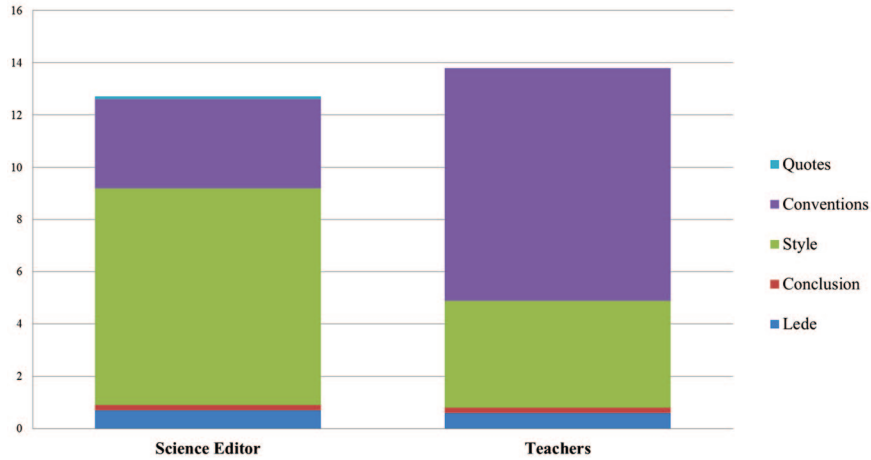

Figure 5. Average number of form edits by code, science editor versus teachers

DISCUSSION

Theory suggests that students can learn disciplinary values and ways of thinking by writing in particular genres. Previous research has shown that, when responding to student academic writing, content-area professors emphasize disciplinary characteristics of the academic genre that someone outside the field might not notice. What this study indicates is that high school science teachers, most of whom have not thought about genre, do not naturally prioritize concerns in this same way. Instead, if their editing is viewed as a boundary object, the connections they emphasize are to community of practice that values isolated correctness and five-paragraph essay form, characteristics of high school rather than of the wider world.

Prior to his involvement in this project, Newman had no previous experience working with high school students. Faced with student writing, he had to prioritize the problems he saw in order to move all students forward and find enough articles to publish the newsmagazine. His focus on "big picture" content was consistent, no matter the publishing potential of an article. To him, content was never about isolated factual errors. His concerns—from issues related to credible sources to explanations of the science—seem to recognize the story (and its relationship to the wider world) in a way that the teachers' fact-checking did not. His form concerns also had to do with a holistic view of the article as a piece of journalism and an expert understanding of genre.

The teachers also found themselves perplexed by student writing. Field notes indicate that they seemed nervous as they began editing the papers for our pre-test. Their eyebrows were raised; they eyed one another with skepticism. We also noted that they took much longer to complete the task than we anticipated; they took the assignment seriously—as if they were being graded on a first quiz.

And how did they respond? They seemed to fall back on a general principle, "It is my job to correct errors." Most began to mark the pre-test papers immediately, before reading the entire piece. Their holistic comments tended to be general, e.g., "interesting information," and their comments to promote improvement were drawn from their knowledge of the five-paragraph essay, e.g., "No conclusion" or "Need thesis statement at the end of the first paragraph." They appeared to be uncomfortable with or unaware of genre and had little sense that we had chosen the news article to help them and their students forefront the science.

In a professional newsroom or publishing house, holistic editing comes first. Fact-checking and copyediting wait until articles are closer to final form. However, without training, our teachers immediately moved toward these lower-level skills. Our findings indicate that novice editors are similar to novice writers

in their focus on word- and sentence-level concerns rather than more global issues. As teachers respond to student writing, their editing could be misleading, emphasizing problems that professionals may not deem as important. The power of a genre to lead to learning and development could be compromised as a result.

Yet we do not suggest that teachers seek to *become* editors. An editor's primary purpose is to produce a publication; for an editor, a piece of writing must stand alone, independent from the writer, and say something understandable and complete. On the other hand, a teacher cannot see a piece of writing without seeing the writer; the two are intertwined. The teacher's goal is to prepare students for the next step, be it the next assignment, the next year of high school, college courses, or adult life. A news article (or any writing assignment) is just one piece of evidence in how well any given student is progressing toward this goal. As they approach student writing, teachers are armed with additional information about students, their own teaching, and future classroom plans; their feedback is deeply contextualized and rooted in the classroom in a way the outside editor's feedback is not.

CONCLUSION

This study demonstrates that a professional science news editor approaches student writing very differently from high school science teachers. This difference seems to stem from a deep understanding of the values and priorities embedded in the genre of science news; these values and priorities are made manifest in the editing of the professional while a very different set of values can be inferred from teacher feedback. As teachers look to expand the genres they use in their classroom in order to achieve specific learning goals, we recommend that they proceed thoughtfully. By working toward a professional awareness of genre, we suspect teachers could learn to prioritize feedback in a way that would help students in the struggle to learn and grow through genre writing. We also suspect that an understanding of genre would affect not only a teacher's written comments but also classroom discussions, private conversations, and related assessments.

NOTES

1. This material is based upon work supported by the National Science Foundation under Grant No. DRL--0822354. All statements are the responsibility of the author.

2. The SciJourn standards are a work in progress and are regularly revised; the most up-to-date standards are posted at http://www.scijourn.org.

3. Although there are many definitions of scientific/science literacy (see Bybee, 1997; DeBoer, 2000; NRC, 1996; Roberts, 2007; Roth & Barton, 2004), the SciJourn research group is primarily interested in what we can teach today about science that may have utility fifteen years after high school graduation (Polman, Newman, Farrar, & Saul, in press).

4. For the purposes of this study, the term "edit" describes any comment, deletion, or insertion by the responder in the writer's paper. All professional edits and some teacher edits were made using the Track Changes and Comment features of Microsoft Word. Other teacher edits were handwritten.

5. This is the spelling of "lead" in the sense of "lead paragraph" that many journalists have adopted.

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APPENDIX. EDITING CODEBOOK

Category: Content (what is being said, not how it is being said)	
Code:	**Example:**
Sources of information: edits about credibility of sources, lack of attribution to sources, and the number of viewpoints represented by the sources	"Says who?" "Where did you get this percentage?"
Information put into context: edits about the implications of the article topic, including controversies and political/economic/ethical ramifications	"show why this is important" "how much will it cost?'
Information made relevant: edits that point out the article should be accessible to a teenage audience or that topics should be local and/or unusual	"I think you assume the reader knows too much"
Information factually accurate: edits about the necessity for information that is clear, fully explained, up-to-date, and includes quantitative measures.	"I tend to doubt that this statement is true." "I don't understand this"
Category: Form (writing, including edits about the structure of a news article; often insertions/deletions/rewrites)**.**	
Code:	**Example:**
Lede[5]*:* edits that have to do with catching the readers' attention; often involves moving, shortening or rewriting the opening	Deletion of several sentences to shorten the opening paragraph.
Conclusion: journalism articles do not have conclusions	Deletion of a concluding paragraph
Style (simplification and fluency): edits that put writing into a journalistic style without changing content. Often shortening of sentences but sometimes combining sentences or adding transitions.	Original: "Young people may think that they will never get this type of influenza due to their age or good health, but they are wrong." Edit: "Even healthy young people are at risk."

Conventions: edits that have to do with spelling, grammar, and punctuation	Original: "ballay" Edit: "ballet"
Quality of quotes: edits about the nature of a direct quote; quotes are not factually inaccurate but are unhelpful to the story (boring or wordy)	"Didn't one of you say anything like 'I'm really excited about this opportunity'? This quote makes it sound like a trip to the dentist—it will hurt but it is better than a cavity. Aren't you thrilled to have this really cool trip?"
Category: Coaching (more characteristic of a teacher than an editor. Mostly comments rather than direct changes to the text)	
Code:	**Example:**
Compliments: positive comments about what has been done; if it has to do with a feature of form or content, double code	"I like this topic" "You have a lot of information here, which suggests you worked hard"
References to the assignment: direct references to the fact that this was created in a classroom, for a teacher (not a "real" journalism article)	"the assignment was to write a credible news story"
Encouragement: positive comments about what should be done next	"I hope you will take the time to revise"
Explanation of change/clarifying comment: edits that explain other edits; usually they come right after an insertion/deletion/rewrite	"say it simply"