

# Information Quality Research Challenge: Information Quality in the Age of Ubiquitous Digital Intermediation

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As information technology becomes an integral part of daily life, increasingly, people understand the world around them by turning to digital sources as opposed to directly interacting with objects in the physical world. This has ushered in the age of Ubiquitous Digital Intermediation (UDI). With the explosion of UDI, the scope of Information Quality (IQ) research is due to expand dramatically as the challenge becomes to capture the wealth and nuances of human experience. This article presents three key changes to the IQ landscape brought about by UDI, including expansion of the scope of traditional IQ dimensions, digital to physical mapping challenge, and the increased need to manage content authenticity. UDI generates many novel questions and opportunities for the IQ research community.

CCS Concepts: • **Information systems** → **Information systems applications**; • **Social and professional topics** → **Quality assurance**

Additional Key Words and Phrases: Ubiquitous digital intermediation, digital to physical mapping, quality of emotions, content authenticity

## ACM Reference Format:

Roman Lukyanenko. 2016. Information quality research challenge: Information quality in the age of ubiquitous digital intermediation. *J. Data and Information Quality* 7, 1–2, Article 3 (February 2016), 3 pages. DOI: <http://dx.doi.org/10.1145/2856038>

As information technology becomes an integral part of daily life, human society is being “enveloped” [Floridi 2012] by an ever-expanding digital world. People create digital information to conduct basic life’s affairs: to communicate with others, open a bank account, apply for a mortgage, schedule an appointment, document a hospital case, record a diary, or find a life’s companion. Concomitantly, to understand the world around them, organizations and individuals are turning to digital sources. We introduce the term *Ubiquitous Digital Intermediation (UDI)* to describe the *expanding practice of relying on digital information for representing, accessing, or manipulating human mental states and physical and social objects as opposed to directly interacting with the states and objects in reality*. Although digital intermediation is not new [Kent 1978; Wand and Weber 1993], UDI underscores a fundamental societal change as digital information is becoming the principal means of relating to the world.

Information and Information Quality (IQ) has always been vital in data-driven organizations. Yet, initially, digital information played a relatively narrow role: automating processes and supporting well-defined decision tasks [e.g., Abdel-Hamid 1988; Laudon 1986; Lee et al. 2006]. Corresponding research on IQ focused on ensuring that information was accurate, complete, and timely for the tasks at hand. With the explosion of UDI, the scope of IQ research is due to expand dramatically as the challenge becomes

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DOI: <http://dx.doi.org/10.1145/2856038>

to capture the wealth and nuances of human experience in digital form. Herein, we outline key changes to IQ landscape brought about by UDI:

- Expansion of the scope of traditional IQ dimensions.* The demand for communicating the full richness of human experience expands the scope of traditional IQ dimensions. Traditionally, much of human discourse occurred through direct contact, and digitization affected aspects of experience most amenable to it. Even the most recent notions of accuracy and completeness continue to deal with declarative facts and statements [e.g., Todoran et al. 2015; Lukyanenko et al. 2014]. With the increased diversity and sophistication of digital forms, however, we now need measures that include episodic (i.e., personal experiences) and procedural knowledge (knowing by doing), as well as emotions and feelings. Correspondingly, conceptualizations and methods to evaluate and improve IQ of sounds, videos, emoticons, and animations also are needed.
- Digital to physical mapping challenge.* The accessibility and convenience of digital content create opportunity costs when dealing with reality. An accountant, for example, may prefer to query a database rather than observe physical assets [Wand and Weber 1993]. A consequence of UDI is having to maintain an accurate and up-to-date mapping between digital content and physical referents. This includes tying the content to the author, especially in anonymous contexts (e.g., social media), and the detection and, possibly, prediction of reality change through an analysis of digital sources. Furthermore, rather than assuming correspondence, special tools and techniques for continuous assessment of the accuracy and completeness of digital-to-physical mapping are needed to ensure that the digital universe is in sync with the physical one (and, sometimes, vice versa).
- Managing content authenticity.* UDI gives rise to heightened concerns about the extent to which the original message is free from external interferences: *content authenticity*. This includes detecting and mitigating cyber hijacking and identity theft, but also involves understanding the impact of system features on content. For example, a patient filling out her own medical record may struggle to navigate and fully understand the concepts and structure of a telemedicine application, thus precluding the disclosure of all situational nuances and resulting in the original “authentic” message being distorted. So, far the potential of system-related distortions has received scant consideration, yet, with the ongoing industrialization of data creation, the need for systematic analysis and detection of system-related inauthenticities becomes more pressing.

UDI suggests an expansion of methods used in IQ research [Madnick et al. 2009]. These can be informed by recent methodological advancements in the reference disciplines of IQ, such as psychology and computing. Novel methods in psychology developed to capture emotions, embodied cognition, and complex situated processes suggest the importance of paying more attention to biophysical (e.g., neural imaging, perspiration, nonverbal communication) and qualitative (e.g., narratives, introspection) methods in IQ. The proliferation of sensor-rich mobile and wearable devices creates opportunities for field studies of the complexities and contingencies of real-world information creation and consumption. Major advances in Artificial Intelligence (AI), such as natural language processing, computer vision, and hybrid intelligence (augmenting AI with humans) can support nuanced measures of human experience, but also advances predictive modeling and pattern discovery that can be used to tackle challenges of content authenticity (e.g., using stylometry) and digital-to-physical mapping.

UDI calls on the IQ community to support this major societal change with innovative and exciting research.

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Received September 2015; revised November 2015; accepted December 2015