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Teaching Millennials to engage THE environment instead of THEIR environment: A pedagogical analysis

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ABSTRACT

This article examines the difficulty in teaching contemporary students of journalism (those in the much-discussed Millennial Generation) to report on complex topics like science and the environment. After examining contemporary literature, the authors subjected 120 undergraduate students to a strategy that combined visual representations of abstract concepts, media texts, and experiential peer interactions. The results indicate positive outcomes on comprehension and demonstrations of critical analysis from this pedagogical approach.

Teaching environmental reporting continues to be a daunting undertaking. Compared to other coverage areas of news media, the issues, sources, politics, and even ideological understandings present more challenges to reduce down into journalistic news frames. In fact, just understanding the issues involved can be daunting, as one journalist noted:

> When it comes to systematically covering "the environmental story," anyone who moves beyond the most simplistic approach sees immediately the extraordinary complexity involved even in mapping the territory, let alone understanding trends, issues, conflicting evidence, the role of information sources, and other aspects of the story. (Dennis, 1991, p. 61)

This article examines the difficulty in teaching contemporary students of journalism (those in the much-discussed Millennial Generation) to report on complex topics like science and the environment. The Millennial Generation consists of those born after 1980 and graduating high school following the year 2000 (Howe & Strauss, 2000). This group represents 30% of the American population and is the most diverse American generation with 34% of their ranks classified as minorities (McGlynn, 2005).

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By examining contemporary science education literature, consulting the literature about the special challenges of educating Millennials, and drawing upon the classroom experience of the researchers, this work proposes a model for motivating contemporary journalism students and helping them develop deeper understandings of the issues involved in more complex topics of news media coverage.

Covering the environment

News media continue to serve a gatekeeper role concerning the filtration of civic information, and serve an almost exclusive role as the purveyors of science and technological information (Friedman, Dunwoody, & Rogers, 1986; Gerbner, Gross, Morgan, & Signorielli, 1981; Gregory & Miller, 1998; Hornig, 1990; LaFollette, 1990; Mitchell 2014a; National Science Board, 2010; Nelkin, 1995). However, Americans remain generally uninformed when it comes to even the most basic political and public policy issues (Delli Carpini & Keeter, 1996). In addition, the general populace's command of science and science policy varies widely across topics, with relatively low command of basic science principles and process (Pew Research Center, 2013), particularly topics like environmental science and policy. Though science writers once saw their craft improving in quality and quantity (Dennis & McCartney, 1979), a more recent survey found this trend significantly reversed as newsrooms cut specialty reporters in response to economic pressures (Crow & Stevens, 2012). Despite recent improvements in the economy, newsrooms have continued to see declines in revenue (Pew Research Journalism Project, 2014), and personnel cuts have largely not been restored. Newspapers, which serve as the primary source of original science reporting, have been particularly hard hit by staff reductions. From 2003 to 2012, newspapers lost 16,200 full-time editorial newspaper jobs (Mitchell, 2014b), leaving the industry with 38,000 full-time editorial employees in 2013, the first time that number had dropped below 40,000 since 1978 (Guskin, 2014, p. 1). The 38,000 figure represented a 33.2% decline from the industry peak of 56,900 in 1989 (Pew Research Journalism Project, 2014, p. 11).

A 2009 Pew Research Center report found that 85% of American scientists thought the public did not know enough about science and 76% cited a lack of context in news media coverage of science. An earlier Pew report (2004) found that Americans acquired most (89%) of their information concerning science and technology from media, a distressing finding, considering concerns about the news media's ability to cover routine scientific developments (Nelkin, 1995, p. 7). Supporting this finding, Suleski (2010) found that less than .005% of nonmedical science journals received any press coverage at all.

Though there exists high levels of interest in science news (Nunn, 1979), the cost and complexity of science coverage leads news organizations to treat the reportage of science as a niche or beat subject, leading to uneven coverage by beat reporters (at larger newspapers), general assignment reporters, and wire stories (Friedman, 1986). Despite an increase in the number of newspaper sections devoted to science

in the 1980s (Lewenstein, 1987), the number of sections declined from 95 sections in 1989 to only 47 in 1992 (Jerome, 1992).

Science is a difficult subject to cover, and several studies have examined the accuracy of scientific news reports. Tankard and Ryan (1974) found that scientists judged only 8.8% of science articles to be error free, compared to 40% to 59% error-free stories in other types of stories found in previous studies. Tichenor, Olien, Harrison, and Donohue (1970) found that only 40% of scientists surveyed agreed with the statement that science news is generally accurate. Dunwoody and Scott (1982) found that 51% of scientists surveyed offered criticism of science reporting for containing inaccuracy and distortion. And the aforementioned 2009 Pew report found that nearly half (48%) of American scientists thought news media oversimplified scientific findings.

Part of the problem of absent, inaccurate, and over-simplified coverage involves education and training. Few journalists covering science topics possess scientific expertise (Palen, 1994), primarily because only 3% of journalists with college degrees major in mathematics or science areas, while most major in communication fields (Weaver & Wilhoit, 1996).

Unfortunately, greater challenges face the youngest generation of burgeoning journalists than those faced by current and past journalists. Observed generational traits in the Millennial Generation indicate critical differences in learning style and the perceived relationship between individuals, groups, and society. The cultural values unique to the Millennials suggest that learning how to cover beats like science and the environment will be particularly challenging for the contemporary students of journalism.

Teaching Millennials

Much has been written about the Millennials, with many observations about their differences from previous American generations, particularly in regards to their consumer behavior and learning preferences (Howe & Strauss, 2000; Oblinger, 2003; Poindexter, 2003; Raines, 2002). Raines (2002) describes the typical generational characteristics of Millennials as sociable, optimistic, talented, well educated, collaborative, open minded, influential, and achievement oriented. Howe describes them as confident, happy, and optimistic, adding, that Millennials are "risk-averse, … and like to work with the best and latest high-technology gadgets" (Howe, 2003). Other scholars have described this generation as confident, self assured, with high self-esteem and an optimistic outlook on life (Habley, 1995; Levere, 1999; Zemke, Raines, & Filipczak, 2000).

Millennials tend to be described as self-focused, expecting to be able to choose what kind of education they buy, and what, where, and how they learn (Carlson, 2006). The learning preferences identified by Oblinger (2003), Brown (2000), Weiss (2003), and Zemke (2001) include traits such as teamwork, experiential activities, structure, and the use of technology.

The difficulties in assessing risk inherent in the Millennial Generation make educating them about complex social systems like science and environmental issues difficult. Risk assessment in environmental reporting is a particularly important challenge for journalists, and the lack of clear risk assessment has been an historic criticism of environmental coverage in the news media (Friedman, 1991). Adding to this problem, the general struggle to judge authoritative sources and institutional credibility among Millennial students (Rieh & Hilligoss, 2008) paints a concerning picture for the prospect of training contemporary university students on the topic of environmental journalism. As one longtime environmental journalist observed, covering the environment is far more difficult than the average news story:

> Given the complex nature of environmental sources, ranging from scientists and economists to political activists and even some who use terror tactics, the playing field is not only not even but encumbered by furrows and bumps that make it difficult to scope out the players and what they are doing. (Dennis, 1991, p. 62)

Another journalist described the daunting task of navigating competing voices as the gathering of:

> thousands of environmental constituencies, special-interest groups, businesses, government agencies, and politicians—with ever-shifting objectives and personal agendas—are constantly battling for the hearts, minds and votes that determine public policy. Meanwhile, the life of the planet is at stake. (Prato, 1991, pp. 7–8)

If environmental journalism is difficult to produce under the best of circumstances, it would appear that Millennials are positioned to have a particularly difficult time navigating the pitfalls of sorting through the competing voices and filtering newsworthy information for public consumption.

On the other hand, though previous Pew Research surveys reported Millennials faring worse on general science knowledge, a 2013 report found that respondents below 30 had closed the performance gap with those in the 30–49 and 50–64 age groups (Pew Research Center, 2013, p. 5). Part of this improvement appears attributed to the rising amount of traditional news content consumed through social media platforms, with the largest gains coming from the 18–29 age group (Mitchell, 2014a). This trend makes some sense, given that Millennials use social media to a larger degree and are connected to more users than other generations (Pew Research Social & Demographic Trends, 2014). In this manner, it appears that the youngest generation of adults accesses the news media at relatively similar rates as other generations though they encounter it in noninstitutional spaces. The Millennial concern, therefore, appears to center less on the knowledge gathering itself and more upon the reportage practices themselves.

A model for teaching Millennials to cover environmental journalism

Drawing upon social learning theory, suggested pedagogical approaches in education literature, and the trial and error of classroom experience, the researchers have developed an approach to helping Millennial students grasp the concepts and skills

needed to engage in science and environmental journalism. Before they can evaluate complex or technical content, most Millennials need a primer in some of the basic conceptual underpinnings. Brown points to a new literacy emerging around digital culture comprised of the Straussian bricolage (the physical ability to find information) and judgment (the ability to sort or categorize information). Because most Millennials have grown up surrounded by technology and immersed in an overwhelming number of digital cultural expressions, they tend to be skilled at the former, but less so at the latter. Judgment, as defined by Brown, is an inherently critical ability, and one that requires the performance of navigation and discovery facilitated through action to acquire (Brown, 2000, p. 4). Radeloff and Bergman (2009) recommended activities such as the evaluation of Web sites, films, and other media forms to build literacy through experience.

Recent studies of Millennial learning patterns have suggested collaborative, experiential approaches favor the strengths of Millennial students over the more traditional didactic approaches (Appelmann, 2004; Howe & Strauss, 2000; Ricketts & Willis, 2001). In particular, the use of research-informed design (RID) practices has been found to resonate with Millennial communication students by encouraging students to solve problems and answer questions by applying previously acquired knowledge and research (George-Palilonis, 2010). In other words, for Millennials, limiting the education experience to simple exchanges of information between faculty and student can be counterproductive. Rather, the RID literature suggests that allowing students to absorb factual information outside of class so that class time can be utilized for application and simulation (experiential learning exercises) serves a Millennial's educational needs more effectively.

Building upon these insights, the authors developed a pedagogical approach with two components: methods used to help students apply their knowledge and skills to practical assignments (focused blogging with peer-review responses), and the intellectual frameworks (presented in visual form) that have been demonstrated effective for increasing the comprehension needed to sort through complex data-driven stories. To test this approach, a sample of 120 undergraduate students enrolled in specialty reporting and technology-oriented journalism classrooms took part in a qualitative pilot research study utilizing these methods and then surveyed afterwards.

To measure the pilot study's results, the following research questions were posed:

RQ1: How do the use of visual frameworks and blogging activities affect student comprehension of complex subject matter in specialty reporting courses?

RQ2: How do the RID strategies employed affect student enjoyment and learning in specialty reporting courses?

Pedagogical method

Because judgment is best acquired through action, it is also important to introduce epistemological inquiries concerning the cultural and political understandings of science, technology, and the natural world through applied course activities. An

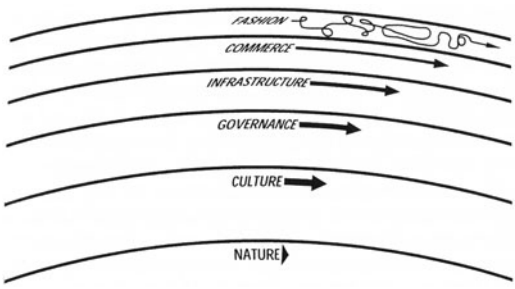

Figure 1. The order of civilization. The fast layers innovate; the slow layers stabilize. The whole combines learning with continuity (Brand, 2000, p. 37).

example of a possible opening exercise for undergraduate students is to ask them to briefly provide their own definition of the word "natural" (said inquiry makes for a good class discussion or blog assignment). For each answer given, the instructor can deconstruct the definition to the roots of ideological bias, forcing each student to confront the ideological complexity of judging the difference between "natural" and "artificial."

From this basic context, cultural controversies such as the definitions surrounding the abortion debate, gun control, and the death penalty provide the stimulus for observing and acknowledging the ideological complexity of the democratic resolution of conflicts driven by competing cultural values and definitions. Such basic exercises, repeated often, allow students the opportunity to witness the presentation of multiple voices on a given issue, a key tool for navigating competing interests surrounding a complex topic like covering the environment.

An example of an effective visual tool can be adapted from Stewart Brand's (2000) *The Clock of the Long Now*. Brand provides approachable epistemological frames for deconstructing understandings of time and a culture's sense of "now." In particular, Brand's breakout of the cultural order of a civilization's sense of time and progress (see Fig. 1) has been demonstrated by the authors to be very effective in getting students to consider how different parts of society interact (and provides understandings late in the course for distinguishing between climate scientists, meteorologists, government sources, advocates, journalists, and other cultural voices involved in the environmental debate).

This primer information allows the instructor an opportunity to introduce students to the basic information needed to cover science, important given that students typically are uninterested in science (King & Ritchie, 2013; Swarat, Ortony, & Revelle, 2012) and nearly half of Millennials report avoiding math and science education because it is seen as too difficult (Pew Research Center, 2013, p. 9). An important note about addressing science for Millennial students: Many of these students have some basic instruction IN science (in other words, they understand the basics of the scientific method), but few possess an understanding of what Millar and Osborne (1998) call the "ideas *about* science." In other words, students often do not understand the philosophical underpinnings of science, the historical context that led to the scientific method, the analysis of data, and the role of

consensus in the scientific community. All of these are important concepts for Millennials to understand before they can grasp the complexity of representing science to the layman. Active engagement of related topics, interaction among peers, and coaching from their instructor consistent with Clark and Fry's (1992) recommendations, helps generate some of the experiential knowledge Millennials need.

Blogging

Perhaps the most important method for getting Millennials to engage with scientific topics is to have them blog about them, and to do so in a collaborative manner. Shelton, Lane, and Waldhard (1999) pointed out that communication technology, active learning, and team learning were the three principle pedagogical trends in communication theory. Hoag, Jayakar, and Erickson (2003) defined communication education as "the business of teaching future communication and information professionals how to write, think critically, work in a team environment and effectively utilize communication technology" (p. 374).

Multiple-authored hypertexts (Weblogs) allow the student to write individually and then link his or her individual writing to a larger text; therefore, the student can be evaluated as an individual and as part of a larger group without necessarily having to depend on others, a major concern of students that can lead to disruptive avoidance strategies (Colbeck, Campbell, & Bjorklund, 2000).

This form of writing lends itself more to a discussion model of discourse, a method that emphasizes many of the characteristics well suited for understanding complex topics. Brookfield examined discussion models for classroom learning and offered the following 15 advantages for utilizing discussion-style activities in the classroom:

1. It helps students explore a diversity of perspectives.
2. It increases students' awareness of and tolerance for ambiguity or complexity.
3. It helps students recognize and investigate their assumptions.
4. It encourages attentive, respectful listening.
5. It develops new appreciation for continuing differences.
6. It increases intellectual agility.
7. It helps students become connected to a topic.
8. It shows respect for students' voices and experiences.
9. It helps students learn the processes and habits of democratic discourse.
10. It affirms students as cocreators of knowledge.
11. It develops the capacity for the clear communication of ideas and meaning.
12. It develops habits of collaborative learning.
13. It increases breadth and makes students more empathic.
14. It helps students develop skills of synthesis and integration.
15. It leads to transformation (Brookfield, 1999, pp. 22–23).

In addition, blogging provides a social learning context for student inquiry. Seeing modeled actions selectively rewarded, depending on whether or not they embody a

certain practice or concept, helps students to identify relevant features and to grasp underlying rules (Rosenthal & Zimmerman, 1978).

Other scholars have examined the use of student blogs and wikis as a pedagogical tool, particularly in science education (O'Donnell, 2011). In a research project examining the effect of accuracy surveys to improve student writing, more than half the students involved stated their work was affected by their knowledge that the sources they interviewed would read their articles (Dodd, Mays, & Tipton, 1997). Smith argued that students take writing more seriously when it is published on the Web, "where it can actually be seen and used" (Smith, 2000, p. 241). When students share their journal writing, they "create their own social support network" (Anson & Beach, 1995, p. 66). Progressive pedagogical techniques, including team writing approaches, modeling assignments, and rewriting techniques, have been prescribed to help students develop better writing attitudes and habits (Kanihan, Neuzil, & Bunton, 2003; Massé, 1999; Olsen, 1987, Riffe & Stacks, 1988; Schierhorn & Endres, 1992; Streckfuss, 1991; Zurek, 1986). Bolter (1990) argued that multimedia represented a different form of narrative than traditional written communication, as "what is unnatural in print becomes natural in the electronic medium and will soon no longer need saying at all, because it can be shown" (p. 143).

Approach

All 120 upper-division students enrolled in upper-division journalism classes were given media texts covering complex science or technology issues to consume out of class. After engaging visual representations like Brand's order of civilization diagram in class discussion, students engaged in verbal discussion about how the content consumed out of class applied at various levels of society. Each student then blogged about the voices represented in stories, the appeals to various levels of society, and the application of principles discussed in class to generate criticism. Students then responded to at least two classmates' blog entries, demonstrating critical analysis of their classmates' posts. After the instructor reviewed the blog activity, the class engaged in a second class discussion in which intellectual or analytical approaches taken by students were presented and critiqued. Through these latter discussions, Millennial students demonstrated a greater degree of critical thinking and analysis than in their initial discussions, invoking competing value systems, cultural contexts, and demonstrating recognitions of differences in ideology. Finally, the students were asked to evaluate the blogging and instructional experience with specific questions added to their course review surveys.

Results

The degree of difference between the initial discussion and the latter discussion in terms of grasp of scientific data, critical analysis, and application of theoretical frameworks to questions was dramatic, both in the amount of support details offered to support positions and the depth of critique offered against competing

positions. In addition, the sophistication of media text evaluation increased as students struggled to reconcile the imprecise claims in media texts with the more precise and tightly defined claims from scientific sources. Therefore, it was determined that RQ1, concerning the engagement of visual representations and blogging activities on comprehension of complex subject matter, could be answered by pointing to demonstrations of increased literacy through the application of abstract frameworks to applied problems and questions.

For RQ2, quotations from the posttest surveys included the following observations:

- Regarding the relationship between blogging and the assigned texts and stories:
  – I enjoyed that blogging experience in class. I think it was our gateway of responding to our discussions in class and what we learned in the text book.
  – … we should have done it more and done less reading.
- Regarding deeper and more critical engagements of texts and concepts:
  – It was frustrating. But looking back on it I appreciate that I was forced to think about and elaborate on topics I usually wouldn't.
  – The blogging topics were good because the specific topics made me think … The blogging assignments were beneficial because they made me look up certain topics.

Discussion and conclusions

Educating Millennials will continue to be a challenge for communication faculty, particularly when it comes to considering complex subject matters like specialty reporting topics. Using blogs in conjunction with visual representations of competing value systems and ideological frameworks, applied to media text analysis, provides faculty with a method for bringing students into closer proximity to critical issues through encouraging peer interaction with one another. One of the defining traits of the Millennial Generation is its proclivity for collaborative deliberation and work. Rather than fighting that tendency because it does not fit into traditional educations structures, faculty can embrace it, helping students to discover more rigorous and trustworthy ways to interact with one another.

The dearth of critical thinking has been a resounding issue regarding Millennial students. Upon closer inspection, that dearth would appear to be less a function of a lack of any literacy with information, but the lack of a particular kind of literacy, specifically, the judgment or critical analysis component of media literacy. Though this article only briefly presented a model for introducing the challenges of covering complex topics like science, technology, and the environment for news media outlets, such models have proven effective in the university classroom.

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