



Article

Constructing audience quantification: Social influences and the development of norms about audience analytics and metrics

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Abstract

Audience analytics and metrics are ubiquitous in today's media environment. However, little is known about how creative media workers come to understand the social norms related to those technologies. Drawing on social influence theory, this study examines formal and informal socialization mechanisms in U.S. newsrooms. It finds that editorial newsmen express receiving a moderate amount of training on the use of analytics and metrics, which is typically provided by their organization; primarily look to people within the organization, and especially superiors, to understand the social norms; learn about those norms mostly through observation and communication about others' experiences with the technology rather than their own; and that experiences are influenced by the organizational context and the individual's position in the editorial hierarchy. This leads to a broader intervention to our understanding of the social

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structures and individual dispositions that influence how emerging technologies are experienced across organizational and institutional environments.

Keywords

Analytics, audiences, journalism, media sociology, metrics, norms, quantification, social influence theory, social learning, structuration theory

Constructing audience quantification

Audience analytics—systems and software that enable the measurement, collection, analysis, and reporting of digital data pertaining to how content is consumed and interacted with—have become nearly ubiquitous in today’s digital media outlets (Tandoc, 2019). Their outputs, audience metrics—clicks, likes, shares, and other quantitative measures of attention, popularity, and interaction—have similarly become increasingly visible and influential elements of digital media work (Zamith, 2018). They provide cues that contribute to the human and algorithmic diffusion of content and help shape ideas about what is relevant or trending, thereby altering the calculus about which cultural products should be encouraged and prioritized (Blanchett Neheli, 2018). Media organizations have embedded this new audience information regime into their workflows, with different indicators factoring to some extent into content decisions and evaluations of organizational objectives (Bunce, 2019). However, there is still considerable tension over the roles that such technologies should play in journalism (Chadha and Wells, 2016).

While there has been a large body of research charting these developments (see Zamith, 2018), there has been less emphasis on the social constructionism that shapes taken-for-granted ideas about what counts regarding metrics and how the systems that produce them ought to be used. Of particular interest given the existing tensions over appropriate uses of analytics and metrics (Chadha and Wells, 2016; Tandoc and Thomas, 2015) is the question of how the norms around audience analytics and metrics are developed and institutionalized among creative media workers. Social influence theory (SIT) (Fulk, 1993; Fulk et al., 1990), an outgrowth of structuration theory (Giddens, 1984) and adaptive structuration theory (AST; Poole and DeSanctis, 1990), helps address that question. SIT calls attention to the actors and forms of social learning that shape the norms mediating the interplay between structure and agency.

Drawing from that theoretical stream, we conducted a survey of U.S.-based journalists, editors, and news directors in 2018. This survey asked a range of questions about the types and sources of training that journalists receive, the reference networks to which they turn in shaping their understandings, and the methods they employ to learn about appropriate uses of audience analytics and metrics in the context of newswork. The findings point to the impact of both formal and informal socialization mechanisms, and highlight the significance of superiors within an organization (i.e. managers and directors) and the two-step influence exerted by traditionally peripheral actors such as audience analytics companies. The article thus contributes to the literature by (1) identifying the

sets of actors perceived to be most influential in establishing the taken-for-granted meanings around audience quantification in media work, (2) examining the learning processes entangled in the development and diffusion of the norms associated with audience analytics, and (3) shedding light on the structures and factors that implicate the social construction of technologies within organizations.

Literature review

Structuration theory and SIT

According to Giddens' (1984) structuration theory, human agents act within structures that simultaneously constrain and enable their activity, and the structures in turn are dependent on the human activity they govern. Giddens describes structures as virtual properties of social systems that guide and are shaped by social interactions. Structures manifest through formal and informal rules (e.g. guidelines for addressing colleagues) and resources (e.g. an individual's position within an organizational hierarchy). According to the theory, agents have some capacity to rationalize, or evaluate, the success of their behaviors. They do so by reflexively monitoring their own actions and drawing upon their partial knowledge of the structures in the context within which they act. Giddens forgoes proposing testable models, instead explicitly treating structuration theory as a set of "sensitizing devices" for understanding the world. Nevertheless, structuration theory offers an important intervention to our understanding of human action by highlighting that agency and structures recursively act upon one another and must be understood in relation to one another.

Poole and DeSanctis' (1990) AST builds on Giddens' work and addresses the criticism that it neglects technology. AST posits that "technology shapes the user, but the user likewise shapes the technology, exerting some degree of control over its use and meaning in social action" (Poole and DeSanctis, 1990: 177). Social structures and technological manifestations thus evolve as groups selectively appropriate features of both the technology and the broader social context it is embedded within.

According to Poole and DeSanctis (1990), each technology has a spirit, or "the general goals and attitudes the technology aims to promote" (p. 179). Rules and resources, then, serve as structural features directed toward that spirit—both in the design and the use of that technology in a social context. However, AST contends that rules and resources are guides to action, rather than constraints, because groups may opt not to utilize a technological feature or may use that feature differently from its intended spirit (Fulk and Yuan, 2017). Moreover, those rules and resources may have different salience to different groups (Poole and DeSanctis, 1990). While the context around a technology impacts the nature of the interaction between structure and agency, "contextual variables such as task and the larger institutional environment are mediated, reinterpreted, and reconstructed by users" (Poole and DeSanctis, 1990: 178). Orlikowski (2000) terms those enacted structures technologies-in-practice, which refers to "the sets of rules and resources that are (re)constituted in people's recurrent engagement with the technologies at hand" (p. 407). Orlikowski adds that "common training sessions, shared socialization, comparable on-the-job experiences, and mutual

coordination” serve as key mechanisms for reifying particular understandings that guide views of and interactions with technology.

In this article, structuration and AST help reconceptualize audience analytics as technologies that are *experienced* by individuals working within media organizations. Those individuals contribute to (and are guided by) organization-specific and industry-wide understandings about the technology and the extent to which those systems are congruent or incongruent with particular aims and objectives. Those understandings contribute to—and are negotiated against—personal attitudes and beliefs, which then impact the manner and the extent of the technology’s use as well as how an individual perceives and talks about it. As such, the technology—which no doubt has identifiable material attributes—becomes socially constructed as individuals engage with it and as it is put to use within a social setting. These insights may be applied to both technological systems (analytics) and their outputs (audience metrics) (Zamith, 2018).

Fulk’s (Fulk, 1993; Fulk et al., 1990) SIT helps shed light on key mechanisms underlying this process of social constructionism, or “how social relations influence the development of shared meanings among interacting members of a collective” (Fulk and Yuan, 2017: 1). SIT posits three core propositions (Fulk, 1993; Fulk et al., 1990). First, differences in the material features of a technology are not necessarily salient to users. Second, the social context around the technology conveys how users should perceive the technology, which technologies or aspects of a technology are appropriate for which tasks and groups of people, and what the normative expectations for the use of that technology are. Third, individuals attribute their attitudes toward objects, persons, and situations by recalling their past experiences in relation to those stimuli and by attending to social cues about how to interpret past experiences. In short, both the technology and the sense-making around that technology, and the subsequent behaviors involving the technology, are socially influenced—and simple efficiency is not necessarily the primary criterion applied in the selection of a particular technology to further an objective (Fulk and Yuan, 2017).

As Fulk (1993) notes, “one form of direct influence is group norms,” which “have powerful effects on individual cognitions and behaviors” (p. 123). Norms may be conceptualized as rules of behavior that individuals choose to conform to (Bicchieri et al., 2014). While norms can be *emergent* (arising from the bottom up) or *prescriptive* (descending from the top down)—or some combination thereof—they need not be articulated (e.g. through an employee handbook) to have structuring power; they can shape action simply through the perceptions that individuals have of those around them (Bicchieri et al., 2014). Social norms may be conveyed through formal training programs, inferred through informal interactions with different members of a reference network, and internalized through different methods of social learning (Fulk and Yuan, 2017).

Training, reference network, and learning methods

Both SIT and AST identify formal and informal training as important forces in structuring behavior by conveying organizational norms and appropriate uses for a technology within that normative context, as envisioned by the trainers or the organizational leaders that empower them. For example, Poole and DeSanctis (1990) note that amid poor or

uncertain uses of a technology, “the solution may . . . [be] to explore ways in which to promote effective use of the technology, through training . . . or the addition of structures that limit the possibility for misuse” (p. 90). Fulk (1993) also notes that “formal or informal peer training effectively uses social influence processes” (p. 945) to encourage and discourage certain beliefs and practices.

Training may be viewed as a form of structure that is especially guiding because it prescribes the official organizational norms as envisioned by organizational leaders, against which individuals can evaluate their own behaviors. It is unclear from the literature, however, how much training journalists receive in areas related to the use of audience analytics and metrics, or from whom. Qualitative evidence does point to uneven amounts of training within and across organizations, and the possibility that non-journalistic actors may play a role in that training (Belair-Gagnon and Holton, 2018; Petre, 2018). As such, the following question is posed:

RQ1(a). What training do newswriters receive on how to use audience analytics and metrics?

In the absence of prescriptions, individuals must figure out for themselves how best to adopt and use analytics systems and measures. SIT calls attention to the importance of identifying the composition of one’s social network (Fulk et al., 1990). This may be more broadly conceived as a reference network, or those whose actions and opinions the individual most cares about (Bicchieri et al., 2014). The theory posits that when an individual experiences attraction to a set of referents (group of people), the individual is more likely to internalize those group norms and adopt behaviors that mirror those of the identified referents (Fulk, 1993). When there is little attraction to a set of referents, the individual is more likely to comply with those group norms only when needed, rather than conforming to the group (Fulk, 1993). In general, SIT anticipates that work-group members—those most intimately tied to the individual’s day-to-day activities—will be particularly influential (Fulk, 1993).

Within the context of journalism, long-standing work has shown that journalists are especially influenced by organizational peers and superiors when it comes to the unspoken rules that guide newsroom norms (e.g. Breed, 1955). Such individuals “are crucial for the proliferation of norms and values in journalism,” but even members outside of the organization may act as “parasocial opinion leaders” despite the lack of personal contact (Rössler, 2017: 6). In the United States, external sources (e.g. professional codes of ethics and media regulations) are perceived to exert some of the strongest influences on journalistic work, with editorial supervisors, managers, and editorial policies viewed as the most influential internal sources (Vos, 2016). Indeed, the institutional perspective, and new institutionalism in particular, contends that macro-level forces shape micro-level actions as individuals and organizations strive to adhere to the broader expectations that have developed over time in order to gain and maintain legitimacy (Lowrey, 2011). That perspective has proven helpful in examining phenomena like isomorphism within journalism, wherein organizations mimic their competitors—sometimes at the expense of economic efficiency—in order to be viewed as legitimate by the public and among its peers, resulting in the homogenization of practices (e.g. Lowrey and Woo, 2010).

However, that higher order focus can obscure important phenomena occurring at the individual and organizational levels (Fulk and Yuan, 2017). Moreover, SIT contends that influences at the organizational level are typically more powerful because of their proximity to the individual's day-to-day activity and the recurring nature of the interactions (Fulk, 1993). To that end, scholars have identified management as being crucial to the initial stages of technological diffusion within newsrooms, but that mid-level reporters play key roles in establishing the social systems that promote particular ideas and applications (e.g. Singer, 2003, 2004). Moreover, they have found that organizational structures played a key role in the diffusion of technological innovations in newsrooms (e.g. Boczkowski, 2004).

It is unclear from the literature how well such findings map onto the particular context of audience analytics and metrics. Indeed, scholars do not yet know whether the key referents are primarily internal or external, or where they might fall within an organizational or supra-organizational hierarchy. Moreover, the composition of the reference network may impact whether social norms are developed in a context-sensitive way or are more universal in nature, and the extent to which they may advance in an emergent manner. As such, the following question is posed:

RQ2(a). Which referents are perceived as being most influential to newswriters' perceptions of the norms around audience analytics and metrics?

SIT draws on Bandura's (1986) social learning theory to identify the methods through which organizational members influence how others perceive and evaluate technology. These take the form of both learning *how others use* a technology and *how others respond to uses of* a technology. Among these are vicarious learning, direct statements, and indirect references (Fulk and Yuan, 2017).

Fulk et al. (1990) argues that much of social learning is vicarious in nature, or "learning from observing the experiences of others" (p. 122; see also Belair-Gagnon, 2018). When others' choices result in positive outcomes, behavior modeling may occur—with the effective behavior repeated both by the individual and by others. Similarly, choices that result in undesirable outcomes may be avoided by others. In addition, social learning may occur through direct and indirect communication. By discussing particular features or approaches, organizational members increase the salience of those features and approaches. Those members also voice judgments of particular features or approaches as well as interpretations of events that may be accepted by the individual. They may further offer cues to individuals about how a technology may fit a particular task or explicitly recommend particular courses of action (Fulk et al., 1990).

Social learning may thus be broken up into three distinct forms (Savarimuthu et al., 2011). The first is *observational learning*, where the individual learns by watching members of their reference network. For example, they may see a colleague be praised by a supervisor for spending their time trying to make sense of audience analytics and thus learn about the norm. The second is *communicational learning*, where the individual learns by exchanging information with members of their reference network. For example, they may ask a celebrated figure at a professional conference about their attitudes and learn accordingly about the norm. The third is *experiential learning*, where the

individual learns by encountering a response to their engagement in a behavior. For example, an individual may justify their choice to write a follow-up story based on the number of times the original story was shared and learn about the norm based on the subsequent admonishment they receive. As such, the following question is posed:

RQ3(a). What methods of learning do newswriters use to understand norms around audience analytics and metrics?

SIT, as with other extensions of Giddens' work, proposes that situational factors may impact the influencers and the nature of the influences (Fulk and Yuan, 2017). SIT does not identify specific situational factors but instead posits different groups of factors: individual-level differences (e.g. familiarity with technology), facilitating factors (e.g. reliability of technology), and direct constraints (e.g. unavailability of a technology) (Fulk et al., 1990). To identify specific factors, it is helpful to review the empirical research examining different situational factors found to have impacted attitudes toward and uses of audience analytics and metrics in newsrooms.

Audience analytics and metrics in journalism

Audience analytics have become ubiquitous in many newsrooms, with many news organizations employing multiple systems simultaneously (Tandoc, 2019). These systems are used to produce audience metrics, quantified and aggregated measures of audience preferences and behaviors that inform newswriters' constructions of those audiences (Zamith, 2018). They address some shortcomings of previous audience information systems like reader surveys and focus groups, making them alluring to both the editorial and business sides of newsrooms.

Media scholars have found considerable support for the idea that audience analytics and metrics have become important tools in newsrooms that are capable of influencing editorial decision making (Tandoc and Ferrucci, 2017; Usher, 2018). Scholars have also observed that newswriters may ascribe a variety of meanings to audience analytics and the metrics they produce (Hanusch, 2017; Tandoc and Thomas, 2015). For example, Bunce (2019) found that newsroom directors publicly praised and criticized journalists based on readership rates, while Usher (2013) observed that editors at Al-Jazeera English actively sought to minimize the availability and use of metrics. Moreover, according to Powers (2018), the idea of impact is important to today's newswriters, but there is little agreement on how to measure it. Nelson (2018) similarly contends that "those who hope to make audience engagement both normative and measurable face enormous barriers to success" (p. 528). Meanwhile, some researchers have lamented how smaller newsrooms may be behind larger ones in adopting metrics in their daily practices (Ali and Radcliffe, 2017). In short, the literature underscores that while normative practices and meanings associated with analytics and metrics are consequential, they remain contested (Arenberg and Lowrey, 2019).

The literature points to multiple individual- and organizational-level factors that can impact the journalistic uses of and attitudes toward analytics systems and metrics. These may be considered as potential situational factors that can impact social influence

mechanisms (Fulk, 1993; Fulk et al., 1990). At the individual level, one's journalism background can play a role. For instance, Vu (2014) found that higher levels of journalism education tended to produce lower use of audience analytics—perhaps because of the increased internalization of traditional journalistic values sometimes viewed as being at odds with the use of analytics (Tandoc and Thomas, 2015). The amount of journalistic and managerial experience may also play a role, with managers in particular holding more favorable attitudes (Belair-Gagnon, 2018; Hanusch, 2017), perhaps because of the economic potential and monitorial power of the technology (Bunce, 2019). At the organizational level, market-oriented organizations and those that perceive greater competition tend to make greater use of analytics, with the evidence for organizational size being mixed (Ferrer-Conill, 2017; Lowrey and Woo, 2010; Tandoc, 2015). Ferrucci (2018) notes that organizations across a spectrum of market orientation use information from audience analytics, but that more market-oriented organizations are more likely to do so to “simply giv[e] the public what it wants” (p. 14). Finally, the primary media vehicle (i.e. newspaper, magazine, or digital) may also impact the use of analytics across organizations, with digitally oriented outlets using them more extensively (Hanusch, 2017) as analytics excel at capturing digital behaviors (Zamith, 2018). As such, the following research questions are added to the earlier ones:

RQ1–3(b). To what extent do post-secondary education, experience in journalism, managerial responsibility, importance of reader-derived revenue, market competition, organization size, and primary media vehicle impact one's (1) amount of training received and training sources, (2) reference network, and (3) one's primary learning methods?

Method

Sampling

This study drew on a survey of journalists, editors, and news directors at news organizations in the United States. The media listings database Cision was searched for journalists working at magazines, newspapers, and online outlets based in the U.S. From sampling frame data, two strata were formed. The first stratum consisted of individuals whose roles and titles, as listed by Cision, indicated a supervisory position (e.g. Editor, Producer, News Director). The second consisted of reporting-oriented individuals whose roles and titles indicated a non-supervisory position (e.g. Reporter, Writer, Columnist). For both strata, individuals affiliated with a print organization (i.e. magazines and newspapers) with a circulation audience below 10,000 and 1,000, respectively, were dropped, as were those affiliated with online outlets that had fewer than 10,000 unique visitors per month. This was done to limit the impact of niche and non-professionalized outlets. Because these media have distinct traditions, they were separated in the analytic models to isolate medium-specific effects while offering a broader picture of the news industry.

A total of 10,449 individuals were then contacted using a manually reviewed random sample drawn roughly evenly from the two strata. This was done to ensure a sufficiently large, but not overpowered, sample for statistical analysis. Individuals were

contacted via email, with three reminder emails sent to non-respondents. A random drawing of either a US\$500 or 1 of 10 US\$50 Amazon gift cards was offered as a participation incentive. To counteract the overinclusive nature of the Cision list, the survey instructed potential participants that the survey was meant for active, full-time journalists, and requested that those not fitting that criteria exit the survey. A total of 520 people completed the surveys and 480 partially completed them, yielding a response rate of 9.6% (RR4 in American Association for Public Opinion Research [AAPOR], 2016). The response rate reflects a downward trend in response rates among surveys of journalists and is consistent with rates in recent, comparable scholarship (e.g. Molyneux et al., 2018; Örnebring and Mellado, 2018). However, the demographic profile of the respondents is consistent with those in comparable, high-standard work by Weaver et al. (2019) and Vos (2016), which increases confidence in the representativeness of this sample.

Respondents who completed the survey ranged in age from 21 to 79 ($M=46$, $SD=12.9$), and 55.6% identified as male. The majority were White (91.9%) and non-Hispanic (93.5%). The sample was well educated, with 70.5% having a bachelor's degree and 25.4% a master's or doctorate degree. Of respondents with a college degree, 62.2% received at least one degree in journalism. There was a wide and fairly even representation of household income, with the median household income ranging between US\$80,000 and US\$100,000 per year. Newspaper organizations were most represented in the sample (64.1%), followed by online media (24.7%) and magazines (11.2%). In addition, 20 respondents were excluded from the analysis because they indicated their organization's primary media vehicle was not a magazine, newspaper, or online site. Small (1–10 full-time editorial workers; 35.9%), medium (11–50; 33.2%), and large (more than 50; 30.9%) outlets were roughly evenly distributed. Of the remaining respondents, 53.8% self-reported working in a supervisory or managerial role at their organization.

Instrument and measures

Respondents were asked a number of questions pertaining to their reference network, methods of learning, and amount and source of training, in addition to multiple situational factors and controls covering the individual and organizational levels. Where appropriate, survey language and response options were adapted from existing survey-based studies, including the works of Hanusch (2019), Tandoc (2015), Tandoc and Ferrucci (2017), and Vu (2014).

Training. To evaluate the amount of analytics- and metrics-related training respondents received, respondents were asked the following question: “How much formal or informal training have you received about how to use audience analytics or metrics from the following sources?” Two dimensions were measured: “your news organization” and “a web analytics company.” A third dimension was measured using conditional logic: “your organization's parent company.” Respondents were also asked the following question: “What training, if any, have you received in the following areas?” Three dimensions were measured: “how to access my organization's web analytics tool(s),” “understanding what different audience metrics represent,” and “how to determine ‘success.’” For both

sets of questions, each dimension was rated from “no training” (1) to “a lot of training” (7), with an option for “not applicable.”

Reference network. To identify the most influential members of an individual’s reference network, respondents were asked the following question: “When you think about the following groups and institutions, how important are they in informing how you think web analytics tools (like Chartbeat) and/or audience metrics (like page views) *should* be used by news organizations?” Two scales were created from response options to that question. Internal Reference Network ($\alpha = .769$) response options included the following: “my superiors in my organization,” “people at my level in my organization,” and “my subordinates in my organization.” External Reference Network ($\alpha = .807$) response options included the following: “my competitors,” “my education,” “industry blogs and publications,” “professional organizations,” and “web analytics companies.” Each of those options was rated from “not at all important” (1) to “very important” (7), with an option for “not applicable.”

Methods of learning. To evaluate the methods of learning, the following question was asked: “To what extent is each of the following influential to your understanding of how web analytics tools and/or audience metrics *should* be used in journalism?” Three dimensions were rated from “not at all influential” (1) to “very influential” (7), with an option for “not applicable.” Observational learning ($r_{SB} = .729$) was measured across two items: “watching or reading about how people in my network use or talk about them” and “observing how people in my network are treated when they use or talk about them.” Communicational learning ($r_{SB} = .857$) was measured across two items: “asking people in my network for advice on how to use or talk about them” and “chatting with people in my network about the way they are used or talked about.” Experiential learning ($r_{SB} = .588$) was measured across two items: “seeing how people in my network respond when I use or talk about them” and “being punished or rewarded for the way I use or talk about them by people in my network.” Due to the low Spearman–Brown adjusted split-half reliability coefficient for the experiential learning dimension, all six items were analyzed individually rather than according to their conceptual mapping.

Situational factors. To assess the impact of theoretically meaningful factors, two sets of questions were developed. First, individual-level factors included journalism education, experience in journalism, and managerial capacity. Second, organization-level factors included importance of reader-derived revenue, market competition, organization size, and primary media vehicle. Journalism education was measured by asking respondents whether they received at least a bachelor’s degree and, if so, whether one of those degrees was in journalism. Experience in journalism was measured by asking respondents about the number of years they worked as a professional journalist. Managerial capacity was measured by asking respondents whether they worked in a supervisory or managerial role at their organization. Importance of reader-derived revenue was measured by asking respondents to rate, from 1 (“not at all important”) to 7 (“very important”), how important subscription revenue or donations were to their organization’s revenue stream. Market competition was measured on a scale ($\alpha = .760$) that asked respondents to rate, from

1 (“not at all competitive”) to 7 (“very competitive”), the degree of competition among different news organizations in their organization’s primary market for (1) advertising, (2) quality reporting, and (3) readership. Organization size was measured by asking respondents to provide their best estimate of how many full-time news and editorial workers were employed at their organization, with options for Small ranging from 1 to 10 journalists, Medium ranging from 11 to 50 journalists, and Large exceeding 50 journalists. Primary media vehicle was measured by having respondents select from the following options: magazine, newspaper, and online. It is important to note here that the organizational factors are dependent on the respondent’s perceptions of those factors, which may differ from reality. Such perceptions exert structuring power as they reflect understandings that help guide action (Orlikowski, 2000; Poole and DeSanctis, 1990).

Control variables. Respondents were asked about their gender, political orientation, and income level. Multiple options were available for gender identification, but only the “Male” and “Female” options were selected. Political orientation was measured by asking respondents to self-identify on a scale from 1 (“strong liberal”) to 7 (“strong conservative”). Income level was measured by asking respondents to select their annual household income from options ranging from US\$0 to more than US\$200,000, spread in US\$20,000 increments. While age was measured in the survey, it was omitted from statistical models due to its strong correlation with the experience in journalism variable. These variables were selected and treated as controls because, as Fulk (1993) argues, SIT aims to identify situational factors that transcend demographic characteristics. Thus, such variables must be measured to ensure variance attributable to them is not accorded to theoretically meaningful situational factors.

Findings

Areas and sources of training

The first research question focused on the training that newswriters receive on how to use audience analytics and metrics. Respondents did not report receiving extensive training for any of the three areas. The greatest amount of training was received for how to access the respondent’s organization’s web analytics tools ($M=3.81$, $SD=1.92$), with lesser amounts for the meaning-making areas (understanding what different audience metrics represent, $M=3.67$, $SD=1.90$; how to determine “success,” $M=3.34$, $SD=1.91$). Respondents noted training was most often received from their own organization ($M=3.53$, $SD=2.00$), with lesser amounts for external sources (the organization’s parent company, when applicable, $M=3.16$, $SD=2.14$; a web analytics company, $M=2.20$, $SD=1.63$).

Multiple regression models were used to assess the impact of situational factors for each training area and source of training. With regard to training areas, being a manager was the lone consistent, statistically significant factor at the individual level, as shown in Table 1, with those in such capacity receiving more training in all three areas than non-managers. Those who had more experience in journalism received less training on access than those with lower levels of experience. Among organizational-level predictors, the importance of

Table 1. Summary of multiple regression analysis for variables predicting the amount of training received in different areas.

Variables	Access to metrics			What metrics represent			Measuring "success"		
	B	SE B	β	B	SE B	β	B	SE B	β
Control variables									
Gender (Male)	.25	.18	.06	.09	.18	.02	.25	.18	.06
Income	.03	.04	.04	.03	.04	.04	-.01	.04	-.01
Political orientation	.11	.07	.08	.10	.07	.07	.05	.07	.04
Individual level									
Journalism education (yes)	.00	.18	.00	.07	.18	.02	.11	.18	.03
Experience in journalism	-.02*	.01	-.12	.00	.01	-.03	.01	.01	.05
Managerial capacity (yes)	.64**	.20	.16	.46*	.20	.12	.48*	.20	.13
Organizational level									
Reader revenue	.17***	.04	.19	.18***	.04	.21	.12**	.04	.14
Market competition	.10	.07	.07	.18**	.07	.13	.21**	.07	.15
Organization size	.47***	.13	.20	.31*	.13	.13	.43***	.13	.18
Vehicle (newspaper)	.54	.31	.13	.14	.30	.04	-.05	.30	-.01
Vehicle (online)	1.18***	.32	.27	.81*	.31	.19	.80*	.32	.18
Observations	425			425			425		
R ² /adjusted R ²	.162/.140			.141/.118			.153/.131		
F	7.280***			6.138***			6.795***		

The reference group for Vehicle is Magazine. Different observation values are due to non-response or applicability of the response variable.

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

reader-derived revenue, organization size, and online media as the primary vehicle were statistically significant factors in all three areas, with increases in those factors consistently linked to higher amounts of training. One additional organizational-level predictor—market competition—was found to be statistically significant for only the meaning-making areas: the greater the amount of competition, the more training received for understanding what metrics represent and how they can be used to measure “success.”

With regard to sources of training, being a manager was again the lone statistically significant factor at the individual level, as shown in Table 2, with those in such capacity receiving more training from external web analytics companies than non-managers. At the organizational level, the importance of reader-derived revenue, market competition, organization size, and online media as the primary media vehicle were all positive, statistically significant predictors of receiving training from one’s own organization. In addition, the importance of reader-derived revenue was a positive, statistically significant predictor of the extent of training a respondent reported receiving from the organization’s parent company, where applicable.

Table 2. Summary of multiple regression analysis for variables predicting the sources of training received.

Variables	Own news organization			Parent company			External analytics company		
	B	SE B	β	B	SE B	β	B	SE B	β
Control variables									
Gender (male)	.29	.19	.07	.33	.29	.08	.22	.16	.07
Income	.03	.04	.04	.01	.06	.01	.03	.03	.06
Political orientation	.03	.07	.02	.19	.12	.11	.03	.06	.02
Individual level									
Journalism education (yes)	-.04	.19	-.01	.08	.28	.02	.27	.16	.08
Experience in journalism	-.01	.01	-.06	.01	.01	.03	-.01	.01	-.09
Managerial capacity (yes)	.23	.21	.06	.31	.31	.07	.85***	.18	.26
Organizational level									
Reader revenue	.14**	.04	.15	.15*	.07	.14	.07	.04	.09
Market competition	.23**	.07	.16	.00	.11	.00	.11	.06	.09
Organization size	.58***	.13	.23	-.24	.21	-.08	.12	.11	.06
Vehicle (newspaper)	.35	.32	.09	-.05	.56	-.01	.11	.28	.03
Vehicle (online)	.93**	.33	.20	.81	.58	.16	.38	.29	.10
Observations	424			248			409		
R ² /adjusted R ²	.170/.147			.079/.036			.110/.085		
F	7.649***			1.849*			4.457***		

The reference group for Vehicle is Magazine. Different observation values are due to non-response or applicability of the response variable.

p* < .05; *p* < .01; ****p* < .001.

Reference network

The second research question examined the constituency of newswriters’ reference networks and, in particular, the actors that most influence newswriters’ perceptions of how audience analytics and metrics should be used. Internal referents (*M*=4.83, *SD*=1.56)—that is, individuals within an organization—were perceived, on average, to be more influential when it comes to norm-shaping than external referents, or those outside the organization (*M*=4.28, *SD*=1.60). Among internal referents, the individual’s superiors (*M*=5.47, *SD*=1.78) were most influential, followed by those at their level (*M*=4.85, *SD*=1.83) and subordinates (*M*=4.07, *SD*=1.98). Among external referents, one’s competitors (*M*=4.52, *SD*=2.00) were most influential, followed by industry blogs and publications (*M*=4.32, *SD*=1.87), professional organizations (*M*=4.10, *SD*=1.95), and one’s education (*M*=4.07, *SD*=2.05).

Multiple regression models were used to assess the impact of situational factors on both internal and external reference network use. As shown in Table 3, managerial capacity—whether an individual is in a supervisory or managerial role—was the only statistically significant factor at the individual level. Those in such capacity perceived both internal and external referents to be more influential to their understanding of how

Table 3. Summary of multiple regression analysis for variables predicting reference network preferences.

Variables	Internal network			External network		
	B	SE B	β	B	SE B	β
Control variables						
Gender (male)	-.30*	.15	-.10	-.32*	.16	-.10
Income	.03	.03	.04	.00	.03	.01
Political orientation	-.02	.06	-.02	-.10	.06	-.08
Individual level						
Journalism education (yes)	.27	.15	.08	.27	.16	.08
Experience in journalism	.00	.01	-.02	-.01	.01	-.07
Managerial capacity (yes)	.52**	.16	.17	.39*	.17	.12
Organizational level						
Reader revenue	.14***	.04	.19	.08*	.04	.11
Market competition	.17**	.05	.15	.15**	.06	.13
Organization size	.28**	.10	.14	-.07	.11	-.03
Vehicle (newspaper)	.23	.25	.07	.04	.26	.01
Vehicle (online)	.60*	.26	.17	.10	.27	.03
Observations	422			423		
R ² /adjusted R ²	.163/.140			.081/.057		
F	7.244***			3.307***		

The reference group for Vehicle is Magazine. Different observation values are due to non-response or applicability of the response variable.

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

audience analytics and metrics should be used than non-managers—suggesting that, at least in this regard, managers were more mindful of their environment (e.g. their competitors as well as other organizational members). Among organizational-level factors, the importance of reader-derived revenue and market competition were similarly positive predictors for the importance of both internal and external referents. As the importance of reader-derived revenue and competition for advertising, readership, and quality reporting increased, so did the influence of referents. Two organizational-level factors—organization size and online media as the primary media vehicle—also had positive, statistically significant relationships with internal reference network import, but such relationships were not statistically significant when it came to the external network. For all three predictors that were statistically significant for both network types, the standardized betas were higher for internal network referents, pointing to the proclivity to look within one's newsroom for guidance.

Methods of learning

The third research question examined the methods of learning that newswriters use to come to understand the norms around audience analytics and metrics. Although the measures were conceptualized into three learning dimensions (observational, communi-

cational, and experiential), the lack of scale convergence for one dimension (experiential, as noted above) requires the presentation of disaggregated results.

The three most consistently reported methods of learning about the norms around analytics and metrics were observational or communicational in nature. The primary method was watching or reading about how people in the respondent's network use or talk about analytics and metrics ($M=4.99$, $SD=1.73$), followed by chatting with people about the way they are used or talked about ($M=4.77$, $SD=1.79$) and asking people for advice on how to use or talk about them ($M=4.64$, $SD=1.86$). Two of the three least-used methods were conceptualized as experiential in nature, with seeing how people respond when the respondent uses or talks about them ($M=4.24$, $SD=1.87$) followed by observing how people are treated when they use or talk about them ($M=4.19$, $SD=1.89$) and being punished or rewarded for the way the respondent uses or talks about them ($M=3.54$, $SD=2.19$).

Multiple regression models were used to assess the impact of situational factors for each learning method. As shown in Table 4, no factor was statistically significant for all six learning methods. Rather, some predictors were predictive for just some of the methods. Market competition was the most commonly predictive variable, with the perception of greater competition being linked to increased use of all learning methods—though only four of them were statistically significant. Those in a managerial capacity were also more likely to watch or read about how people use or talk about them and see how people respond when they use or talk about them. Those working in organizations focused on online media were more likely to observe how people are treated when they use or talk about them and see how people in their network respond when they use or talk about them. Finally, the more journalism experience one had, the less likely it was that they would infer norms from the punishments or rewards they experienced.

Discussion

Amid widespread use of quantification tactics to construct audiences and establish the popularity and value of media content, this study addressed an under-examined dynamic: what kinds of people and processes are most influential in shaping the social rules and expectations that media workers incorporate in their use and rationalization of audience analytics and metrics? By answering these questions in the context of journalism, a domain where metrics have become especially salient in recent years (Zamith, 2018), this study offers a perspective on the ways that technologies become socially influenced and on the taken-for-granted understandings that emerge around metrics as a manifestation of what counts. Moreover, the case of journalism serves as an entry point for more fully reckoning with the myriad social structures and individual dispositions that influence how emerging technologies are perceived and applied across a variety of organizational and institutional environments.

To recap, this study first found that respondents generally expressed receiving a moderate amount of training and mostly from their own news organization. Second, respondents reported most often looking toward internal referents, with particular attention paid to superiors when thinking about metrics. Third, respondents expressed that they learned more about analytics by observing others or communicating with them, as opposed to

Table 4. Summary of multiple regression analysis for variables predicting the use of different learning methods.

Variables	Watching (observational)			Treatment (observational)			Asking (communicative)			Chatting (communicative)			Responses (experiential)			Punishment (experiential)		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Control variables																		
Gender (male)	-.29	.17	-.08	-.35	.20	-.09	-.44**	.19	-.12	-.58**	.18	-.16	-.43*	.19	-.11	-.02	.24	.00
Income	.00	.03	.00	-.02	.04	-.03	.01	.04	.02	.03	.04	.05	-.02	0.04	-.04	-.03	0.05	-.04
Political orientation	-.02	.06	-.02	-.01	.07	-.01	-.01	.07	-.01	.05	.07	.03	.04	0.07	-.03	-.01	0.09	-.01
Individual level																		
Journalism education (yes)	.27	.17	.08	.11	.19	.03	.01	.19	.00	.24	.18	.07	.03	0.19	.01	.33	0.24	.07
Experience in journalism	-.01	.01	-.07	-.01	.01	-.06	.00	.01	.00	.00	.01	-.01	.00	0.01	-.03	-.02*	0.01	-.11
Managerial capacity (yes)	.66***	.18	.19	.28	.21	.07	.39	.21	.11	.35	.19	.10	.47*	0.21	.13	.21	0.27	.05
Organizational level																		
Reader revenue	.06	.04	.08	.05	.05	.06	.13**	.04	.15	.07	.04	.09	.05	0.05	.06	.02	0.06	.02
Market competition	.20**	.06	.17	.11	.07	.08	.20**	.07	.15	.18**	.07	.14	.21**	0.07	.15	.00	0.09	.00
Organization size	.05	.12	.02	.22	.14	.09	-.14	.13	-.06	.01	.12	.00	.07	0.14	.03	.31	0.17	.11
Vehicle (newspaper)	-.13	.28	-.04	.40	.32	.10	.06	.31	.02	-.18	.29	-.05	.57	0.32	.15	.76	0.42	.16
Vehicle (online)	.24	.29	.06	.83*	.34	.19	.29	.32	.07	.12	.31	.03	.71*	0.33	.16	.68	0.43	.13
Observations	422			410			414			418			408			372		
R ² /adjusted R ²	.105/.081			.058/.032			.076/.050			.088/.063			.066/.040			.046/.017		
F	4.393***			2.235*			2.985***			3.548***			2.543**			1.577		

The reference group for Vehicle is Magazine. Different observation values are due to non-response or applicability of the response variable.
 *p < .05; **p < .01; ***p < .001.

reflecting on their own experiences with the technology. Finally, respondents were primarily influenced by their perceived organizational context, though their position within the editorial hierarchy was also an important factor. Taken as a whole, these findings reveal that norm formation about audience analytics and metrics in newsrooms appears to involve both formal and informal processes that operate on both direct and indirect pathways. Notably, respondents perceived prescriptive (top-down instructions) and non-experiential learning mechanisms (i.e. watching and learning from others) as being particularly influential, which in turn implicates scholarly understanding of how technologies become socially constructed. However, experiences varied across situational contexts, highlighting the importance of examining local settings.

When it comes to making sense of audience analytics, there appears to be little prescription in the form of formal instruction endorsed by organizational leaders (i.e. training) and, consequently, more opportunity for such norms to be negotiated in a less formal manner. This could be partly because of confusion over how to best measure “success” or the relative impact of content (Powers, 2018)—and it contributes to the lack of agreement regarding how to determine those two things (Nelson, 2018). This intra-organization focus offers the possibility that prescriptions about “good” uses of analytics and metrics may be more sensitive to the organizational context (e.g. the media outlet’s objectives). Furthermore, when the training comes from the outside, it more often comes from within the immediate field (i.e. a parent organization rather than an outside analytics company). Thus, while external organizations—and analytics companies in particular—exert ample influence in establishing the technological affordances, their *direct* influence on how media workers perceive acceptable practices in newsrooms, as measured through training, is perhaps less consequential than previously thought (cf. Belair-Gagnon and Holton, 2018; Petre, 2018).

The combination of a superior-oriented reference network and the moderate amount of training appears to support Arenberg and Lowrey’s (2019: 145) assertion that “management both directly and indirectly influences reporters’ use of metrics” and their perceptions of what is acceptable (see also Breed, 1955; Bunce, 2019). That is, even with informal mechanisms, norm formation would still appear to follow a top-down approach. This is consistent with prior work examining technological diffusion within media organizations (e.g. Singer, 2004). The perceived import of superiors may also be indicative of a form of what Fulk (1993) calls “attraction,” which if true would result in an increased likelihood that the superiors’ norm conceptions would be internalized by organizational members, leading to greater acceptance and conformity (Fulk, 1993). This is particularly notable in light of the significantly larger amount of training that managers receive from analytics companies. Thus, while analytics companies’ direct influence may be limited, their *indirect* influence may be considerable—and a two-step flow of opinion leadership offers a more useful lens for assessing their impact on newsroom norms and practices (Rössler, 2017; Thornton and Ocasio, 2008). However, as anticipated by SIT, the locus of influence is still *within* the organization, as that is the setting where the greatest recurrence of interaction occurs and where actors are most proximate (Fulk, 1993; Fulk et al., 1990).

Respondents’ tendency to draw on others’ understandings and experiences, either through observational or communicational learning methods, rather than reflecting on

their own experiences with the technology, underscores the importance of examining the broader social context in which the technology is embedded (see also Singer, 2003). Put differently, while direct experience with the technology is no doubt important to the construction of that technology, interactions that do not involve direct engagement with the technology are also key when it comes to audience analytics. This is consistent with SIT's emphasis on vicarious learning and the tradition of social learning theory (Bandura, 1986; Fulk et al., 1990). Moreover, the statistical modeling underscores the influence of one's situational context on the socialization practices around the technology—as we have seen with some earlier media technologies (see Boczkowski, 2004). All of the organization-level situational factors were significant variables in different aspects of this study. In contrast, the demographic controls and individual-level factors (with the exception of one having managerial responsibilities) were less meaningful. This is, again, consistent with SIT's contention that influences at the organizational level are particularly powerful (Fulk, 1993; Fulk et al., 1990).

The nature of this survey precludes an examination into why particular situational factors matter to certain aspects, but the literature can offer some indications. For example, the significant influence of reader-derived revenue may indicate that organizations that depend on stronger relationships with audiences perhaps recognize and seek ways to use analytics to link subscribers' interests with their information needs (see Tandoc and Thomas, 2015). Or, perhaps it suggests that individuals require additional training given the more complex conceptions of "success" at such organizations (see Nelson, 2018; Powers, 2018). Market theory may serve as a useful entry point for examining these questions (Ferrucci, 2018), but the finding underscores a core proposition of AST that simple efficiency is not necessarily the primary criterion applied in the selection of a technology to further an objective (Fulk and Yuan, 2017). In addition, individuals in larger organizations may feel like they have sufficient expertise in-house as a product of scale, and online-focused media outlets may similarly feel like they have more digitally fluent workers who understand analytics better. The result may be a propensity among media workers to focus on internal referents with regard to metrics, perhaps leading them to develop idiosyncratic norms that are more reflective of particular organizational ambitions than universal professional ideals (see Arenberg and Lowrey, 2019; Hanusch, 2017). This all adds up to a broader intervention: that scholars must be sensitive to situational factors when examining attitudes, socialization, and uses of audience analytics and metrics within media work.

Taken together, these findings offer several directions for the larger study of social influences, organizations and institutions, and technological constructionism. At least in the early phase of technology adoption within a given field, the formation and diffusion of norms may be more locally situated and less broadly institutionalized (cf. Lowrey, 2011). This highlights the value of a more organizationally focused framework for capturing the social shaping of technology, rather than a macro-level approach that might miss important organizational dynamics (see Boczkowski, 2004; Fulk and Yuan, 2017; Thornton and Ocasio, 2008). Simultaneously, these findings also suggest that theories that put the organization and its members front and center—including, to some extent, SIT and AST—may miss the impact that organizational outsiders exert by virtue of a

two-step flow or via institutional logics (Fulk et al., 1990; Poole and DeSanctis, 1990; Rössler, 2017). This is particularly important given constantly shifting media ecologies, wherein actors previously on the peripheries of media industries have moved closer to their centers (Belair-Gagnon and Holton, 2018). To that end, sociological concepts such as embedded agency, institutional leadership, and structural overlap (see Thornton and Ocasio, 2008) could complement organization-oriented frameworks to more fully examine consequential structuration forces—and in the process create opportunities for theory-building. Such concepts could be used to explore the ways in which broader social forces, such as role conceptions and audience expectations, implicate local contexts, and further connect media studies with market theory to disentangle the impact of industry-wide economic markers. We thus echo Fulk and Yuan's (2017) call to develop theoretical ensembles that unite concepts from epistemologically compatible theories, as the "expansion of the landscape through other theories can enrich both the ensemble itself and our understanding of the individual theories embedded in it" (p. 16).

In interpreting the study's findings, it is important to remain cognizant of certain limitations. First, the organizational-level variables only reflect perceptions (e.g. perceived import of reader-derived revenue rather than the actual breakdown). While those perceptions may not reflect reality, they nevertheless play a meaningful structuring role (Bicchieri et al., 2014). Second, the study did not examine variables at the social institutional level or higher, including potentially explanatory factors like the health of the media market and the industry at large. Third, the lack of convergence in one dimension of the learning methods instrument and the generally low explanatory power of the associated models highlight the need for better measurements of social learning processes. Such methodological development in communication research would prove insightful to the examination of norm development.

Finally, turning the gaze to future research on media work and audience quantification, scholars are encouraged to more closely examine organizational superiors and traditionally peripheral actors such as analytics companies (Tandoc, 2019)—and, in particular, their values, role conceptions, and routines—in order to better understand the interpretations that emerge among those actors around metrics as a manifestation of what counts and how those interpretations diffuse within social systems. In doing so, scholars should remain mindful that the ubiquitous technologies that enable audience measurement are not just artifactual in nature. Analytics become socially constructed as they are deployed, and a sensitivity to the organizational context and one's position within the organizational hierarchy is key to understanding the socialization mechanisms surrounding that technology. The blending of concepts from theories of social constructionism and institutional logics may help further discern the most meaningful of those factors and the mechanisms by which they operate. Ultimately, these dynamics matter for what they reveal about broader patterns in the way emergent technologies are perceived and applied.

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