

Seeing Through the User's Eyes: The Role of Journalists' Audience Perceptions in Their Use of Technology

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Abstract

Drawing on the concept of audience construction, this study offers an empirical test of the argument by Boczkowski that journalists' perceptions of their audience influence their implementation of new technologies. It uses a national survey of U.S. newspaper journalists to determine whether their perceptions of audiences' use of and demand for video, social media, and mobile-oriented design predict their own public-facing use of those technologies. Findings indicate that journalists' perceptions of audience demand, but not audience technological use and access, are significantly associated with news organizations' increased technology use, suggesting that journalists view their audiences more as market-oriented technological consumers than as dynamic users.

Keywords

audience perception, technology adoption, audience construction, news audience

The story of professional journalism over the past two decades is often viewed as one of the sweeping transformation at the hands of changing technologies. Yet outside of a cluster of large, well-funded news organizations—and often even within

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them—online interactivity is limited, and journalists remain reluctant to use technology in ways that are truly participatory or disruptive of their long-held practices (MacGregor, 2013). Instead, as Ryfe (2012, p. 3) notes, journalists across the profession are largely packaging news the same way they have for decades and publishing that news to websites that still look uncomfortably like the preweb, analog products on which they are based. Scholars have explained this gap between technological promise and practice partly through the rigid and routine-bound culture of professional journalism (e.g., Lewis, 2012; Ryfe, 2012). Financial considerations have also played a role, as increasing corporate ownership and economic uncertainty have led news organizations to take an economic approach to technological adoption, one that leads to imitation rather than innovation (Boczkowski, 2010; Lowrey & Woo, 2010).

This article delves more deeply into a possible explanation that has gone largely unexplored: the role of journalists' perceptions of their audiences in encouraging or inhibiting technological adoption and innovation. Media producers construct audiences as sets of consumers, then tailor their products toward their perceptions of those audiences' preferences (Ettema & Whitney, 1994; Turow, 2005). Despite their resistance to the influence of the audience, journalists are no exception to this practice, embedding tacit knowledge of the audience into their conceptions of newsworthiness (DeWerth-Pallmeyer, 1997) and, more recently, balancing professional news judgment with the quantified collected preferences of audiences through online metrics (Anderson, 2011; Tandoc, 2014).

Boczkowski (2004) proposes a similar process regarding technology in journalism. Journalists, he argues, perceive the audience as a set of either technologically savvy or unsavvy users as one of the core elements that determine professional journalists' use of digital technology. In the decade plus since his seminal book was published, however, that factor has been the subject of little scholarship or empirical testing. Through a nationally representative survey of U.S. newspaper journalists, this study attempts to test the idea that journalists' view of their audience's technological uses and demands influence their adoption of those technologies, shedding light on a potentially important factor in explaining why journalists use—or don't use—particular technologies in presenting their work to the public. Its findings suggest that journalists' technological adoption is influenced by a construction of the audience as market-oriented consumers demanding particular technological products from them.

Literature Review

Audience construction. The audiences whom media producers perceive are not pre-existent givens but are instead in many ways their own constructions. As Schudson (2011) argues, "The news media do not find and respond to an existing audience; they create one" (p. 162). That audience is built around a particular media product which calls it into existence: *The New York Times* creates a *Times* audience, Fox News creates a Fox News audience, and so on. The audience, then, only exists as a

construction based on institutional needs and justifications rather than objective observations (Ang, 1991; Turow, 2005). Those institutional needs are largely economic, and an audience's effectiveness to a media institution is directly tied to its ability to produce economic value within its industrial system (Ettema & Whitney, 1994; Napoli, 2011). The audience, in this sense, is constructed as a market, a set of consumers. This is an inherently media-centric conception of audiences—people don't perceive themselves as being part of a market—and one that depersonalizes audiences, renders them largely passive, and interacts with them in a relationship that is predominantly calculative, rather than social (McQuail, 1997).

Journalists' perceptions of audiences. Throughout the mid- to late 20th century, journalists tended to resist this construction of their audiences as a market often by their organizations; instead, they have a long history of ignoring and dismissing their audiences altogether. Their vision of the audience has generally been a vague one—an amorphous, incomprehensible mass that, to the extent that it can be known, is uninformed, unappreciative, and irrational (Gans, 1979; Sumpter, 2000). In its place, journalists have substituted an imagined audience based on their own social worlds—family, friends, sources, colleagues, and themselves, whom they see as a commonsense representative of the audience (Gans, 1979; McQuail, 1997; Schlesinger, 1978).

Some of this lack of knowledge of the audience is rooted in the one-way communicative structure of mass-mediated journalism that has historically made it difficult for journalists to come into contact with their audiences. But this ignorance in the pre-internet era was willful as well. Journalists have long had access to information about their audiences through survey and marketing data, though they have typically ignored it for a variety of reasons: distaste for statistical measurement and the business side of their organizations, concern that relying too heavily on audience desires would weaken their professional autonomy, and fear that the audience is not actually interested in what they produce (Gans, 1979; Schlesinger, 1978). This self-oriented bubble of audience perception has weakened in the past two decades, as the interactive nature of online journalism has made audiences much more obtrusive to journalists. But journalists have often resisted envisioning online audiences in individual or specific ways, lest they infringe on professional autonomy (Lewis, 2012). When they have engaged with audiences on an individual level, it has tended to be in self-oriented ways focused on building their own personal brands (Molyneux & Holton, 2015).

This does not mean that journalists' perceptions of audiences have no influence on their newsmaking practices, however. DeWerth-Pallmeyer (1997) argues that even a hazy, self-serving conception of the audience is a crucial part of the news construction process, though it is embedded in journalists' newsmaking routines. Through ideas such as "public interest," "local impact," and "controversy," journalists' sense of newsworthiness is undergirded by a tacit but particular view of the audience, often as an abstract but civically minded public (DeWerth-Pallmeyer, 1997; Sumpter, 2000). An ethic of public service that undergirds journalists' professional values has

often led them to invoke the audience as a civically minded public, which uses news to monitor power and make democratically informed decisions (Schlesinger, 1978).

While journalists' conception of their audiences has always tended toward the abstract, it has also increasingly taken on a more economic tint. This market-based conception of audiences has long pervaded TV news through its construction of viewers in the form of ratings, but it became more prominent across journalism during the 1980s and 1990s, as newspapers shifted toward a more consciously reader-centered approach, though one built around an economic goal, resulting in news content tailored to more desired upscale readers (Underwood, 1993). Several researchers have observed that the audience has gained influence in recent years, though that growth in influence is rooted more deeply in this market-based orientation than a public-service one (Anderson, 2011; Napoli, 2011).

This market-based turn accelerated as news organizations moved online and their ability to measure readers' behavior—and, indirectly, their preferences—became much more specific and instantaneous, thanks to an ever-growing array of online metrics. Several researchers have reported a focus within journalism on audience monitoring through metrics that borders on obsession, both on the organizational level and within journalists' everyday routines (Anderson, 2011; MacGregor, 2013; Petre, 2015). Following metrics is inextricably tied to economic motivations because of the dominant online publishing business model based on advertising revenue through traffic (MacGregor, 2013; Tandoc, 2014). Through metrics, journalists' traditional self-oriented and socially idealized imagination of the audience is being replaced by a construction of the audience that is rationalized and algorithmic—more empowered and more grounded in reality but still reduced to a thin sliver of its actual characteristics and social identity (Anderson, 2011; Napoli, 2011). Where audiences were once disregarded, they are now being taken into account, though they are being reduced to a quantification. Thus, while journalists are more closely monitoring their audience and orienting their work around it, their perceptions of that audience remain impersonal, controlled, and only knowable in certain narrow ways.

Audience perceptions and technology use. Journalists' perceptions of their audience may also play a significant role not only in the news they produce but the technological forms by which that news is presented to the audience. Boczkowski's (2004) examination of the influence of audience perception on journalists' use of technology is based on the concept of inscription, drawn from science and technology studies, in which a construction of the user is embodied in the production of a technology. In the inscription process, designers envision who will use an object and how, and that vision is inscribed into the object itself (Akrich, 1992; Boczkowski, 2004). Although journalists are not designing the technologies they use to present their work to audiences, Boczkowski finds that the process applies to them as well, as they "have an idea of what kind of users they would like to reach and inscribe this idea in technical and communication domains such as interface design, media choice, and information flows" (p. 175). Through the inscription process and their own interaction with

technology, users play a powerful role both directly and indirectly in the construction of technology not only as objects but as social forces (Boczkowski, 1999). Boczkowski identifies two dimensions in which news users are conceived: their technical capabilities and their role as either producers or consumers. He finds journalists' views of the user as tech-savvy information producers connect with increased multimedia use and interactivity, and views of the user as tech-limited connect with limited multimedia use. In the cases Boczkowski examines, technological perceptions of the audience are tied up with economic concerns as well, as building technically unsophisticated products is seen by online journalists as a key to maintaining a broad audience.

Without directly following Boczkowski's framework, other researchers have found particular ways in which journalists' views of their audiences have helped influence corresponding patterns in their adoption and use of public-facing technologies. Lowrey (2003) found that higher community structural pluralism was a strong predictor of greater online interactivity among newspapers, hypothesizing that journalists respond to pluralistic communities' demands for more interactive local news. In a more economically driven case, Ashuri and Frenkel-Faran (2013) found that TV stations' use of social media was fueled in part by a desire to attract users of those technologies who are perceived as young, trendsetting, and affluent. Audience perceptions have also influenced nonadoption, as in Anderson's (2013) finding that Philadelphia newspaper journalists' views of their audience as uninterested in interaction led to a lack of interactivity in their online journalism. And other scholars have noted that newspaper editors' perception of low broadband access and low interest in online local news, particularly in small, rural communities, may have led them to lag in developing full-featured websites (Domingo, 2008; Johnson, 2010; Tate, 2011).

Boczkowski (2004), then, has established a concept explaining how journalists take into account their perceptions of audiences' technological aptitude and desires when inscribing and incorporating technologies into their work. Since then, other researchers have observed the incorporation of audience perception at work in journalists' technology use (and nonuse), though this process has not been examined in any systematic way. This study aims to examine Boczkowski's concept more directly by looking at two dimensions of journalists' perception of the user in relation to the technology they incorporate: the user's ability to *access and use* particular technologies and the user's *demand* for news through those technologies. Through these dimensions, the study offers a test of Boczkowski's concept of journalistic inscription through two dimensions of audience construction: one looking more generally at the fundamental issue of audiences' technology access and use, and the other employing the more economic framework of technological demand. The findings and arguments of past literature appear to support a connection between perception and use in both dimensions. Boczkowski and others have found that journalists are more likely to incorporate particular technologies when they perceive that audiences can and will use those technologies robustly, and research has also indicated that perceiving audiences

through an economic frame has substantially influenced the way journalists produce and present news. This study thus presents the following hypotheses:

Hypothesis 1a: Newspaper journalists' perceptions of audience technology access and use will be positively related to their news organizations' public-facing technology use.

Hypothesis 1b: Newspaper journalists' perceptions of audience technology demand will be positively related to their news organizations' public-facing technology use.

Newspaper size. Although the variance has been reduced as online technologies become more widespread among newspapers, organizational size remains a significant determinant in technology adoption and use (Greer & Yan, 2010). Specifically, smaller newspapers have consistently been found to be less likely than larger ones to have websites, to update them regularly, and to include interactive features (Greer & Yan, 2010; Karlis, Mitchell, & Ellis, 2012). Some of that technological lag may be because, at least in rural areas, editors of smaller newspapers see their readers as not using or desiring those technologies (Johnson, 2010; Tate, 2011).

Broadly speaking, small newspapers tend to be more closely tied to their audiences. Editors of weekly newspapers—which tend to be much smaller organizations than dailies—report getting more feedback from their readers and have been characterized as having a closer connection to the communities in which they operate (Smethers, Bressers, Willard, Harvey, & Freeland, 2007; Weaver, Beam, Brownlee, Voakes, & Wilhoit, 2007). Because of smaller newspapers' tendency to be more closely connected with their audiences and because of previous research connecting perception of audience demand with lack of technological adoption in small newspapers, this study proposes the following hypothesis:

Hypothesis 2: The relationship between journalists' perceived audience technology demand and their news organizations' public-facing technology use will be stronger for smaller newspapers than larger ones.

Method

To test these propositions, this study relied on responses from a national survey of U.S. newspaper journalists conducted in February 2014. The sample of journalists was drawn from Cision, a media contact service whose database contains at least 1.5 million media professionals worldwide. A list of U.S. newspaper journalists and editors in the CisionPoint Media Database was drawn using searches for job descriptions containing the words "writer," "reporter," "columnist," "contributor," and "editor." The search yielded 39,000 journalists who worked at newspapers or their online news products, a similar number to the 37,983 full-time newspaper newsroom

employees in the American Society of News Editors 2013 census (ASNE Newsroom Census, 2013), though Cision's list was larger because some part-time and contributing journalists were included. Although newspapers are only one realm of journalistic work, they do represent a major portion of U.S. journalists (Weaver et al., 2007). They also make a useful, bounded set for this initial empirical test, given their prominent role in previous studies of audience perception, including Boczkowski's (2004) initial expression of this hypothesis. The sample was stratified according to the ASNE's 2013 ratio of editors to noneditors (1.92:1), then chosen randomly within those two categories. Of the 5,197 participants, 546 completed the survey, for a 19.6% response rate, according to the American Association of Public Opinion Research's RR4 calculation. This response rate is similar to that of other research on journalists using web-based surveys (e.g., Gil de Zúñiga & Hinsley, 2013).

Control Variables

To limit the influence of potentially confounding variables, this study controlled for several demographic and personal variables: age, gender, years of journalism experience, and professional seniority. In addition to age ($M = 49.34$, standard deviation [SD] = 13.16), gender (46% female), and years of journalism experience ($M = 23.37$, $SD = 12.84$), a measure of professional rank was included as a control to account for the differential use of technology and views of the audience at different levels of news organizations (DeWerth-Pallmeyer, 1997). A multiple-choice question about job titles was recoded into a variable ranging from *lowest seniority* at 1 to *highest seniority* at 4: (1) reporters/writers/copy editors, (2) desk/section/online editors, (3) editors/managing editors, and (4) publishers/owners.

Key Variables

This study examined the hypotheses and research questions in relation to three public-facing newsroom technologies: video content, social media, and mobile accessibility. For each of the three technologies, variables were constructed to measure whether journalists perceived them as being in wide circulation among their audiences, focusing particularly on what might be most likely to be a barrier to use for each particular technology. For a technology (video) in which access is a potentially significant barrier, through high-speed internet access, perception of that access was measured. For a technology (social media) in which access issues are minor, perception of use was measured. For mobile, both access and use were measured in relation to smartphones and tablets. Each technology was also measured in relation to perceived audience demand.

Perception of audience technology access and use. For video, perceptions of audience *high-speed internet access*, which is necessary to view video content without buffering, were drawn from two questions on a 10-point Likert-type scale (1 = *none*,

10 = *all*), asking how many of journalists' local readers had access to high-speed internet at home and at work. The 2 items were combined into a single variable ($\alpha = .75$, $M = 14.91$, $SD = 2.78$). Perceptions of audience *social media use* were measured through three questions on a 10-point Likert-type scale (1 = *none*, 10 = *all*) asking how often journalists' local readers and followers used the following to get the news: (1) Twitter, (2) Facebook, and (3) other social networks. Twitter and Facebook were separated into their own categories because they were much more widely used by journalists than other social media platforms, particularly around the time the survey was conducted (Global Social Journalism Study, 2015; Willnat & Weaver, 2014). The 3 items were combined into a single index ($\alpha = .76$, $M = 15.44$, $SD = 5.48$). Perceptions of audience *mobile access and use* were measured through four questions, each based on a 10-point Likert-type scale. Two of the questions asked how many of journalists' local readers had access to (1) smartphones and (2) tablets, and two of the questions asked how often those local readers used (1) smartphones and (2) tablets to get news. The 4 items were combined into a single index ($\alpha = .83$, $M = 25.26$, $SD = 6.07$).

Perception of audience technology demand. Perceptions of audience demand were measured through a single item for each of the three technologies examined. Each item asked how great journalists believed the demand in their community was for the following offerings, all based on a 10-point Likert-type scale (1 = *very low*, 10 = *very high*): (1) multimedia content ($M = 6.29$, $SD = 2.62$), (2) an active social media presence ($M = 6.94$, $SD = 2.48$), and (3) a mobile website or mobile app ($M = 6.60$, $SD = 2.58$).

Technology use. Because its hypotheses were connected with the perceptions of the audience, this study aimed to measure technology use by journalists directed at the audience itself. Three variables were used to measure technology use for each of the 3 items. *Video use* was measured through a single item on a 5-point scale (1 = *never*, 5 = *more than once a day*) asking how often their news organization's website offered new video content ($M = 3.12$, $SD = 1.58$). *Social media use* was measured through 3 items on a 5-point scale (1 = *none*, 5 = *all*) asking how many of the newspaper's editorial staffers used (1) Facebook, (2) Twitter, and (3) other social media networks. The 3 items were combined into a single index ($\alpha = .75$, $M = 10.10$, $SD = 2.76$). Mobile use was measured through three dichotomous items asking whether the journalist's news organization had (1) a mobile app, (2) a tablet app, and (3) a mobile- or tablet-specific site design. The 3 items were combined into a single index ($\alpha = .90$, $M = 1.80$, $SD = 1.34$) with values ranging from 0 (*none of the three*) to 3 (*all of the three*). It should be noted that these variables predominantly measure use at the organizational level, while responses came from individual journalists. Despite this asymmetry, these measures were used because these news-room technologies (particularly video and mobile use) tend to be implemented on an organizational rather than individual level.

Table 1. Ordinary Least Squares (OLS) Direct Effects Regression Models Predicting Newspaper Journalists' Technology Use.

Variables	Video Use (β)	Social Media Use (β)	Mobile Use (β)
Demographics			
Age	-0.198**	-0.196***	-0.207**
Gender (female = 1)	-0.084*	0.054	0.012
Years in journalism	0.294***	0.127	0.261***
Professional rank	-0.343***	-0.066	-0.243***
ΔR^2 (%)	28.1	8.0	20.9
Audience perception			
Perceived access/use	0.024	0.134***	-0.024
Perceived demand	0.428***	0.351***	0.515***
ΔR^2 (%)	16.4	17.0	22.5
<i>N</i>	499	490	413
<i>F</i>	65.879	26.911	51.805
<i>df</i>	6, 492***	6, 483***	6, 406***
Total R^2 (%)	44.5	25.1	43.4

Note. Cell entries are final-entry OLS standardized β coefficients.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Newsroom size. Because the study is examining technology adoption processes that take place at the internal, organizational level, organization size was used as the measure of newspaper size rather than circulation. Organization size was measured as newsroom size (Weaver et al., 2007), through an open-ended question that asked how many full-time news and editorial employees were at the newspaper. The variable was heavily skewed (skewness = 5.848) toward smaller numbers and was logarithmically transformed because linear regression assumes a generally normal distribution among independent variables, as other researchers have done to address similarly skewed size variables such as circulation (e.g., Rosenberry, 2005). The resulting variable ($M = 2.99$, $SD = 1.51$) was well within the standard for normal distribution (skewness = .321).

The hypotheses and research question were analyzed using ordinary least squares linear regressions to test prediction of video use, social media use, and mobile use. In each regression, independent variables were entered causally in separate blocks: (1) demographics; (2) perceived audience use and demand; (3) moderating variables, specifically size and metrics use; and (4) their interaction terms. To avoid potential multicollinearity problems, each of the variables included in interaction terms was centered.

Findings

The relationship between journalists' perceptions of their audience's technology access and use and their own public-facing technology use (Hypothesis 1a) was not supported. This relationship was tested through analysis of each of the three technologies. In regression analysis (see Table 1), perceptions of audience technology use and

Table 2. Ordinary Least Squares (OLS) Indirect Effects Regression Model Predicting Newspaper Journalists' Technology Use.

Variables	Video Use (β)	Social Media Use (β)	Mobile Use (β)
Demographics			
Age	-0.049	-0.106	-0.081
Gender (female = 1)	-0.026	0.081*	0.077*
Years in journalism	0.092	0.026	0.112
Professional rank	-0.088*	0.081	-0.019
ΔR^2 (%)	28.7	8.0	21.4
Audience perception			
Perceived use/access	-0.020	0.151**	-0.005
Perceived demand	0.285***	0.247***	0.260***
ΔR^2 (%)	16.9	17.2	22.6
Moderating variable			
Newsroom size	0.562***	0.297***	0.531***
ΔR^2 (%)	17.1	4.6	10.7
Interaction term			
Newsroom Size \times Demand	-0.014	-0.151***	-0.149***
ΔR^2 (%)	0.0	2.0	1.8
<i>N</i>	491	485	409
<i>F</i>	101.630	27.728	64.910
<i>df</i>	8, 482***	8, 476***	8, 400***
Total R^2 (%)	62.8	31.8	56.5

Note. Cell entries are final-entry OLS standardized β coefficients.

* $p < .05$. ** $p < .01$. *** $p < .001$.

access were a significant positive predictor only of social media use ($\beta = .134, p < .01$) but not significantly related to video use ($\beta = .024, p = .498$) or use of mobile-oriented design ($\beta = -.024, p = .543$). Perceptions of audience access to and use of particular technologies were thus not a consistently significant predictor of journalists' incorporation of those technologies into their news product.

The next hypothesis (Hypothesis 1b) examined whether journalists' perceptions of their audience's technology demands were related to their own public-facing use of those technologies. This hypothesis was supported. In regression models for each of the three technologies (see Table 1), this perception played a significant role in predicting higher technology use (video: $\beta = .428, p < .001$; social media: $\beta = .351, p < .001$; and mobile: $\beta = .515, p < .001$). Perception of audience demand explained at least a moderate amount of the overall variance in technology use, accounting together with the largely nonsignificant perceived audience technology use variable for 16.4% of the variance in video, 17.0% in social media, and 22.5% in mobile. Perceptions of audience demand for technology were a relatively strong predictor of higher technology use by journalists.

The moderating relationship tested was the role of newsroom size in influencing the relationship between perceived audience demand and journalists' technology use (Hypothesis 2; see Table 2). This hypothesis was rejected because it was not a

significant relationship for all three technologies, though it was significant for two. Newsroom size played a significantly positive role in predicting use of all three technologies (video: $\beta = .562, p < .001$; social media: $\beta = .297, p < .001$; and mobile: $\beta = .531, p < .001$). Newsroom size played a particularly large role in explaining variance in video ($R^2 = 17.1$) and mobile ($R^2 = 10.7$). When interactions between newsroom size and perceived audience demand were tested, they were significantly negative predictors of use of two of the three technologies, social media ($\beta = -.151, p < .001$) and mobile ($\beta = -.149, p < .001$) but were not significant in video ($\beta = -.014, p = .622$). The relationship between perceived audience demand and use of social media and mobile-oriented design was greater for smaller newspaper newsrooms than for larger ones, though it had no significant influence on that relationship for video.

In sum, newspaper journalists' perceptions of their audiences' demands for technologies played a major role in predicting journalists' use of those technologies, though their perceptions of audiences' technology access and use did not. Larger newsrooms were associated with increased public-facing technology use, but the relationship between journalists' audience perceptions and technology use was stronger in smaller newsrooms than larger ones.

Discussion and Conclusion

This study's findings suggest that as Boczkowski (2004) argued, journalists are influenced by their perceptions of the audience in determining what technologies they use to bring their work to that audience. But the vision of the audience that relates to journalists' technology use may only encompass particular dimensions. Journalists' views of their audiences' access to and use of certain technologies did not relate to the technologies they used to present their journalism; the only view that related was that of the audience's demand of particular technologies from them. (This does not, of course, entail that journalists' perceptions of the audiences' technology access, use, and demand were accurate. The answer to that question is likely regionally dependent and beyond the scope of this study.) This finding is a potentially important one in two ways, corresponding with both the market-based and vague self-oriented perceptions of audiences.

First, it may be an indication of newspaper journalists acting on constructions of their audiences primarily as economic actors. Specifically, the conception of the audience that broke through to influence journalists' technological presentation was not the audience as a set of *users* who shape technologies through dynamic processes of interaction (Boczkowski, 1999) but as a set of consumers—a group of people who demand to be provided with a certain technological product from their local newspaper. Even the concept of the audience as users carries an implicit economic orientation, as it centers on their use of certain economic and technological goods. But the view of the audience in terms of demand goes further into an economic paradigm, placing user desires into a framework defined by the values of the market. These results suggest a connection between journalists' market-oriented audience

conception and their implementation of technologies that market was perceived to demand. This study suggests, then, that viewing the audience as generators of demand rather than as users may have been associated with the way they ultimately deployed technologies.

Second, the influence of the perception of the audience in the form of demand for certain journalistic products could be another manifestation of professional journalists' historically self-oriented idea of their audience. In this study, the view of the audience that influenced public-facing technological use was one that considered the audience only as it was concerned with journalism. This, too, has an antecedent in journalists' historical perceptions of audience demand as extensions of their own, leading them to overestimate audiences' interest in news (Gans, 1979; Schlesinger, 1978). In the context of developing technologies to be used by audiences, this self-centered view of audiences makes fairly good sense; journalists are developing technologies that enable their audiences to consume and participate in journalism, so it may be rational and even beneficial for journalists to consider their audiences most strongly through a journalistic prism. However, this view remains a rather thin one to influence newsroom decisions, technological or otherwise, and such a one-dimensional influence may work to constrain the audience's role, rather than expand it.

The results also indicated that newspapers' size plays a significant role in the technology they use. Larger newspapers have consistently been found to adopt more technologies and integrate them more fully (Greer & Yan, 2010; Karlis et al., 2012), and this study confirms that finding. Beyond this, the study also provides some indication that smaller newspapers take their view of the audience more into account when developing public-facing technologies than larger newspapers do. These two findings provide empirical support for the suggestion (Johnson, 2010) that small newspapers do not use technologies as heavily as larger ones not simply because of a lack of resources and structural capabilities (though this is certainly a factor) but also because of a perception of their audience as having less need or demand for those technologies.

These findings both confirm and complicate Boczkowski's (2004) model of technological inscription of the user by journalists. The vision of the user does indeed shape the technologies that journalists and their organizations employ in a measurable way, but at least in these cases, that inscription seems to take on a more economic cast than Boczkowski found. Boczkowski does leave room for this type of development of his model when he argues that production context and representations of the producer are also inscribed in technologies in a way that intertwines with user representations (pp. 91–92). The data here may suggest that the production context of today's newspapers—and all the economic precarity and preoccupation that goes with it—may be especially influential in filtering journalists' perceptions and inscriptions of their users in their technological adoption.

The indication that newspaper journalists are considering their audiences as they implement technology that is intended for them is commendable, but limited in important ways. The dimension most closely associated with their technological

implementation was not how journalists believed audiences were actually using technologies, but what journalists thought those audiences demanded from them. This sort of atrophied influence of the audience could result in technology that is neither useful nor innovative, but instead the sort of heavy-handed, overly rationalized implementation lamented by MacGregor (2013) and others. To develop and implement the type of journalistic uses of technology that reach above this plateau, news organizations would do well to incorporate a more nuanced and in-depth understanding of their audiences as in which technology use is more than a matter of market demand.

Limitations and Future Research

Despite the significance of its findings, the study is constrained by a few limitations. First, it measures only U.S. newspaper journalists and thus cannot be generalized to journalists as whole. Although newspaper journalists constitute a major portion of journalists in the United States (Weaver et al., 2007) and parallel the journalists examined in Boczkowski's (2004) foundational study, additional research could be used to examine whether these findings hold true for journalists in television or online-only news or beyond the United States. Second, the study's measures of technological use and demand by journalists were relatively simple, largely measuring quantity of organizational use rather than quality, and a general sense of demand rather than particular dimensions. These simple measures were meant to capture practices across the spectrum of U.S. newspapers, large and small, and it is notable that even basic practices were far from universal among the newspapers studied. Third, the survey measured individual journalists' reports of what are often organizationally driven decisions. Ownership and organizational imperatives are a key part of the technology adoption process, and an individual survey could not adequately capture that level of influence.

Future research could address these limitations and deepen our knowledge of the role of audience perceptions in journalists' technology use in several ways. Researchers could analyze the decision-making processes involving technology and the ways audience perceptions play into them through qualitative research, using similar methods to Boczkowski's (2004) original study but looking more closely at these factors. Such research could also help inform more nuanced measurement of technology use and audience perception, exploring the varied dimensions in which journalists perceive and relate to their audiences, and the multifaceted ways journalists implement technologies within those relationships.

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