



# Journalists and Communicators' Perceptions of Their Graduate Training in Environmental Reporting: An Application of Knowledge-Based Journalism Principles

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### Specialty section:

This article was submitted to  
Science and Environmental  
Communication,  
a section of the journal  
Frontiers in Environmental Science

**Received:** 15 September 2017

**Accepted:** 15 December 2017

**Published:** 08 January 2018

### Citation:

Takahashi B and Parks P (2018)  
Journalists and Communicators'  
Perceptions of Their Graduate Training  
in Environmental Reporting: An  
Application of Knowledge-Based  
Journalism Principles.  
Front. Environ. Sci. 5:94.  
doi: 10.3389/fenvs.2017.00094

This study explores the educational and post-graduation experiences of graduates of a master's program with a focus on environmental journalism. The study uses the framework of knowledge-based journalism to qualitatively examine how the competencies of journalistic skills, general and content-specific knowledge, learning communication theory, and developing journalistic values allowed graduates to develop a niche in their professional careers. Results show respondents placed disproportionate emphasis on the importance of journalistic skills and were ambivalent about the value of theory courses. The responses suggest scholars' idealistic conception of knowledge-based journalism is problematic when applied to the changing realities of journalism and the media industry in the U.S.

**Keywords:** environmental journalism, knowledge-based journalism, master's program, program evaluation

## INTRODUCTION

The news media environment of the 21st century requires journalism students to master a wide range of skills. Students are expected to demonstrate not only news writing, video editing, podcasting, and social media abilities, but also are pushed to carve their own content niche (Mensing and Ryfe, 2013; Barnes and de Villiers Scheepers, 2017). Future professional journalists can choose from careers in public affairs reporting, sports journalism, environmental journalism, international reporting, and health journalism, among many others. This increasing pressure to simultaneously generalize in skills and specialize in knowledge represents a challenge to journalism schools that have to try to adapt their curricula to follow industry trends (Parks, 2015).

This highly competitive environment is in part the result of a crisis in the business model of media organizations. This crisis has affected the number of traditional reporting jobs, including those in specialized beats such as environmental and science reporting (Pew Research Center, 2016). The rise of social media, the decline of local newspapers, and the uncertainty of viable advertising models within news media are some issues that journalists and journalism students need to consider as they move and develop their professional careers (Franklin, 2014). In addition, trust in news media organizations is shifting along party lines, with Democrats more likely than Republicans to trust information coming from the media (Barthel and Mitchell, 2017). Such contemporary economic and professional pressures have placed greater responsibility on individual journalists to contribute to the production process, not just reporting or photographing or editing or designing or marketing content, but performing all of these tasks for every assignment. Demand for such diversely skilled professionals places a special burden on journalism schools.

At the same time, it represents an opportunity, because journalists who seek to expand their knowledge base and develop new skills and expertise might seek a graduate education. The present moment, therefore, is a particularly fruitful time to investigate the role graduate curricula play in students' professional development, and to evaluate how practitioners reflect on the relative value of their varying graduate experiences.

There is limited research examining specialized journalism graduate programs in the U.S. This study addresses that lack by examining how graduates from an environmental journalism program perceive their training and the ways in which such training has affected their professional careers and their journalistic and communication work. Using the framework of knowledge-based journalism (Patterson, 2013; Donsbach, 2014), this study explores the educational and post-graduation experiences of alumni at a major research university in the Midwest with a focus on environmental journalism. Knowledge-based journalism suggests that to effectively serve poorly informed publics, journalists should be less generalists and more specialists in a particular area by mastering five competencies: knowledge of history and liberal arts, understanding of a particular subject, knowledge about mass communication process, professional skills, and a commitment to professional values and roles. Although there are some theoretical discussions about the applicability of the framework to environmental reporting, there is limited empirical evidence about its associated pedagogical practices, application in newsrooms, or outcomes (e.g., quality reporting and effects on audiences).

The study is based on the qualitative analysis of interviews with 13 graduates, examining the ways in which the knowledge-based journalism dimensions of skills training, acquiring general and content-specific knowledge, learning communication theory, and developing journalistic values allowed graduates to develop a niche in their professional careers.

## Problems and Challenges in the Practice of Environmental Journalism

Past research in environmental journalism has mostly focused on the characteristics (Sachsman et al., 2008, 2010), challenges (Detjen et al., 2000) and practices (Tandoc and Takahashi, 2014a) of reporters. This extant research highlights shortcomings in the reporting, such as lack of accuracy in scientific reporting, bias in the use of sources, struggles in balancing objectivity and advocacy, and the individual and structural factors that affect the reporting (Palen, 1999; Detjen et al., 2000; Sachsman et al., 2005; Crow and Stevens, 2012; Tandoc and Takahashi, 2014b). In addition, environmental and science reporters are experiencing changes in their perceived societal roles, especially within online news production (Fahy and Nisbet, 2011; Tandoc and Takahashi, 2014b). Fahy and Nisbet (2011) suggest that science journalists should take on the roles of knowledge brokers or information curators to differentiate themselves from other information producers (e.g., blog writers, scientists, and public relations professionals). But recent scholarship in journalism suggests that some problems specialty journalists experience are due not only to the volatile news environment in which journalists now work, but also to insufficient educational training. Donsbach (2014); and Nisbet and Fahy (2015) argue that it is imperative to

build stronger foundational knowledge among future journalists during their education, and that this education be realigned with community needs (Mensing, 2010). Next we examine some of the main ways in which scholars suggest journalism education should be reimagined to address the problems identified in extant research.

## Balancing Journalistic Skills and Specialized Knowledge

Journalism curricula are constantly in flux due to the dynamic nature of the media industry, one in which new technologies such as virtual reality, drones, and smartphones are being incessantly developed and implemented. At the same time, prior research in journalism education has examined the challenges faced by journalism schools in developing and teaching specialized content, such as statistics. Carpenter (2009, p. 298) suggests that "To get a job and to work in the industry, one needs skills knowledge, and to evolve with the industry, one needs more theoretical knowledge." However, the particularities of journalists' theoretical knowledge about communication processes and media effects, and the impact of such knowledge on journalism practice, have not been fully examined. Similarly, Russial and Santana (2011) report that not all journalists are expected by employers to master cross-platform skills, but that basic skills, specialization, and adaptive expertise are equally valued. Journalism directors in the U.S. mostly agree that reporting and writing courses are essential and that a focus on visual communication is more important than ever, but they otherwise vary widely in their opinions about what courses should be part of a core journalism program (Blom and Davenport, 2012). There is also evidence that journalism students should learn mass communication theoretical knowledge if they want to evolve with the industry (Carpenter, 2009). Du and Thornburg (2011) reported that despite an agreement between online journalists and online journalism instructors about the importance of core skills (e.g., writing and grammar), there seems to be discord over the relative value of other competencies (e.g., multitasking, mass communication theory, interpersonal skills, etc.). As a response to rapid technological changes, some scholars (e.g., Doherty, 2012) have even argued that journalists need to learn computer science skills to regain control over their work.

The centrality of statistics and mathematical skills in journalism education are also a matter of controversy. Despite recognition by journalism faculty and administrators of the importance of statistics for journalists, few programs emphasize this competency in their curricula (Dunwoody and Griffin, 2013; Griffin and Dunwoody, 2016). Many journalism students believe a journalism career will free them of math or statistics. Once they graduate and start working in media organizations, however, they might realize that math, statistics, and data are an integral part of their work. Their low self-efficacy when it comes to numeracy might prevent them from using a broader range of sources or analytical tools in their reporting. To prevent this lapse, there are several arguments for incorporating statistical reasoning and data analytic skills—which are not the same as math—throughout the curriculum (Lacy and Fico, 1994; Curtin and Maier, 2001; Dunwoody and Griffin, 2013; Griffin and Dunwoody, 2016; Hewett, 2016; Nguyen and Lugo-Ocando,

2016; Splendore et al., 2016; Tabary et al., 2016). Curtin and Maier (2001) argue that journalism schools not only have to ensure that students master AP style, but also should increase students' self-efficacy in math. However, Cusatis and Martin-Kratzer (2010) report, based on a 2008 survey of chairs of journalism schools, that few journalism programs in the U.S. offered a math course for journalism students, and that math requirements were satisfied with minimal credit hours through general education requirements. The majority of journalism chairs (70.2%) rated their students' math skills as either poor or fair. In this respect, Lacy and Fico (1994) had previously suggested ways in which statistics could be incorporated in the curriculum of master's programs. They proposed that students take a survey course in quantitative methods, a course in which a quantitative research project is designed and conducted, and a readings course about quantitative research in a specific field. Many MA journalism programs incorporate such courses, but the practicality of those courses is unclear. The importance of statistical reasoning is particularly important in the realms of science and environmental journalism, where much of the reporting relies on sorting through academic publications filled with complex statistical analyses (Dunwoody and Griffin, 2013).

Scholars such as de Burgh (2003) and King (2008) also argue that news gathering and presentation skills alone are not enough to prepare well-rounded journalists, and that journalism education should be approached similarly to education in the social sciences or the humanities. Specifically, de Burgh (2003, p. 105) argues:

Journalism has—potentially at least—a great advantage over many other humanities and social science subjects in that it can provide unrivaled opportunities for the learning of skills with an immediate close relationship to the theory. It is the very combination of the reflexive practical and the applied theoretical which makes journalism such a terrific subject—and an academic discipline with great potential.

Finally, some scholars suggest that journalism education should opt for a teaching hospital or experiential learning model (Mensing and Ryfe, 2013; Parks, 2015). This allows students to learn journalistic skills, while at the same time serving a community and developing a professional portfolio. In the realm of environmental journalism, this experiential model has also been developed (Freedman and Poulson, 2015), but no formal evaluation of the outcomes post-graduation has been conducted. The challenge for experiential journalism education models is to balance “real world” learning with the theoretical and academic background that scholars such as Donsbach (2014) and Patterson (2013) insist is essential (Parks, 2015).

While arguments for broad and deep academic training for journalists have recently resurfaced in research (e.g., Patterson, 2013; Donsbach, 2014; Nisbet and Fahy, 2015), journalism educators have emphasized the importance of a broad knowledge base since at least the early twentieth century. Bleyer (1932) articulated 13 requirements for successful reporting, including both general and specialized knowledge: “Many of the blunders that find their way into newspapers, and many unfortunate experiences of reporters, result from a lack of knowledge” (p. 60). Bleyer pointed explicitly to the value of “some knowledge

of the basic sciences” (p. 59) for reporting on scientific advances, and foreshadowed Donsbach's call for understanding of communication theory when he argued that “A knowledge of both individual psychology and social psychology is essential to an understanding of many questions in economics, government, and politics” (p. 60). Similarly, a textbook introduction by H.F. Harrington of Northwestern's Medill School of Journalism asserted, “Unless a reporter is acquainted with the accumulated facts of science, social psychology, economics, politics and government, English and American literature, he cannot render the service expected of him on a progressive newspaper” (Warren, 1929, p. x).

The decades-old challenge behind realizing such goals for journalism students has been two-fold: First, conceiving its implementation across the curricula; and second, the need for institutional support, not only within academia, but also across the industry and the institutions that support quality journalism. One initiative that attempts to close these gaps is called knowledge-based journalism.

## The Case for Knowledge-Based Approaches to Environmental Journalism

Donsbach (2014) and Patterson (2013) have advocated for the adoption of knowledge-based journalism as a solution for the shortcomings of journalism. This concept proposes that journalists should function less like generalists and more like doctors, lawyers, or other highly trained professionals. Undergoing such training would increase the quality of reporting, sourcing, and news judgment. In addition, these scholars argue that rigorous intellectual training would preserve journalistic standards amid an overabundance of non-professionalized information available online. Specifically, they propose five sets of competencies that journalists should embrace: (1) a knowledge of history and the intellectual context in which news events occur, (2) an educated understanding of the particular subjects they cover, (3) process knowledge about the social-psychological factors governing news decisions and the communication process, (4) professional skills in writing, interviewing, and fact gathering, and (5) commitment to professional values and roles.

The contemporary conceptualization of knowledge-based journalism originated from a joint Carnegie-Knight Foundation initiative that examined the future of journalism education. This initiative, which started in 2005, concluded that journalism education was not providing answers to the crisis of confidence in journalism. Part of this initiative included 11 journalism programs across the country that reformed their curriculum to address this crisis (A Report on the Carnegie-Knight Initiative on the Future of Journalism Education, 2011). However, besides simple self-assessments of those curriculum changes, little evidence is available that highlights the benefits of approaching journalism education from the knowledge-based perspective outlined by Patterson and Donsbach.

Donsbach (2014) explains certain ways in which journalism programs could implement the principles of knowledge-based journalism. Among these, he suggests that journalism students

can pursue a master's degree in a different discipline to improve their expertise in a given subject (e.g., environmental science, political science, etc.). Similarly, he suggests that non-journalism graduates can pursue a master's degree in journalism. However, Schultz (2002) reported limited differences in role conceptions and audience perceptions between journalists in the U.S. with graduate degrees and those with only bachelor's degrees, although the former were more likely to embrace an interpretative role. Nevertheless, this finding offers some support that knowledge-based journalism as measured by degree attainment produces more authoritative and/or pedagogically inclined journalists. But it remains unclear to what extent the experiences of journalists with higher-level degrees encompass the tenets of knowledge-based journalism or whether such choices help improve the quality of specialized reporting, such as environmental or science journalism. For instance, within the realm of science and environmental journalism, Nisbet and Fahy (2015) argue that knowledge-based journalism could prevent the politicization of scientific issues by the media. However, similarly to Donsbach and Patterson, no empirical evidence or clear set of pedagogical recommendations is presented.

Despite the perceived importance of specialized skills, and the promises of approaches such as knowledge-based journalism, there is some skepticism about them. Claussen (2015) argues that Patterson is overly optimistic about the potential outcomes of a cafeteria-style journalism curriculum (e.g., offering courses in science, social science, humanities, business, etc.). He argues that both professors and students are probably not prepared or interested in knowledge-based journalism and that news executives would resist due to perceptions that specialty reporters are biased or that specialized audiences are small and expert reporters will be unable to move between beats. Stempel (2014) and Hayden (2014) criticized knowledge-based journalism for its inaccurate and incomplete notion of journalism education, arguing that most of what Patterson proposes is already part of many journalism programs. Similarly, Dimitrova (2017) asked whether the proposal made any sense for news organizations struggling to keep afloat under trying financial conditions.

Beyond all these discussions, specialized master's programs have not been examined in detail as a platform for some kind of knowledge-based journalism education. The existing literature either examines general journalism education (e.g., Carpenter, 2009), or explores the performance of journalists based on their area of expertise. For instance, some evidence shows that specialized environmental reporters cover environmental groups in a more positive light than other beat reporters, and that overall differences in the tone and portrayal of conflicts exist between reporters beats (McCluskey, 2008). Although this research does not clearly examine differences in regards to quality between generalists and specialists, some studies suggest that years on the job and number of stories on a topic are positively associated with diversity of sources and viewpoints (Takahashi et al., 2017). However, due to industry trends toward eliminating specialized reporting positions, generalist reporters most often cover environmental topics (Crow and Stevens, 2012). Evidence supporting the value of specialized reporting could validate educational proposals such as knowledge-based journalism.

Environmental journalism programs are rare around the U.S. and the rest of the world (see, Parratt Fernández, 2014 for an example of environmental journalism in Spain), with most of the instruction in this area being restricted to individual courses. Programs that do offer a structured environmental reporting curriculum appear to follow some of the general principles of knowledge-based journalism, providing an opportunity to evaluate whether that type of education model has the desirable outcomes proclaimed by its proponents. However, few studies have exclusively focused on the ways in which future environmental journalists are currently trained, and how such training influences the professional paths they follow.

In this study we examine a graduate program with a specialization in environmental journalism. The program seeks to train students in both skills and content knowledge:

Our focus is to improve your ability to produce fair, balanced and accurate news stories about the environment. You'll learn diverse journalism skills that are increasingly important in a competitive environment. And you have the opportunity to more deeply learn about environmental issues in a context that helps you ask better questions and more deeply understand the stories you produce.

Based on the above discussion, this study seeks to answer the following research question: In what ways and to what extent did a graduate education in environmental journalism impact the professional development of graduates?

## METHODS

### Data Collection

This study is based on a qualitative thematic analysis of interview transcripts. Interviews with graduates from the master's program with a specialization in environmental journalism offered at a Midwestern research university in the U.S. were conducted by the authors. The 30-credit program allows students to select between a research (thesis) and a professional (professional project or internship) track. Regardless, both tracks require a class on communication theory (this class covers journalism and mass communication theories such as gatekeeping, agenda setting, and framing) and classes in research methods. This type of program is common among research universities; on the other hand, professional programs only cater to working journalists and can vary in length (e.g., 1-year program) and level of specialization. With this in mind, we are cautious in generalizing to all Master's in journalism programs or even those at research universities, but the exploratory study does highlight some areas for more extensive research, such as tensions in research-centered programs between the more theoretical and more practical aspects of the curriculum.

A sampling frame was created using records of graduates. Students in the program have to complete a 9-credit specialization that includes courses in environmental and science journalism, environmental science and policy, or other specialized courses in the area approved by the student's advisor. We followed a purposive sampling approach, which was guided by the selection of individuals who followed a career in

environmental journalism and communication. The alumni list included this information, and an online search was conducted for all individuals to verify and update the information. Once the sampling list was updated, 65 individuals who met the sampling criterion were retained. This sampling list included graduates from 2004 to 2014.

Potential participants were contacted on up to three occasions via email. This procedure resulted in 13 individuals agreeing to participate in the study, a response rate of 20%. Interviews were conducted via telephone and generally lasted about 30–45 min, with some lasting an hour. All interviews were recorded with the participants' consent. The interviews followed a semi-structured procedure and were guided by a script based on the five competencies of knowledge-based journalism outlined by Donsbach. The focus was on their professional careers and educational experiences. Some sample questions include the following:

- What specific subject courses in environmental science/studies or other specialized area did you take?
- Did you learn about mass communication theory? How useful do you find that knowledge in your current work?
- Tell me about your transition from college to your first professional journalism job. What were your responsibilities? What specific skills that you learned in college did you apply (e.g., newswriting, interviewing, video)? What are things you did not know that you had to learn on the job?

## Analysis

Interviews were analyzed thematically using the five principles outlined by Donsbach. However, the analysis also allowed for an inductive process that allowed additional themes to emerge from the data. The coding was conducted by the two authors independently using notations in a word processing software and then codes were compared and discussed. Coded text was then grouped in various categories following an axial coding approach. Each coder identified multiple codes that were aggregated under one of the competencies; these codes reflected responses elicited by interview questions that probed respondents' views regarding each competency as manifested in their graduate program and professional experience. In addition, coding coalesced around four emergent themes that were raised by multiple respondents and identified as significant in discussion by both authors: thoroughness, interpersonal skills, adaptability, and professional/academic tension. The thematic analysis reached saturation through substantial overlap with minimal variation in respondents' reported perceptions of how the five competencies were presented in their graduate program and applied in post-graduate practice. Since no new codes appeared to emerge from each additional interviewee by the end of the sample, the authors deemed the number of interviews sufficient to draw conclusions.

## RESULTS

The results are presented following the five competencies of knowledge-based journalism proposed by Patterson and Donsbach: journalistic skills, general knowledge, content-specific knowledge, understanding of communication theory,

and development of journalistic values. Expression of these competencies was mostly consistent across respondents, with some variation based on respondents' background and experience prior to their time in the graduate program. Among the five competencies, journalistic skills clearly emerged as the most important for respondents. Subject knowledge and communication theory—arguably the most “knowledge”-focused components of Donsbach's model—emerged only when prompted by the interviewers. In addition to the competencies, four additional themes emerged from the data. *Thoroughness* in the reporting of science-based issues, *interpersonal skills* for professional development, and *adaptability* to a changing media and work environments were discussed by respondents as key competencies that are needed in today's environmental journalist's toolbox. Finally, *academic vs. professional tension* in students' perspective about program requirements was identified as an emergent theme.

## General Competence

Journalism students and professional journalists are expected to have a broad and intellectual perspective that can guide their journalistic practices and decision-making. This includes the ability to apply critical thinking to the evaluation of news sources, information, and intentions of people. This by definition implies an understanding of policy and historical contexts in the reporting of environmental and science issues. This theme was discussed by the respondents in passing, as discussed here: “If you read a study and then you are writing a story about it, you want to make sure you pull the right numbers and really know what they mean.” One alumnus suggested that the content of a history course played little role in day-to-day practice, but that the ethical issues raised by historical cases had “been very helpful, and I think necessary for anybody going into the field.” Another respondent wished more time had been spent discussing how to engage with diverse communities, suggesting dissatisfaction with the amount of exposure to broad social contexts for reporting. Given the vast range of circumstances emerging journalists find themselves in, settling on a canon of generalized knowledge that will prepare diverse graduates for all possible contexts could be a daunting task for graduate journalism programs.

## Subject Competence

Specialized journalism programs distinguish themselves from traditional programs in part by their focus on topical content. Environmental and science journalism are particularly complex due to the nature of scientific efforts and the transversal nature of environmental affairs. Respondents were somewhat divided in their responses about their experience with subject courses and their applicability to their journalistic or communication work. Graduates varied in their course selection and interest, mostly as a result of their disciplinary backgrounds during their undergraduate studies. Respondents came from various undergraduate programs prior to the graduate degree, including journalism, history, biology, English, and environmental science. Overall, there was limited in-class learning of environmental content, with most content knowledge acquired later on the job. For a couple of respondents, learning about environmental and science issues happened in environmental journalism classes, but

for others it happened in specialized classes in disciplines such as geography or environmental science: “I remember at least one or two courses in environmental science and public policy that were incredibly helpful.” This specialized knowledge gained in the graduate program was important for respondents who used it in the journalistic work they did professionally, which is linked to professional opportunities: “[B]ecause I had that knowledge base, I think people looked to me as one of the different—kind of stood out and more from some of the other members at [my environmental magazine] ... So often times, that was to my advantage.”

Less than half of the respondents discussed the need to understand the scientific process and the academic publication process. Although this may seem distinct from subject knowledge (e.g., understanding the feedback loops that exacerbate the process of global warming), such process knowledge is specifically useful in science and environmental journalism. For example, understanding the peer review process and distinguishing journals based on quality were mentioned. A couple of respondents explicitly valued the ability to interpret scientific studies. Although no respondent specifically recalled a course that taught them how to do so, some of their journalism courses, especially those in environmental journalism, required them to read scientific studies, which eventually led to a better understanding of how those articles are constructed. While almost half of the respondents expressed satisfaction with the science content they acquired in the environmental reporting classes, others wished they had received more science content instruction, a limitation they attribute to curriculum requirements:

I didn't get a lot of training in my master's degree in looking at published peer reviewed scientific research and how to dissect that. I feel like I took a lot of initiative on my own to learn how to properly engage science and talk to scientists. I feel like that was something that the [program] could really benefit from. For anybody who wants to be environmental reporter, it's just part of every story you write.

## Journalistic Skills

The overall main theme discussed by respondents was skills knowledge, especially in the context of real-life experience. When asked about the most important thing they learned during their graduate program, more than half of the respondents highlighted specific skills such as interviewing, reporting, writing, video editing, social media management, photography, and multimedia work, among others. Writing skills were the most discussed. Journalistic writing was also highlighted by respondents in positions to hire journalism students as the most desirable skill that new graduates should have: “I definitely would say the most valuable thing I learned was how to write well...” For three interviewees, journalistic writing is the most important skill that can later lead to better positions: “That is something that helped me get in the door and then helped me get to the next level because I knew how to pitch a story.”

The focus on skills varied slightly based on the background of the respondents, who entered the program with a diversity of

experience and needs. This created some issues for students who felt overqualified for certain required skills courses:

We were also forced to take remedial journalism classes. I think a lot of people in the program were from like an English major background, or professional writing and that sort of thing, and so my cohort I think was kind of unfortunate in the fact that we had to take a lot of very basic journalism classes.

Graduates valued skills learning in the context of experiential learning, particularly working for the in-house environmental reporting magazine, and later for its website. Three respondents in this context also mentioned study abroad programs. This theme was largely related to opportunities to learn hands-on journalistic skills, such as news writing, video, and audio editing, multimedia reporting, etc.: “...I only received them (skills) because I was working on the magazine as part of my graduate assistantship.” Also: “Without a doubt—the [practical] publication was not only what I remember most but what prepared me the most professionally”.

The preferred learning model by almost all respondents followed an apprenticeship model, not unlike those in other professions such as medicine:

It's almost like apprenticeship really, leaning from people that know more than you and just having practical experience of continuously leaning and trying and failing and getting better. ... I felt that the majority of my experience came from working with writers that I respected outside of my curriculum.

These findings are likely to reinforce graduate programs' emphasis on practical, experiential activities such as in-house publications, supported internships, etc. But they also raise questions and trade-offs regarding the more academic and intellectual aspects of knowledge-based journalism, such as the theory competency described below.

## Mass Communication Knowledge

The fourth competency described by Donsbach is knowledge about communication processes, such as the effects of media consumption on risk perceptions. More than half of the respondents expressed their lack of interest in communication theory and methods, highlighting that they failed to see the link between such concepts and the practice of journalism that they were interested in: “The harshest way I can put it is that some of the academic and theoretical courses felt a bit like jumping through hoops, because that's just what needed to be done to give the degree and to be there to take advantage of those hands-on experiences.”

Despite this sort of frustration with the mass communication and theoretical content, four respondents discussed the importance of understanding an audience, the frames that can influence those audiences, and other topics directly related to the mass communication literature that was criticized. These discussions were mostly expressed without connecting theory and practice. For example, a respondent mentioned the importance of emotional vs. rational appeals in their communication to donors, but didn't make the connection with research in communication that explains such processes or

the master's coursework that explored them. In addition, more than half of the respondents expressed difficulty in applying theoretical ideas in their day-to-day practices due to the high pace of the work:

I don't have time to think about those kind of things. It's ... just a fast-moving business and I mean, I certainly try to maintain ethics and all that, but in terms of actually looking at it through a communications theory or framework or a paradigm or whatever the right word is, I can't say I do that consciously, professionally.

Only two respondents explicitly recognized the value of mass communication knowledge. One said:

But like learning about qualitative analysis and quantitative analysis kind of blew my mind. I was like, "Wow, we can measure this stuff? That is so cool." And I think ever since then I've always been, kind of like what you [the researchers] are doing, interested in evaluating. Like okay, if you are going to try this, what are the metrics? How can we measure it? What's the significance of that? So I think that is one that stuck out for me.

A related topic that has been discussed in the journalism education literature and that fits within the tenets of knowledge-based journalism is statistics. Similar to the preceding discussion about theory, the discussions about statistics revealed that graduates attached limited value to its use in their journalism or communication jobs. This respondent illustrates this problem: "From a personal standpoint it (statistics) does (interest me)... but professionally it really doesn't. I don't have time to think about those kind of things".

Four interviewees recognized the importance of statistics, not as a specific skill that they use in their work, but as a way to recognize the appropriateness of statistical information that comes across their desk:

I think statistics are useful especially when judging claims... I really don't do any complex manipulations now and haven't for years. So, I don't really have a practical application for that knowledge other than looking at something and giving a general idea whether I should or shouldn't believe it.

I can read something in the newspaper, like a website or something, and I feel like I'm a bit more prepared to interpret that, and to try to fully understand it because I was able to take those classes.

Respondents' lack of interest in or time for theoretical concerns, even as they acknowledge the practical implications of understanding audiences and communication strategies, suggests a need to reconsider how graduate programs approach such subjects in their curriculum. For journalism and communication practitioners, a clearer line between practical problems and theoretical tools might make this competency more meaningful.

## Professional Values

The final competency of knowledge-based journalism is professional values. Ethics was discussed only in passing by most respondents, but all agreed that the courses taken solidified

their commitment to strict ethical journalistic rules. In addition, one respondent mentioned the need for training in dealing and engaging with communities.

The main professional value discussed by respondents was objectivity. In the context of environmental reporting, the theme of advocacy vs. objective reporting has historically emerged as a contentious issue (Palen, 1999). Respondents addressed the tension between objectivity in journalism and advocacy for environmental protection, as well as the individual tensions for those who now work for advocacy organizations. Interestingly, respondents mostly agreed on the importance of objectivity even when they were writing for environmental organizations, and said their graduate program provided an effective training in understanding journalistic roles. More than half of the respondents agreed that one must subordinate one's environmentalism to one's journalism, even at an environmental organization:

Yeah, I think I see myself as an environmentalist. I would see myself as a journalist first and then an environmentalist, but with my current job that all has so much switch because of the nature of the work. And because it is an environmental organization and not a journalistic organization, yeah.

For three interviewees, journalistic advocacy was acceptable if the reporter is well informed, accurate and fair—although even advocacy supporters' language tended to revert to traditional values:

I think it's a natural thing for somebody to be reporting on an issue for a long time to have a stance on that issue. They are obviously well versed in issue, so I think it's a little unreasonable to assume that that person won't have some sort of stance, but I think what I try to do even at [an environmental non-profit] still value those journalistic—those journalistic values in terms of—you now this needs to be factually accurate. We need to have both sides of the story. And we just need to present the data and the information in the most honest way that we can.

One respondent, however, was more willing to stray from journalistic orthodoxy to defend a pro-science perspective:

I think it's more important to represent an accurate reflection of a scientific debate than to present both sides. I think that it's intellectually lazy to find someone that says yes and someone who says no, one that doesn't reflect the current state of scientific knowledge.

Given journalists' complicity in proliferating political debate over the reality of climate change long after scientific consensus had formed (Boykoff and Boykoff, 2007), one could argue that an unreflexive indoctrination to certain journalistic norms might inhibit critical thinking skills necessary for environmental journalists in particular to navigate the contemporary propaganda-filled, "post-truth" media environment.

## Emergent Values

In addition to the five competencies, four additional themes emerged from the data.

## Thoroughness

The idea behind thoroughness is that of critically assessing a reporting situation, making sure you don't miss anything, and focusing on the right material, as explicated by one respondent:

[I]f you want to be accurate, you've got to consider everything. Consider all the factors and looking at something with—through an open eye and not just saying, “Okay, here's one piece of information.” ... [A]nd just gathering as much information as you can on something to get a whole picture of what is in front of you.

Although this concept should be expected from all professional journalists and communicators, the data suggest that thoroughness is particularly relevant in the context of environmental and science reporting due to the complexity of the topics under examination. In addition, this theme emerged not only in the discussion about scientific facts, but also when discussing ethical consideration and statistical reasoning.

## Adaptability

This concept relates to the changing nature of the profession and job opportunities for graduates, which are not only within news media but include positions in public relations, fundraising and strategic communications:

You need to be adaptive, you need to be open to doing new things, you need to be open to writing about new subjects, because that is what it means to be a journalist in this day and age. And I think that is something that really stuck with me, and I tried not to put myself inside of a box and say, “These are my skills, these are the only things I can do.” But what else can I learn; how else can I continue growing?

More specifically:

I do see a pretty natural fit for environmental journalists to work in the non-profit sector, to work for organizations or foundations that are trying to advance scientific study, because the journalism gives them really quality writing that can bring a topic into a larger market, a large audience. And the role of the communicator is very similar to what we are attempting to do as journalists with our communities as a whole.

This theme is also expressed in respondents' assessment of the gaps in the master's program, which included the need for training in teamwork, non-profit communication, and the business aspect of journalism: “Maybe just working more in teams in some of those classes would have been beneficial to learn some of those skills I picked up just on the job”.

Curriculum changes in public universities can take a long time to implement due to the bureaucratic structure of the institutions. Those changes usually cannot match the fast-paced changes in professions such as journalism (Parks, 2015). The job prospects in news organizations for journalism students have shrunk, but at the same time have expanded in other areas such as strategic communication, political communication, fundraising, and technical writing. Some respondents said their master's program lacked courses and preparation in those new areas: “[W]hen I started here I didn't know much about how

non-profits work, which I've heard others ... [say] that maybe that should be a focus a little more on non-profit news or just non-profits generally”.

Graduates had to gain such know-how outside the program: “I kind of had to teach myself on the fly about donor communications, and also I learned a lot on the fly ... about fundraising and the process that is usually behind that... So, a lot of that was informal training.”

## Interpersonal Skills

The assumption is that going to a reputable journalism school, more specifically a specialized program, puts you in contact with people in positions to hire for journalism jobs. Although this theme falls outside the realms of knowledge-based journalism as defined by Donsbach, it fits with the concept of basic skills, in this case, *interpersonal skills*. *Interpersonal skills* also include the concept of *networking*, which is about meeting people who know things, so it allows prospective journalists to build a base of expert sources, which is compatible with subject knowledge in some ways. One respondent articulated this theme:

There is kind of like intangible sort of like networking component that I think my time at the [program] really set me up for success. I was able to meet so many great people, not only the faculty and staff in the journalism department, of course. But the beyond that like the greater community in [the state], in [the region], in the country, and in the world. By going to conferences and just doing each day learning in the classroom, meeting new people. That kind of thing you just grow your network.

Interviewees were asked about how well prepared they felt after they graduated and started or continued with their professional careers. The majority of them stated that the transition was seamless, with many stating that their internships had led to full-time positions. A follow up question focused on the need for additional training post-graduation in order for them to fulfill the requirements of their positions. Within this theme, some respondents said they did not get sufficient training in the logistics of interacting with employers and employees in a news organization, including handling expense reports, working with editors, and paying freelancers: “. . . those kinds of things that are part of having your first job. . .” Finally, most respondents stated that they have received little post-graduation training, and that what they have learned about environmental journalism has been mostly on the job.

## Academic vs. Professional Interests

Many master's programs, including the one we examined, provide both academic and professional tracks. Although each track has a unique set of requirements, they overlap with some common courses. Among respondents, this distinction was not always clear, and the overlap was perceived as a problem that created tension between and among students and faculty. The resistance of practically minded students to more academically oriented classes might help explain their overall frustration with the theory courses and lack of interest in the communication knowledge competence within knowledge-based journalism:

I was not super happy with sort of the qualitative and quantitative research that was a part of the master's degree. Myself and several others in the program felt like it was not getting us the real world skills that we needed in terms of landing jobs. It was really geared more toward ... people who are looking to get a Ph.D.

On the other hand, one respondent regretted not learning more about the academic track and what it meant:

Looking back again from 10 years on I can see that ... maybe should have thought more about an academic track, and maybe looking into more not just reading the academic studies but learning—learning how to actually undertake one. So, that would have been interesting to have the opportunity of that.

## DISCUSSION

This paper presented an examination of the experiences of recent graduates of a specialized master's program in environmental journalism. The study assessed graduates' experiences by applying the principles of knowledge-based journalism. We designed this study under the proposition that a highly specialized master's program in environmental journalism addresses all of the main competencies of knowledge-based journalism, with the potential to produce holistically trained specialists who can explain complex scientific issues to information-starved publics. Scholars such as Nisbet and Fahy (2015) have argued that science reporting that follows the principles of knowledge-based journalism is essential in a polluted and partisan science communication environment. However, outside of a report (*A Report on the Carnegie-Knight Initiative on the Future of Journalism Education*, 2011), there are no scholarly efforts that examine the application, outputs, or outcomes of this type of journalistic training.

The main premise of knowledge-based journalism is that balancing five competencies spanning skills, expertise, and values will result in better prepared and rounded journalists who will go on to produce higher quality journalistic products. One respondent articulated the ideal outcome of a specialized graduate program that fits such competencies, although it assumes that students arrive to the program with journalism skills already in place:

[I]f I were an editor looking for an environmental journalist who came out of a program like that, I would expect there to be some solid science knowledge, ability to navigate a journal, a good backing in statistics ... I would want someone that had knowledge in the areas of my region.... And an ability ... to communicate with those sources, so a good scientific language I guess.

But this study's findings suggest that graduate programs face an uphill battle in delivering these competencies in ways that are universally effective or meaningful to student cohorts representing a broad range of backgrounds and aspirations. Most of our respondents came across as very committed to the more traditional aspects of journalism education—that

is, newsgathering and presenting skills and values—and tentative about the knowledge-based specifics such as content knowledge and mass communication theory that Donsbach and Patterson have argued for. The disproportionate emphasis on skills training and experiential learning among these graduates suggests an incongruity between the changing reality of journalism and the media industry in the U.S., now driven mostly by quick technological changes and economic disruption, and the idealistic conception of the journalism profession as discussed by Patterson and Donsbach. It is easier to conceive of a journalist who draws on current theory and broad contextual knowledge than it is to produce one in a media environment demanding near-instantaneous reactions to sources, competitors, editors, and audiences across multiple digital platforms. One challenge for graduate programs is to build enough flexibility into curricula, requirements, and experiential opportunities to respond to changing field conditions in time to adequately prepare incoming students for the unexpected.

Many students in the program presently studied did not come from undergraduate journalism backgrounds, which might explain the overall consensus that learning basic journalistic skills, particularly writing skills, was the most important part of these respondents' graduate program. However, there was considerable disagreement in regard to other knowledge domains, particularly concerning mass communication knowledge and subject knowledge. For example, subject knowledge is something that a few graduates believe is learned on the job by reporting on the topics, which is consistent with previous research that highlights the socialization and professionalization processes in journalism (Mensing, 2010). However, past research suggests that the quality of environmental reporting can decrease when reporters lack "specialized education or training in science and do not cover these topics with the frequency that would allow them familiarity and expertise in science reporting" (Crow p. 45). Establishing the proper threshold of content-specific knowledge, and distributing it properly among students with varying baseline knowledge, is another substantial challenge for specialized graduate journalism programs.

An important issue we identified in these interviews is the disconnect that students perceive between courses that focus on mass communication research and the applicability of that knowledge to the journalistic work they are interested in pursuing. It would appear that the program, to the extent that it is attempting a holistic knowledge-based approach, has not succeeded in communicating the value of such an approach to its students. Because this program, like many other journalism programs and those commonly found in engineering, nursing, or law, follows an apprenticeship model (Freedman and Poulson, 2015) focused on experiential training, fitting abstract and esoteric theories and models becomes a challenge. The disconnect is important considering that not only Donsbach, but others such as Carpenter (2009) call for more emphasis on theory knowledge in journalism instruction.

Future research (e.g., content analysis of journalism syllabi) could examine the content of graduate programs' theory

classes to try to determine existing teaching practices and the best approaches to make such content relevant to students. An additional challenge is to determine what theoretical content should be taught to these students, especially to those planning a professional career in journalism. Should this include only journalism and mass communication theory (e.g., agenda setting, framing, gatekeeping, etc.) or should other social scientific approaches also be explored? The results of this study do not reveal the specific theoretical knowledge that graduates find useful in their work. But the current political and media environment might provide an opening for graduate programs to emphasize understanding of communication effects and broader social research as essential to contemporary journalism practice, as earnest reporters increasingly compete for the public's attention with diversionary propaganda and intentionally false reports.

This study is not exempt of limitations. First, we examined a single program, so the results cannot be fully generalizable to other programs. Despite the evidence presented, it is difficult to isolate the effects of the academic training on alumni's professional careers. Many additional factors can impact their career choices, such as personal circumstances or the state of the industry. Nevertheless, there might be enough baseline commonality among U.S. environmental and science journalism programs and their alumni that these results can be instructive for evaluating any such program in connection with knowledge-based journalism concepts. Further research should expand the research design of this study into similar programs. Second, our sample consisted of graduates working in environmental fields, which included news media, communication, and advocacy organizations. Our sample size did not allow for a nuanced comparison between those doing journalism and those working in other communication fields. However, one of the more compelling findings is that the concept of objectivity so suffused their mostly skills-based journalistic education that they carry it with them even when they are working as advocates.

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- Although some principles of knowledge-based journalism education can be found in existing graduate programs, many efforts are likely driven by individual faculty members who determine how to blend theory and practice within established curricula. An analysis of a larger number of programs would be needed to determine the extent to which these principles are being taught and the extent to which graduates leave the programs with a toolkit that enables them to become not only better reporters but also leaders in their area of reporting. Future research could examine the application of knowledge-based journalism in the programs that were part of the original Carnegie-Knight Initiative and compare them to programs outside the initiative. More importantly, future research should examine the content produced by these journalists trained in knowledge-based journalism to determine the relative quality of such work. Finally, we believe that despite the somewhat conflicting findings reported in this study, a continued focus and investment in specialized reporting that goes beyond training in the latest technologies and skills will contribute to quality journalism that will be recognized and appreciated by audiences, as one of the respondents articulated:
- You have to build your own audience, you have to build your own interest in the topic, you have to build your own beat from the very beginning. ... And I think that a program like Environmental Journalism uniquely qualifies you first, then prepares you for something like that ... I think specializing in a certain type of journalism is exactly what journalists will need in the future.

## AUTHOR CONTRIBUTIONS

BT developed the research idea and design as part of a Lilly Teaching Fellowship at Michigan State University. Both BT and PP conducted the interviews and qualitative analysis, and co-wrote the manuscript. A previous version of this paper was awarded the Top Faculty paper by the Scholastic Journalism Division at the 2017 AEJMC conference.

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