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When algorithms meet journalism: The user perception to automated news in a cross-cultural context

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ABSTRACT

Automated journalism – the use of algorithms in writing news reports – underscores the new direction of media transformation in the 21st century as it may reshape how the news is produced and consumed. Such writing algorithms have been increasingly adopted in U.S. and Chinese newsroom, but how well they are accepted by news users deserves more research. A comparative study was thus conducted to examine how U.S. and Chinese news users perceive the quality of algorithm-generated news reports, how much they like and trust such reports. Results show that U.S. and Chinese users demonstrated more shared, rather than different, perceptions to automated news. The users did not perceive automated content in a linear way, but viewed them by considering the interaction of the authors (i.e., journalists or algorithms), the media outlets (i.e., traditional or online media) and cultural background (i.e., U.S. or Chinese users).

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1. Introduction

The practice of journalism “has always been influenced, constrained and structured by technology” (Pavlik, 1999, p. 54). The advances in computational tools provide journalists new ways to report the news, such as editing video on the go, live reporting from hurricane-hit areas or analyzing a massive amount of data for investigative reporting. By improving the quality and in-depth of news reports, these tools start altering the traditional process of news production. The tools, however, did not contest journalists’ “authority for actually creating the news” (Graefe, 2016, p. 4), which is the core business of news industries. For centuries, writing news had been under the control of journalists until the recent rise of automated journalism. Comparing to other computational tools, automated journalism underscores the new direction of media transformation, which may reshape and disrupt how the news is produced and consumed, for better or worse. The advent of automated news raises a series of concerns and questions, for instance,

are the algorithms going to replace human journalists in writing news, what are the implications for journalistic practices and news media as a whole, how do news users perceive automated news reports in terms of quality, credibility and liking? The present study will mainly explore the answers to the last question.

The research on automated content is still at its initial stage (Carlson, 2015; Dörr, 2015; Napoli, 2014). Many studies in this stream focus on the impact of automated journalism on news organizations (Carlson, 2017; Napoli, 2014), journalists (Carlson, 2015), journalistic practices (Dörr, 2015), journalists’ experiences in using automated technology (Thurman, Dörr, & Kunert, 2017), and journalists’ opinions on the technology (Van Dalen, 2012). Fewer studies, however, investigate the user perception to automated content (see Clerwall, 2014). A few recent studies in this regard start to look into users’ responses (e.g., Clerwall, 2014), but none was found to examine it in a cross-cultural environment. Employing a cross-cultural approach, this study investigates how news users in the United States and China perceive algorithm-generated news reports differently from those written by journalists. Results from this study should contribute to a better understanding of the user perception to automated content in a cross-cultural setting, which becomes an essential part of today’s media ecology. Moreover, the findings help provide insights into the

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diffusion of algorithmic journalism and the new direction of media transformation in the 21st century.

2. Literature review

Few journalists could predict, just a couple of years ago, that their core business – writing news – could be done so *quickly* by algorithms installed in newsroom computers. Part of the reason is that writing has long been taken as an “innately human” activity (Carlson, 2017, p. 228), an assumption that was not much challenged even when human-computer interaction becomes normal in the information age (Card, Moran, & Newell, 1986). The assumption, however, is seriously contested as algorithms are developed for writing news articles like earning reports, sports updates and breaking news. It is worth noting that today's algorithms could create and personalize an enormous number of articles much quicker, cheaper, and potentially with fewer errors than any human journalist (Oremus, 2015). The algorithms could work 24/7 in newsroom, never needing a sick day nor asking for a pay rise. More importantly, the overall quality of automated journalism keeps improving at a lightning speed these years, which may lead to big changes to the nature of journalism as a profession (see Lewis, 2015).

2.1. Automated journalism

Automated journalism can be viewed as the latest development of computational journalism (Anderson, 2012; Gynnilid, 2014; Hamilton & Turner, 2009). Computational journalism refers to “the combination of algorithms, data, and knowledge from the social sciences to supplement the accountability function of journalism” (Hamilton & Turner, 2009, p. 2). Since the 2000s, computational journalism is increasingly adopted by newsrooms around the world. Hamilton and Turner (2009) contend that computational journalism builds on two familiar approaches, computer-assisted reporting and the use of social science tools and models, which are also known as “precision journalism” (Meyer, 2002) or “data journalism” (Gray, Bounegru, & Chambers, 2012). Those tools, to some extent, have shaped how news content is produced. The tools are used to assist journalists in analyzing a massive amount of data so to improve the quality of reports, but not to replace human journalists in writing stories. Simply, the tools have brought big changes to the practice of journalism. Most of the changes at this stage were about altering the process of news gathering, production and distribution, but not about writing stories, which, we argue, belong to the first stage of media transformation.

The rise of writing algorithms represents a new phrase of media transformation as they begin to reshape the fundamental part of news business – writing stories. In this study, we view the new phrase as the second stage of media transformation, which is mainly featured by automated journalism – the use of algorithms in writing news reports (Carlson, 2017; Dörr, 2015; Gynnilid, 2014; Napoli, 2014). In other words, algorithms may take away some bylines from human journalists. At the second stage, news media are at an ever faster rate of transformation thanks to the advances in developing algorithms of natural language generation (NLG) (Reiter & Dale, 2000). The NLG algorithms, which are built upon the development of language recognition (Lee, Hon, & Reddy, 1990, p. xxi), have made their way into the newsrooms around the world. They can generate full news reports, such as sports updates, financial analyses and breaking news with little or no help from human journalists.

Scholars propounded numerous definitions on automated journalism (Carlson, 2015, 2017; Clerwall, 2014; Napoli, 2014; Thurman et al., 2017), which is also known as algorithmic

journalism (Anderson, 2012; Dörr, 2015; Napoli, 2014), or even, misleadingly, as robot journalism (Oremus, 2015). Following other scholars (Carlson, 2017; Dörr, 2015; Gynnilid, 2014; Napoli, 2014), we define automated journalism as the process of using writing algorithms to automatically generate natural language texts in news formats with little human input. In a sense, automated journalism underscores the future development of news production.

2.2. Writing algorithms in U.S. and Chinese newsrooms

Part of the future news production is evident today at some U.S. and Chinese newsrooms, where writing algorithms are being developed for producing a growing part of news content with little human interference. In the United States, “Quill” and “Wordsmith” are two well-known writing algorithms, which are developed, respectively, by tech companies Narrative Science and Automated Insights. Quill from Narrative Science uses intent as its guide to develop stories, which transforms data into automated, natural language narratives. Wordsmith from Automated Insights has joined the Associated Press (AP) to write stories since 2014. The AP produces thousands of stories every quarter with the help of Wordsmith and other writing algorithms. The *Washington Post* started using its own writing algorithms, Heliograf, to cover the Rio Olympics in 2016, and to automate election reports on congressional and gubernatorial races as well as high school football games (Moses, 2017).

Algorithms are working hard in China's newsrooms, too. Toutiao, an online news portal, began to use self-developed “Xiaomingbot” to cover the 2017 Olympics and generated over 450 sports reports that were read by over one millions readers (Yin, 2017). The Tencent News has developed its own algorithms named “Dreamwriter” used for writing Chinese-language financial reports. In September 2015, Dreamwriter completed its first business report on inflation in one minute, containing over 1000 Chinese characters (He, 2015). China's national news agency Xinhua has also used its robotic writing tool “Kuaibi Xiaoxin,” (*Fast Pen*) in writing wire stories. A growing number of internet companies weight in developing NLG algorithms for news media, and more news organizations are using them in producing content (Glaser, 2017).

Algorithms are also increasingly used in news selection and editing for most online news portals, such as Google News, Apple News, and BuzzFeed News in the United States, and Tencent News and Toutiao in China. In coming years, news users are expected to encounter more news articles written by algorithms, online or offline. Some users may consciously realize the reports at hand are not written by humans, but the same automated articles may not be evident to others who notify few differences between those written by humans and algorithms. It is imperative to study users' perceptions towards automated content at the diffusion stage; otherwise the technology's novelty could quickly disappear after it reaches a critical mass (Park, 2010; Zhong, 2013).

2.3. A cross-cultural study

Culture has been found to have a significant influence on how people deconstruct and respond to the news information they encounter. But culture is not just one thing, rather it is multifaceted, consisting of shared values, beliefs, norms and more. Triandis (1994) defines culture as “unstated assumptions, standard operating procedures, ways of doing things that have been internalized to such an extent that people do not argue about them” (p. 6). Hall (1959) argued, “Culture is communication and communication is culture” (p. 218), who also proposed a classic theoretical framework

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