Why Journalism Students Don't Learn CS

By Lindsey Cook ⋮ 29-37 minutes

It happens every year, just the same. Papers are posted to a board at NICAR seeking journalists with tech skills; journalists tweet encouragements that any young person wanting a job in journalism should learn data and coding. Look at all these jobs! This is what the young whippersnappers should learn! If only there were more of *this!*

These same people probably don't think a lot about all the small *whys* that lead journalism schools to graduate their students without computer science experience that would suit them for these jobs. Perhaps it's because the small whys are more difficult to excuse than the large ones—stubborn department heads, slow-moving curriculum changes, lack of professor skills, or an inability to hire a new professor with necessary skills. Perhaps it's because the whys are not as sexy as drawing up innovative new teaching models, funding new research about the best way to teach journalism students CS, or learning about the cool new tool the kid geniuses are working on at Northwestern's Knight Lab.

The facts are simple: *any journalism student can learn to code*—resources online are plentiful and most students probably attend universities with CS classes, departments, or schools, meaning that taking a class in coding is as simple as adding it to their schedules. Yet, students who take both CS and journalism courses are so incredibly rare we call them unicorns. Why is that?

If students know they should take CS classes, if they know doing so can lead to better jobs with higher pay and help them do awesome internet things deep into the future, then why don't we have enough of these people to stop calling them unicorns? I wondered a lot about the disconnect during my own years in school, as both a CS and journalism student.

That's not to say, of course, that there aren't other paths to this field. Many coder/journalists are self-taught, pick up things along the way, use online resources such as Code Academy or learn in communities such as NICAR (see Chrys Wu's annual NICAR roundup for a taste of its resources). Every path is valid. But, as people who have backgrounds in both fields become more useful, more sought-after and produce more stories that couldn't be done another way, the question of how to train more "unicorns" is more important than ever. For journalists already enrolled in universities offering computer science classes, taking those classes seemed like one obvious (and easy) solution.

In the 2013-2014 academic year, with the support of the Associated Press and Google through ONA's Journalism and Technology Scholarship, I set out to research the barriers that keep journalism students out of CS classes.

My research left me crisscrossing the University of Georgia's campus for a year: I surveyed more than 500 students in the CS department and journalism school. I talked with professors who had worked at UGA since before the internet. I interviewed experts in computer vision, new teachers who struggled to make change, and women who got their starts when CS was an even-more-difficult place for them than it is now. I learned about the workings of departmental politics. I helped start the first class collaboration between CS and journalism at UGA and served as the teaching assistant for it. I sat in on the same journalism and CS classes I had taken years earlier and heard the same professors giving the same jokes. Once, I will admit, I ran after a freshman I heard asking a CS professor if the professor thought he could handle the material, since he was "only a journalism major" with no background in math.

Here's what I found—the three reasons journalism students don't take computer science:

1. They don't know they should.
2. They think they will fail.
3. They don't think they'll enjoy CS classes.

This article explores what I learned about those three reasons, and it offers three sets of research-based recommendations for journalism professors and other interested people who want to solve these problems and get more journalism students into CS classrooms. (If you'd like to go deeper, I've also published a research paper on the journalism/CS class I co-designed, posted my report to the UGA Computer Science Department, which details the gendered barriers to participation I found, and given a TEDx talk about the confidence gap and how my attitude toward feminism changed as a result of my research.)

Reason 1: They Don't Know They Should

Most journalism students I talked to had never considered a computer science class. I was usually the first person who had even suggested it to them.

I started my research with some biased assumptions—assumptions shared by the multitude of lessons, workshops, and lesson plans meant to help journalism students learn computer science:

1. Journalism students know what computer science is.
2. They know they should learn computer science.

3. They know that learning computer science will lead to more job opportunities in journalism.
4. If a student wanted to take a CS class, they would know how to go about it.

Turns out, students don't know any of these things.

While some professors think it's impossible to grow up with computers, MySpace profiles, and video games and not know what CS is, journalism students have managed it. Most students I surveyed and interviewed had no idea what CS was. When I asked, "What is computer science?" the responses ranged from the popular "the science of computers" to "no clue" to "studying the insides of computers."

In fact, journalism students were so clueless about what CS was that it was difficult to determine how many students had experience with programming. Although 15% of surveyed students said they knew some programming, I quickly learned most students meant they knew some HTML. This confusion seemed to create an even greater barrier for students who did have some HTML experience, because they felt they had "been there, done that" and that there wouldn't be much benefit to learning more about `hrefs` and `h2` tags.

Although 90% of students agreed that the future of journalism was online media, only 14% agreed that "learning to program is important for my major." When asked if "knowing how to program makes people in my profession more successful," students were fairly equally divided into "agree," "disagree," or "don't know." Only about half thought programming would lead to more job opportunities, and some even thought it would lead to fewer.

Misconceptions about the value of programming skills even extend to seeing them as a potential liability. I spoke with a journalism student at another university who was in her first computer science class, and was finding both the material and atmosphere challenging. She expressed a revealing concern: "The field you are in seems so small. I am worried I won't be able to find a job." She was interested in the intersection of journalism and computer science but worried that interest would *limit* her job opportunities—that she would be stuck in the IT department instead of doing journalism, her passion. If a student's curriculum doesn't talk about this intersection, if they have never met someone in this field, if they aren't on the NICAR listserv, if they have never seriously explored the "how" behind a cool journalism-technology project— can they know how in-demand programming skills are in journalism and what types of projects they lead to?

Exposure Is the Key—and We're Missing It

Research in computer science has found exposure to the field to be one of the most important factors in increasing CS enrollment (see Jane Margolis' books on

underrepresented populations in CS for a thorough discussion on exposure). Without an understanding of what CS is and how it relates to journalism, students think it will be difficult and professionally unrewarding. In an ideal world, exposure to computer science would begin early, with connections to other fields continuing throughout a student's education, but in fact, journalism schools are often the only opportunity for many students to be exposed to CS. If a journalism school chooses to waste that opportunity and graduate students who enter the job field without any knowledge of programming concepts, that school has failed.

Gendered Harm

The lack of discussion about CS in journalism is likely to harm female students more than male students, which is particularly concerning, considering that most undergraduate journalism programs are majority female—75% female at UGA when my study began. Men are more likely to have exposure to CS before college through gaming or a friend or relative. In my CS interviews, male students also expressed more attraction to CS itself, while women were more interested in CS's application to other fields. Margolis found the same thing: 44% of women in her study connected CS to other fields, compared with 9% of men. The researchers called this "computing with a purpose."

Past studies have found that when students are given the option of doing socially relevant work, CS classes have higher retention rates for female students. Without a clue of how computer science will help their journalism careers—the lack of computing with a purpose—men are more likely than women to take a computer science class just for fun, then see the connections later.

Finally, the timing of a student's exposure to programming in journalism was critically important in shaping his or her interest in CS. Many of the senior students I interviewed had recently become aware of the connections between technology and journalism, usually through an internship or from looking at job opportunities. Several said they wished they could take more technology classes, but with their senior schedules packed with graduation requirements, it was too late.

Fixing Problem #1

To fix this, journalism schools should:

- **Alter curriculum in the first introduction to journalism class that students take.** Talk about what computer science is, where the job opportunities in the field are, and discuss innovative online journalism projects and how they are done instead of solely relying on outdated "textbook examples" of excellent reporting that happened before the internet. A guest speaker from the computer science department could give a short

lesson on what CS is and what it's used for. Consider Skyping with a working journalist who uses coding and technology in her job who can talk to students about it—and about available job opportunities.

- **Educate advisers on what computer science classes are available and in what departments.** These classes might be less than obvious—at UGA, there was a class that covered an introduction to Python that was taught in the Physics department. Evaluate how advisers talk to students about courses outside of the journalism department, which ones they recommend, and why. Maybe this means developing a handout for journalism students about what computer science classes are offered, what they teach, what the workload will be, and how those teachings will relate to journalism.

- **Try to have at least one person on-campus with experience in journalism coding to whom professors or advisers can direct students showing an interest in the field**. Maybe this person is a professor in your department or in another department, a Ph.D. student studying data visualization or Human Computer Interaction, or a current or past student.

- **Educate professors and journalism staff on what computer science is —consider a lunch-and-learn with a computer science professor.**

- **Develop a relationship with the computer science department at your college** so that the journalism department is aware of what the best classes for students are, what the courseload looks like and what prerequisites might be required. It's possible that higher-level classes could be taken by journalism students and potentially have prerequisites waived. At UGA, there was a Human-Computer Interaction class, that although high-level, concentrated on the social side of computing and could have been taken by students with a smaller knowledge base of computer science concepts.

  Also start a dialogue about trading students. Computer science departments often struggle with how to teach their students to write and communicate better—essential skills for any profession, but especially for computer scientists, who often are tasked with explaining complicated processes and problems to non-tech people. Teaching people how to communicate complicated topics simply…sounds like journalism!

- **Accompany any discussion on web development or lessons in HTML/CSS (hopefully there are some!) with a thorough discussion about how the web works and computer science's role in that.**

These solutions don't need to be initiated at the faculty level, necessarily. Working journalists can reach out to a local journalism school or your alma mater to create an open dialogue about this issue. Volunteering to lead a class is a

quick and effective way to support the field. For students, if your school doesn't offer this but you want it, talk to your professor and bring up possible speakers.

Reason 2: They're Afraid They Will Fail

The popular fear of math keeps many journalism students from signing up for CS classes, and this too affects women more than men. The men in my survey sample had more experience with math and science and were more confident in their abilities in math, science, and technology. On average, the men had taken 0.5 more math classes and 0.4 more science classes at the University. While only 10% of men strongly disagreed with "when people I know have problems with technology, they come to me," 25% of women did. (Other confidence questions not related to STEM, such as how students would perform as lawyers or how they felt about their job prospects after graduation, also showed gender differences reflecting the confidence gap between women and men overall, but the differences were more pronounced for STEM questions.)

It's also common to hear working journalists say they got into journalism to avoid math or say things like, "that's why I'm a journalist!" in reference to their lack of math abilities. The narrative that journalists are *words people*, not *numbers people*—and therefore avoid math at all costs—has become embedded in the culture of journalism as much as the rum in the editor's bottom drawer. This belief seeps into students as well, even though when pressed, most students admitted they had been successful in math classes throughout their schooling.

Despite that history of success, journalism students were sure they would not do well in computer science (or other STEM) classes. They thought computer science classes were very difficult and that only a specific type of student, one who has a special "gift," could be successful in them. Many students agreed that someone had to be really smart to be a CS major. One woman described a computer science major as "very smart and probably a technology expert… male," a sentiment often echoed in student interviews. Women were more likely to see intelligence as a barrier to computer science: 60% of female students thought CS majors had to be really smart, compared with 40% of men.

Students also worried that if they were to try a computer science class and not be successful, it would harm their grade point averages and therefore their future job opportunities. When female students estimated how much their grade point averages would change if they switched their major to CS, the average estimated drop was .96, meaning if they had a 4.0, they would later have a 3.0. Men estimated a .64 drop. In interviews, many students emphasized that having a high GPA was important for gaining a job in the field and expressed concern that one less-than-stellar grade could put their GPAs—and therefore, job prospects—in jeopardy.

The irony is that UGA is home to many of the best students in the state, based on grades and standardized test scores at enrollment. Frequently ranked a top journalism school, UGA's Grady College is even more competitive and requires a separate application process for entry. Any student at Grady can learn to code, but many believe they aren't smart enough or don't have what it takes. Only a third of journalism students surveyed thought they would do well in Calculus 1 at the University, an early foundation course for many majors that many students were already exposed to in high school.

Why the dissonance? My research experience leads me to believe it's because our culture fetishizes hackers and computer scientists as geniuses so much that students believe coding is near impossible. The CS students don't downplay this narrative either—many revel in it. This in particular is a significant barrier to many women and minorities entering computer science, and requires similar strategies to counteract. It's also compounded by journalism's own habit of glorifying coder journalists. Even within the small journalism-coder community, there are plenty of "rockstars" who support the "journo-hacker" genius image and don't seek to discount it…and plenty of journalists who regard them as geniuses.

Fixing Problem #2

To fix this, journalism schools should:

- **Avoid supporting the "journalism is for math-haters" doctrine.** Talk to professors about making jokes about it in their classes, particularly in introductory classes. Talk to guest speakers ahead of time and mention that the university is trying to discourage this phrasing. I've noticed many speakers resort to this narrative when they are nervous, in an apparent effort to establish common ground with students. (It should really be added to the journalism speaker bingo card.)

- **Include some math in the first reporting class students take** by doing a lesson on—for example—budgets, salaries, or costs in local government. Teach students some Excel formulas and encourage professors to "sell" the lessons by emphasizing the power of numbers in journalism, instead of warning students that math will be present. (This is another opportunity for alumni or local journalist involvement.)

- **Include some examples of data-backed investigative stories and emphasize the numbers in the stories as crucial.**

- **Give students information about the aggregate grade breakdowns of introductory CS classes** to reassure students that it is very possible to be successful in an early CS course if they keep on top of course material.

- **When finding journalism tech guest speakers for classes, seek people who are approachable**, who students won't perceive as untouchable, "larger-than-life figures." Consider looking for journalists working in your own community instead of seeking out well-known journalists at top news organizations, to emphasize that data journalism and journalistic uses of technology happen everywhere.

- Past computer science research has shown success in professor recruitment of women and minority students to computer science classes. **Encourage professors and advisers to speak to students one-on-one about computer science classes** and emphasize that they believe the student will be successful, to bolster confidence.

- Past research has also shown strength in numbers for women in computer science. **Connect journalism students potentially interested in CS and encourage them to sign up for the same class** so they can help and support each other.

- **Offer sessions for students to learn a little CS—think "Hello World"—either inside or outside the curriculum** so students can see that CS is not impossible and doesn't involve complex math problems. In the journalism/CS course we taught at UGA, students said they felt more comfortable because the class was in the journalism building. Allowing journalism students to have their first experience with computer science in the journalism building among journalism students can provide a "home field advantage" to skeptical students.

  At UGA, we also had success organizing Code Academy dinners where students could bring laptops, eat together, and complete Code Academy courses around others doing the same lessons, with CS students on-hand to answer questions and explain concepts. Organizing sessions such as these is a relatively easy opportunity for journalist involvement and for student leadership.

Reason 3: They Don't Think They Will Enjoy CS Classes

Dr. Christopher Plaue and me, teaching our data journalism class at Grady College (courtesy Grady College)

Journalism students have no reason to believe they would enjoy learning computer science—a concept that is largely unknown to them, rooted in math and tech abilities in which they have little confidence, and disconnected from their field of study.

Because CS is such an unknown to them, students have no concept for what projects they might be able to do if they had CS skills. During interviews, when I asked students what they could do in journalism if they knew how to code, most said they didn't know, or that they could build a portfolio website. Only a few students mentioned user-centered design, news applications, pipelines for user generated content, machine learning, data-driven investigative reporting, or other modern applications of programming to journalism. Ask students to bring examples and discuss them or assign reading on Nieman Reports, Poynter, Source or from the American Press Institute newsletter—all of these publications regularly feature posts on how cool projects were done.

Students are also leery of CS classes because of the perceived environment, which keeps many potential CS students out of the department in general. Journalism students are afraid that the teacher, class environment, and/or other students will make the class difficult socially. Imposter syndrome as a barrier to entry was more significant for female students. Male students in the survey felt they would fit in more with CS students and that they were more likely to have the same hobbies as CS students. Past research found the top two factors in selecting a major are students' expectations for success and the value placed on the course of study. Journalism students have little expectation for success in CS classes, and also see little value in taking CS classes.

Perceived similarity to others in a major, or whether you will fit in, has also proven to be a factor for enrollment in computer science, even on qualities that have nothing to do with success in the field. Just as women in general face additional barriers to belonging in computer science, women in journalism face more barriers than their male peers when signing up for CS classes.

Even if journalism students ended up in a computer science class because they were interested in it—again, something far more likely for a male student—they still didn't always see the connections between journalism and CS. Introductory CS classes teach a fairly standard curriculum: basics of computers (RAM, hard drive, etc), variables, Hello World!, loops, if/else statements. While the benefits of thoroughly learning CS concepts are many, the connections between journalism and CS are not obvious in the first class, particularly if students start from a baseline of zero knowledge about this field. Without this connection, the few students who are motivated to take introductory CS classes are likely to quit after the first class or even mid-semester. (And often, as is the case at UGA, these concepts are taught using a programming language not used in journalism-coder circles—in my CS education, I learned Java, C, and C++.)

Fixing Problem #3

In addition to the solutions outlined above, journalism schools should:

- **Encourage professors to spotlight cool projects and explain more about how the project was done** or have students read more about projects involving graphics, investigative journalism, or machine learning.

- **Learn what types of projects are done in the first computer science class** at your university. It is likely that at least some of these projects are humanities-based, since CS departments are attempting to integrate more different types of projects in the curriculum to recruit more women (who are statistically more engaged with humanities programs).

- **Try to enroll journalism students—especially women—in classes with approachable, relatable professors or TAs.**

- **Create opportunities for CS students and journalism students to learn more about each other.** Create a class that brings together students from both departments. Hold a weekend hackathon to work on computing problems in journalism and organize teams with students from both disciplines.

  Have students work on a journalistic project that involves reporting on the computer science department, research, or students. For example, have students cover project presentation day. Hold a mixer for journalism and computer science students and professors. Organize a lecture series with

speakers of interest to both groups. Advertise in both types of classrooms and have a coffee hour beforehand.

In Conclusion

These solutions are imperfect because students do begin identifying which "type" of person they are early on and thus, begin closing themselves off to opportunities that don't fit this perceived identity.

When asked when they began identifying as a "words person" or a "numbers person," the grand majority of journalism students said before college. Several women said "birth." While male students were most likely to say they chose their camps in middle school, women were more likely to say elementary school. The best solution for gaining diversity in computer science (and decreasing the journalism tech skills gap) is teaching students about coding early on, in elementary school, before these decisions are made and become part of their identities.

Many CS professors and administrators in this research used this as an excuse to pass the buck. Journalism departments shouldn't. Journalism administrators have the ability to graduate students who know what computer science is, who know what code looks like, and who know what opportunities are available to them in CS – but first they have to learn themselves.

Computer science departments could and should do a lot more to recruit and retain women, minorities, and people interested in non-traditional applications of computer science.

Significant work also needs to be done on the job-hunting side. I met many women while doing this research who had taken classes that talked about code, had coded websites in JavaScript, knew what a for-loop was, or had done the entire Python Code Academy lesson but refused to identify as coders—and wouldn't disclose this information to potential employers unless asked, for fear that they would be drilled, quizzed, or asked to do something completely beyond their skill set, or that they would be considered impostors or not part of the "club." The journalism coder community could do more to welcome beginner coders who aren't interested in "taking it all the way" but just want to dabble in code. The community should also do more to make sure job descriptions for entry-level hires that are geared to students include reasonable expectations in order to recruit more of these students who have experience with code, but who don't consider themselves rockstars, ninjas or experts.

All of this is to say that, although this research concentrated on journalism schools, the blame is shared among all of us. Every person reading this article—and congrats if you have made it all the way to the end—can start work on one of

these solutions, whether that is starting a conversation in your department, reaching out to the journalism school if you are in CS, volunteering to speak at a local school or your alma mater, talking to journalism students you encounter about CS, or starting a student group that works through Code Academy together.

About a month ago, I, along with another UGA alumna, was asked to take a Grady student to dinner in DC. When asked what type of journalism she wanted to go into, she responded “print journalism.” My ears bled. It’s something I hear often from journalism students. In an era where newspapers are closing their doors and layoffs are commonplace all while other organizations are raking in hundreds of millions of dollars for online journalism projects, not only is it irresponsible to graduate students without knowledge of the industry as it is now, it’s just plain mean. Jobs in the journalism code field are plentiful. They pay well. They are growing. In the next decade, the connections between journalism and computer science are going to explode. All the newest computer science tools—computer vision, machine learning, big data, robotics, virtual reality—will allow this group of journalists to tell stories in new ways and to uncover important information. We need more people in that group. We need more people from more backgrounds. We need more women in that group. We need more people of color in that group. We need more people to have access to that group—not just the ones who attend a few of the most prestigious (and most expensive) journalism schools.

Sometimes journalists ask me why I think we even need more women and people of color in this small field. I explain it like this: “You don’t want a group of white men designing your news app for the same reason you don’t want all old white dudes running your newspaper.” In journalism, we’ve worked hard to get to the point where most people understand that is a bad idea. Many have worked hard to diversify so we can better serve our audience.

But, looking at the future of journalism and the people who will have the skills and experience necessary to take part in that future, we’re moving backward, not forward, in terms of diversity. It looks like we’ll be left with ill-fitting IT and technology solutions built by people who don’t understand journalism. It looks like we’ll be left with experiences that don’t serve everyone. If we want to change that picture, we need to start now.