Fighting Fake News: Interdisciplinary Online Literacies for Social Justice

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"Fake news" stories fool readers of all skill levels. In this overwhelming landscape, it is important that students develop critical literacy skills to approach texts with a discerning eye (Luke, 2012). Furthermore, critical literacy is essential for helping students explore texts with a social justice mindset. Looking for elements like author beliefs and power systems allows students to see what ideologies influence texts.

This article outlines how the authors worked with middle school students to develop both critical literacy and critical mathematics skills, which allowed them to read online texts in more complex ways and ultimately aided students in positioning themselves as advocates for social change. While this study was conducted in 2014 before *fake news* became frequent in our everyday speech, this study has implications for ELA teachers who want to show students how to read carefully and come to their own conclusions about online texts. We posit this can be done using an interdisciplinary curricular framework.

Research Framework

We formed this curriculum using critical literacy and critical mathematics, which work toward social justice. Critical literacy combines "social, political, and cultural debate and discussion with the analysis of how texts and discourses work, where, with what consequences, and in whose interests" (Luke, 2012, p. 5). Gutstein (2003) describes critical mathematics as teaching students to read the world through math, thereby enabling them to develop mathematical power. The role of the critical mathematics instructor, then, is to help students to develop a sophisticated understanding of society and foster a belief that they can make significant changes in their world. This study continued in a tradition of critical math literacy, the combination of critical literacies with mathematics (Terry, 2010). We approached this combination as Hand (2012) described by "de-stabilizing predictable conceptual boundaries between 'mathematical' and 'non-mathematical' activity [which] extended the domain of mathematics beyond that prescribed by textbooks" (p. 241).

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Study Context

This study questioned how critical literacy might work with critical mathematics to teach middle schoolers about social justice. Summer is a former English teacher; Bryan a former math teacher. We partnered with Morgan (all names are pseudonyms), a teacher at a private Quaker middle school, to teach an interdisciplinary literacy and mathematics course. The elective course was for students in grades 5 through 7. Some were primarily interested in math, others in social justice, and many were interested in both. Students were primarily white and from middle- to upper-SES families. From our class conversations, it appeared most had not personally experienced discrimination. Additionally, perhaps because their school promoted equal treatment for all, they had difficulty understanding that not everyone shared values of equality and frequently asked why some people would treat others unfairly because of race, sexual orientation, or other identity factors.

We created the curriculum with Morgan, influenced by student interests in social justice topics and began the course with a discussion of what social justice means, elicited examples from students, and used these to clarify what our course was about. We discussed the words *social* and *justice* as concepts first, and students stated that *justice* meant fairness and equality. We talked about how *social* referred here to

groups of people, and we discussed how certain groups of people might face discrimination, not for their individual actions, but only because they were members of this group. Some students shared examples of racial discrimination they had witnessed or learned about. For example, some students had learned previously about the Freedom Riders during the Civil Rights Movement. When misunderstandings arose, such as a student sharing that her neighbor was robbed and wondered if that was an example of discrimination, we clarified that individual crimes like a robbery were different from an entire group of people facing constant discrimination. These conversations continued throughout the course as the students read about social justice topics.

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The class was student led and student centered, aligning with social justice teaching practices to allow students to explore social justice topics of interest to them through a generative learning environment. Students worked primarily in small groups to analyze texts and create mathematical inquiries together, using scaffolded worksheets to stimulate critical thinking but without the teaching team directing them to a predetermined understanding or question (see Figures 1, 2, and 3 for examples). In other words, we did not begin the semester with specific mathematical learning goals in mind, but as students' needs arose we adjusted our instruction. For example, when students were struggling to compare percentages, Morgan and the Bryan led a lesson on this topic. Our initial lessons on critical literacy skills were more structured as we asked students to look for specific elements in every text so they would learn that texts are not neutral. We frequently asked students to reflect on the texts and the numbers by asking what they felt and thought about their findings. We found it was important to allow reflection throughout each unit rather than waiting until the end, as this continual reflection aided student understanding.

The structure of the units was as follows: first students read an article from a reputable online source related to a social justice topic. Sometimes the teachers chose the articles; at other times the students chose articles with our approval. Morgan encouraged students to use a student-specific search engine on their library's website, but most used Google instead, which led to some using articles above their reading level before checking in with a teacher as we had instructed. As students read, they practiced their critical literacy skills by identifying critical elements of the articles and reflecting on their findings. Lastly, they used their critical reading as inspiration for asking mathematically oriented questions that might either validate or negate the information from their article.

Investigating their math problems required further online research and data mining. Topics studied over the ten-week trimester included the shooting of Michael Brown in Ferguson, MO; school funding; marriage equality; and health care discrimination toward transgender people. Data for the broader study included student work, audio recordings of student discussions, field notes and analytic memos from Summer, and interviews with select students and Morgan. Both authors analyzed the data for this article (student work, transcripts of student conversations, and reflections and field notes) using open and deductive coding. Our open codes were reduced to categories of success and struggle; our deductive codes were reduced to categories that included critical literacy success and critical literacy struggles.

Reading Critically Online through a Social Justice Lens

The student work analyzed here is from the second unit in which student groups chose their topics and found their own articles. Each group identified the following

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about their text: (a) who holds the power in the article, (b) author beliefs, (c) intended audience, (d) norms, (e) math words and how they affect the meaning, (f) student opinions, (g) student reactions, and (h) what the students wanted readers to know about the article topic. Items A through E allowed for critical literacy (Luke, 2012) and mathematics practice (Gutstein, 2003), F and G were important moments of reflection, and H allowed them to ponder transmitting their knowledge and reflections to a larger audience. One group was interested in education, and they found an article related to educational spending as compared to military funding. Another group was interested in learning why some people oppose same-sex marriage rights. This group first found an article on *The Week*, but it was above their reading level and left them frustrated. After consulting with Morgan, they found another article from a conservative fundamentalist Christian website and answered the questions again, this time with greater enthusiasm and success. We will now analyze each example.

Education Funding

This complex topic proved difficult: from examining recordings of their conversations, it was clear that this group struggled to find an interesting and understandable article. For example, an article on college funding included terms unfamiliar to students, like *Pell Grant*. Because of this difficulty, it took two full class periods to find an article, and they rushed to complete their scaffolded worksheet (see Figure 1).

The students vaguely determined who had the power in the article by answering "the government controls the costs" but struggled to come up with a specific audience: "all Americans and the government, so everybody in the U.S." Their recognition of mathematical concepts was also superficial. When asked to look for math words, they wrote "money, %, taxes. The amount of money for schools is basically what the article is about." While their answers indicate that they could identify the main topic of the article, they did not question the mathematics upon which the main argument was constructed.

When mathematical questions did arise they were often interesting but outside of their mathematical abilities to answer. The group was interested in looking at areas with less school funding to see if that correlated to performance but struggled with ways to calculate these comparisons. One researcher led them to a website of report card-style charts of school funding in different states as compared to state test scores. The group resolved

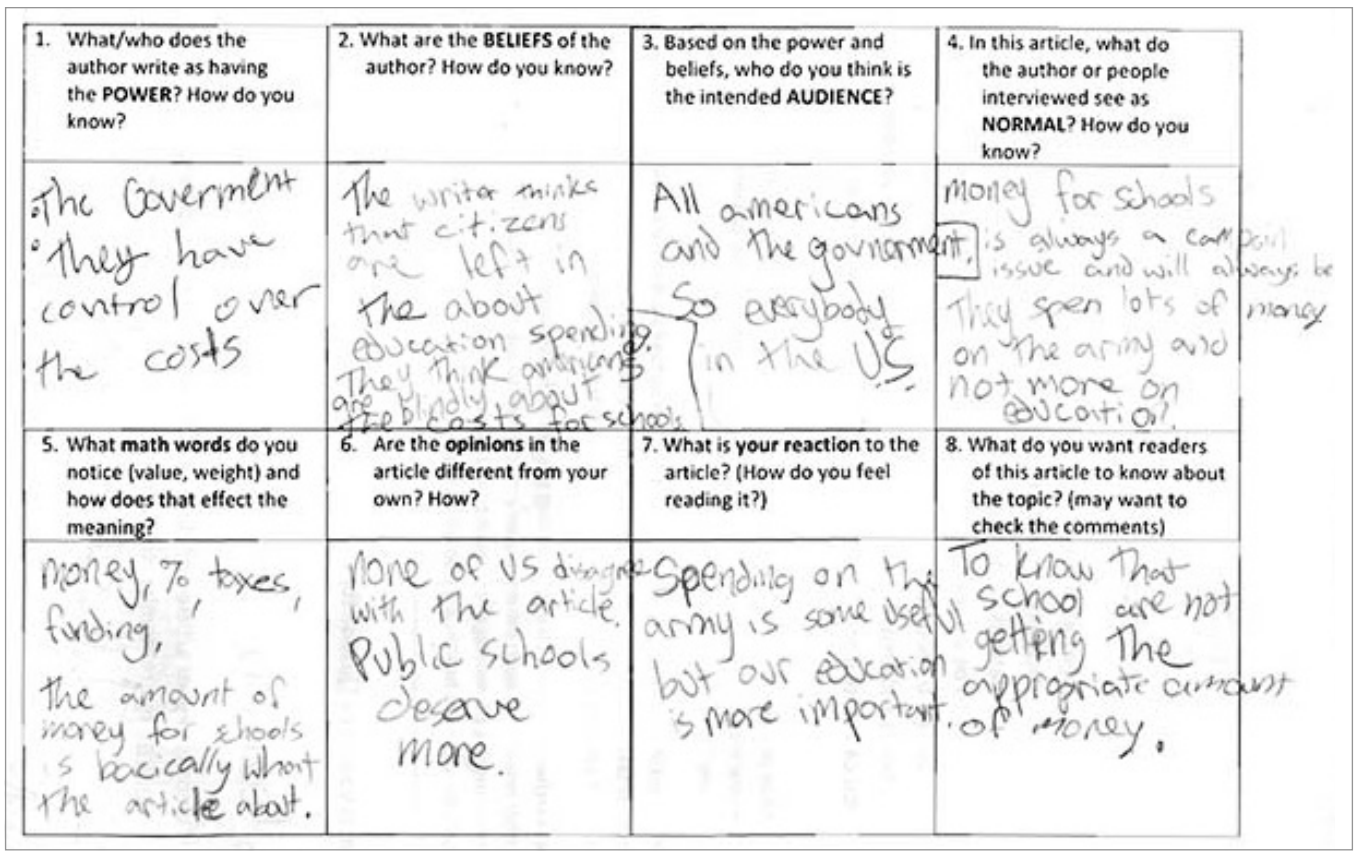

Figure 1.

to calculate the average amount of funding for the higher funded schools and the lower funded schools. However, they attempted to find this by adding the funding percentages and dividing by two. While eventually one student realized this was pointless, this came too late to try any other math. Their problem remained unfinished.

A number of suggestions emerge from the analysis of the education funding group. First, students needed additional assistance in navigating online spaces to find relevant information at their reading level. Second, students needed assistance applying relevant critical skills to their texts. Thus, if students lack sophisticated online information literacy skills, they cannot apply critical literacy skills. This may prevent them from recognizing irrelevant numbers (such as meaningless averages) that fake news articles use as a distraction.

Same-Sex Marriage

The same-sex marriage group showed significant growth in their critical literacy and mathematical analysis skills in their second attempt with a critical analysis. In their first article, they were confused about author voice and purpose and wrote "he doesn't give much with beliefs" and "it does not say his opinion." The math words they identified ("more, bigger, single, two") were more akin to mathematical "keywords" than true identifiers of a mathematical argument. See Figure 2 for their completed worksheet.

When the students read a second article, it was evident they had a greater understanding of both its critical literacy and mathematical implications (see Figure 3). Here, they identified the beliefs of the author as "antigay and a strong believer in the Bible" and the audience as "Christian antigay students." This specificity is necessary for their critical understanding of this social justice issue. They did not find any overt mathematical words, but they had the interesting idea to count how many times the author used *homosexual* vs. *gay*. The students discussed with Summer that they thought anti-gay people used the word *homosexual* more and that LGBTQ+ people and allies did not use this word. They found *homosexual* was used about twice as often as *gay*. This showed us that because students were confident in their reading and were assisted by teachers in clarifying both their interest in the topic and their mathematical

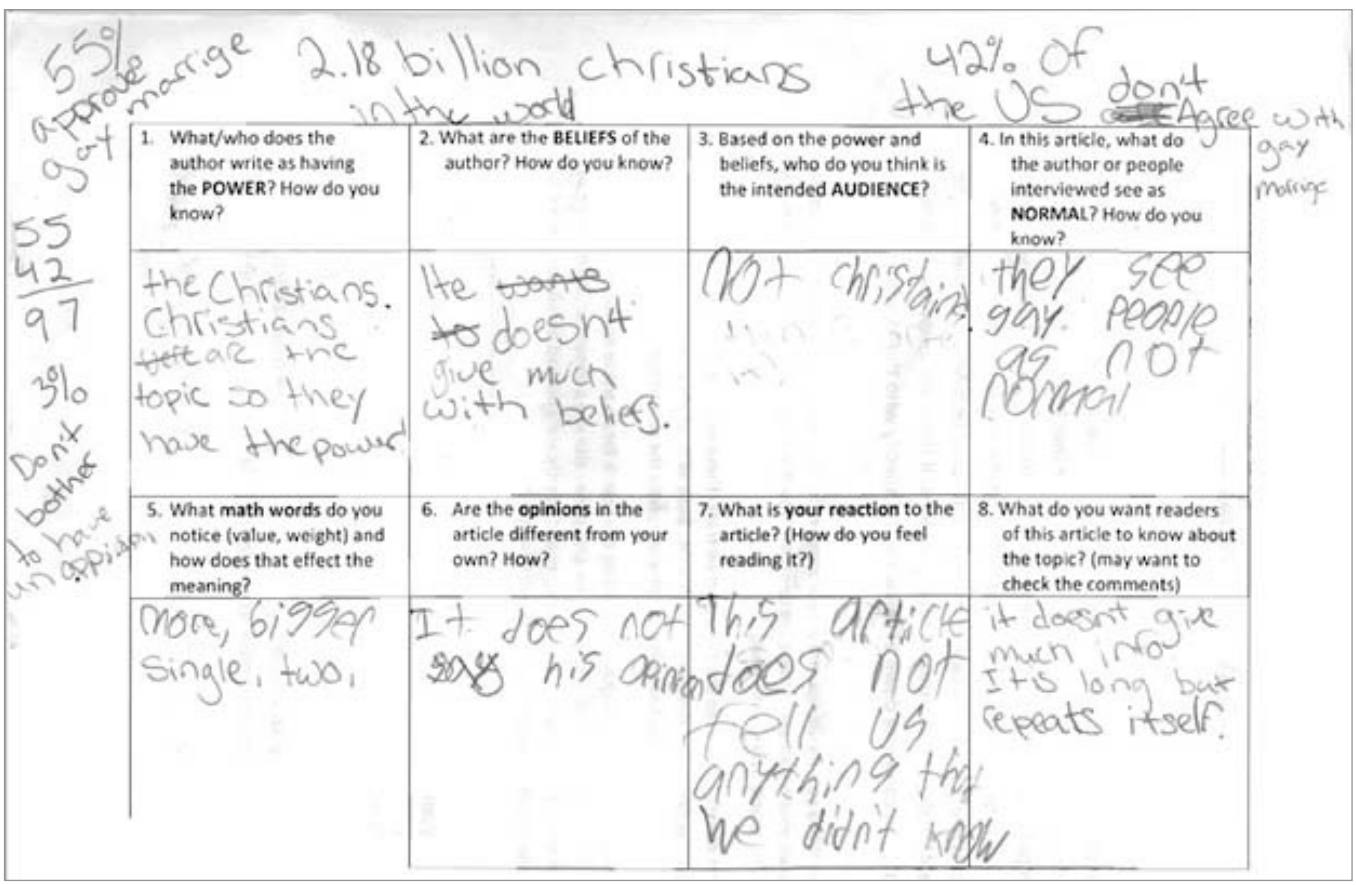

Figure 2.

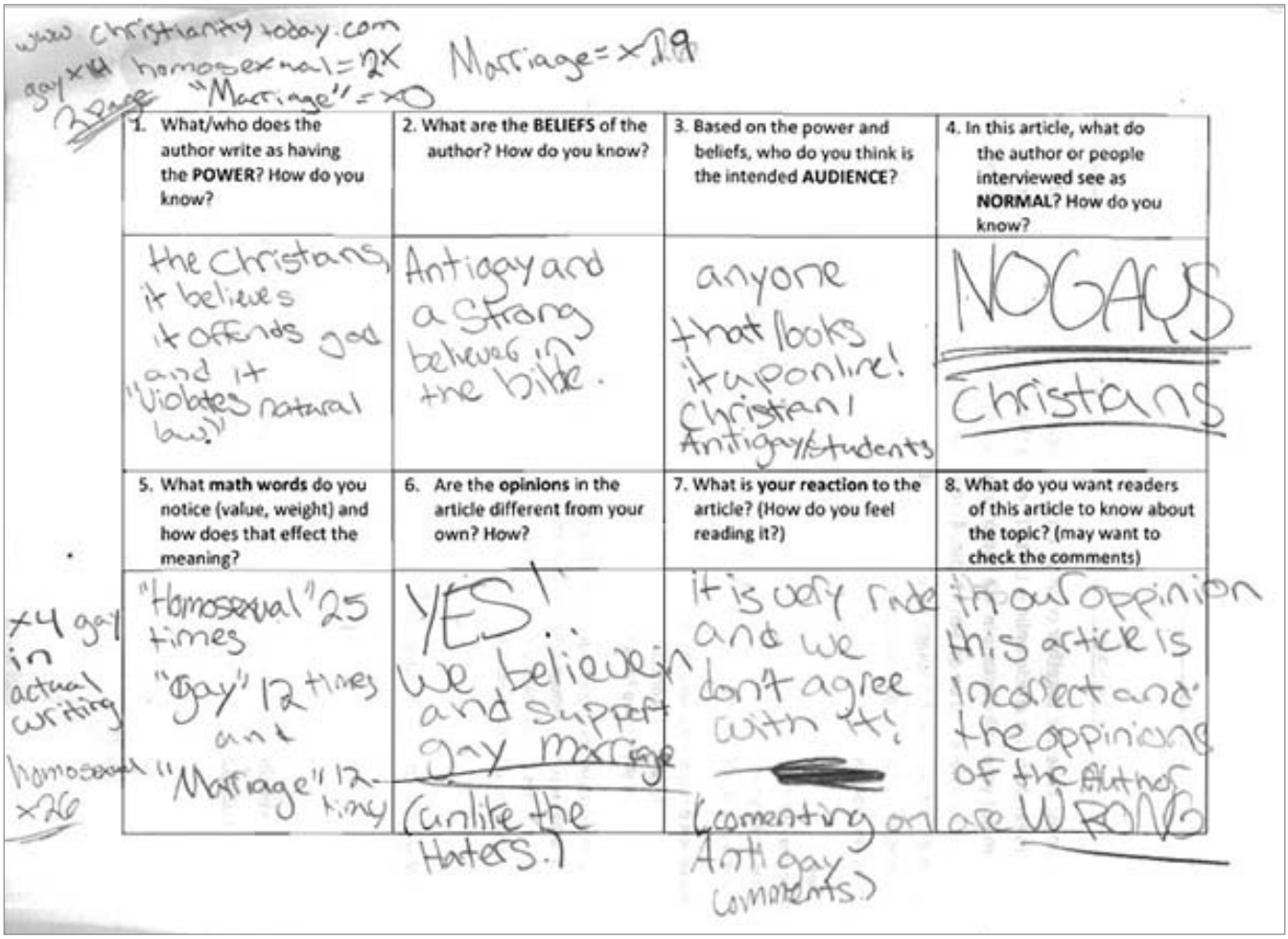

Figure 3.

question, they could assess the power structures behind an article's creation and find mathematical possibilities. They critically assessed the writer's craft, which will help them assess other news articles for reliability. This serves as a good example of how critical literacy and critical mathematics can work together to enable sophisticated student readings of a text.

Challenges

This type of interdisciplinary social justice work has many challenges. While students are searching for texts or data to solve their math problems, they may be distracted by articles that are only tangentially related. Reminding them to check whether the article addresses their specific question can help them stay on track. There should also be a balance between giving students freedom to explore and having enough scaffolds to prevent (unproductive) confusion. We found that giving students frequent time for reflection (both oral and written) helped them refine their goals. Lastly, we had originally hoped that students could interact with other readers through the comment section. Students did not usually finish in time for this last step. However, the students who read the same-sex marriage article did try to engage, but their comments were never approved by the conservative website. Thus, even when teachers want students to interact beyond the classroom, there are limits outside of students' or teachers' control. Having students create their own content (public videos, blogs, etc.) can help them promote their work and get around these barriers.

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Ideas for ELA Teachers

If we were to teach this class again, we would collaborate with a school librarian and/or explicitly teach more information literacy skills. Our students knew how to effectively conduct online searches, but mining through articles and data was more demanding. Students needed support not only finding sources that were credible—which often meant looking at the "about" pages and decoding language to determine who was sponsoring the website—but also how to find data that was not just interesting but relevant to their questions. We recommend showing students examples of credible and noncredible websites on the same topic so students can compare and learn to spot fake news. Teachers can instruct students to visit the "information" or "about" pages to see what organization supports the website. Then, they will have to research those organizations. What biases or priorities might that organization have? What information might an organization called Promoting Private Schools provide about school funding compared to Supporting Public Schools? Students will need to be reminded that these extra steps are necessary to find accurate information.

While marriage equality is now federally legal, there are many current social justice topics teachers could explore using this method. Some ideas: the deportation of undocumented immigrants, disaster relief funding, the school-to-prison pipeline, voting rights and voting districts, and transgender people serving in the military. While the news cycle can be overwhelming for everyone, discussing and breaking down these issues in the classroom can help students understand the world and make sense of what they see and hear.

Fighting Fake News Takes Teamwork

Teaching online literacy, particularly online informational literacy, benefits from a comprehensive approach with an interdisciplinary team of teachers. While we team-taught this course, this will not always be possible. ELA teachers can plan lessons with math teachers to conduct separately. ELA teachers could have students read articles in class and then share these with math teachers, who could create (or help students create) math problems to investigate real-world issues. ELA teachers and librarians can assist students in searching for information and teach them how to critically read news and data. Students benefit from learning that even news authors have a purpose in writing and that news is not necessarily "true," even when words are paired with numbers. To help our students sort through and read the barrage of online news articles available, they not only need critical literacy skills, they need the ability to apply these critical literacy skills to mathematical information embedded within texts. Combining frameworks of critical literacy with critical mathematics improves students' conceptions of both reading and mathematics, how they complement each other, and how these readings are necessary for investigating complex social justice topics.

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