Right-click Authenticate Adoption: the impact of authenticating social media postings on information quality

Pardis Pourghomi[1], Ahmed Abu Halimeh[1], Fadi Safieddine[1], Wassim Masri[1]

[1] The American University of the Middle East,
P.O.Box: 220, Dasman, 15453, Kuwait
{Pardis.Pourghomi, Ahmed.AbuHalimeh, Fadi.Safiedinne, Wassim.Masri}@aum.edu.kw

Abstract

Getting the daily news from social media has nowadays become a common practice among people. Unreliable sources of information expose people to a dose of hoaxes, rumors, conspiracy theories and misleading news. Mixing both reliable and unreliable information on social media has made the truth to be hardly determined. Academic research indicates an increasing reliance of online users on social media as a main source of news. Researchers found that young users, in particular, are to believe what they read on social media without adequate verification. In previous work, we proposed the concept of 'Right-click Authenticate' where we suggested designing an accessible tool to authenticate and verify information online before sharing it. In this paper, we present a review of the problem of sharing misinformation online and extend our work by analyzing the ways in which 'Right-click Authenticate' reduces the challenges of while improving key metrics within the Information Quality fields.

Keywords: Social Media, Misinformation, Fake News, Information Quality.

1. Introduction

Over the past several years, social media sites, such as Facebook, Twitter, Instagram, and Youtube have drastically changed the social interaction landscape by creating new platforms for communication and information exchange. Organizations and individuals are striving to integrate information from various social media into their daily business practices in recruiting, sales and marketing [1]. Yet, if individuals are to rely on data collected through social media sites, they need to understand the quality of information emanating from these sites. Although there are concerns with the quality of this information, understanding relevant quality attributes and effective means of their assessment is limited. This has raised, for many researchers, the question of the quality of user-generated content in social media [2].

Given the distinctive characteristics of social media such as wide accessibility, permanence, global audience, recentness and ease of use, Information Quality (IQ) in this context is quite unique [3, 4]. Social media has extended knowledge creation boarders across organizational boundaries, therefore unlike traditional information systems, users have no control to influence quality of the information obtained [5]. According to [6, 7], IQ has been defined from the user's point of view that is the extent to which the information fits for the intended use of the consumer. Yet, with the lack of means to verify information, social media has been accused of becoming a hotbed for sharing of misinformation. Facebook as one of the largest social networking services has been facing widespread criticism on how its newsfeed algorithm is designed thus amplifying dissemination of misinformation [8].

2. Background

This section describes the problem of misinformation propagation in social media and focuses on how important this problem is. It then provides a summary of IQ dimensions and metrics in addition to discussing their role of IQ on social media. Our previously proposed approach, namely, Right-click Authenticate (RCA) is then briefly explained to ground the further analysis in presented in the next sections.

2.1 Misinformation spread in online social networks

Several social media outlets such as Facebook, Youtube, and Twitter are becoming the main source of news and information for online users. There is, however, some validated concerns in using these models since there is little accountability and source validation resulting in spread of misinformation propagation. Social media networks are being blamed of not doing enough to combat the spread of misinformation and allowing the spread of fake news [8]. Limiting the spread of misinformation on the web has so far proved very difficult if not impossible especially when considering the variety of online social media websites [9].

Some researchers have attributed the problem of spread of misinformation online to the algorithms employed by some social media [10]. Facebook algorithms, for example, do not distinguish what users' feeds get or attempts to validate news posts that are being shared. Hence fake news posts are able to spread in a very similar way as genuine news. A Ipsos survey [11] of Facebook users demonstrates that individuals using Facebook as their main source of news are more likely to categorize misleading news as correct [11].

A survey conducted by Pew research [12] showed that a 62 percent of U.S. adults depend on news they see on social media and this may include misinformation and fake news. What is more concerning is that this survey shows that even though many social users recognize the presence of fake news on social media, these users still consider social media a main source of reliable news.

2.2 Information quality

The meaning of information quality lies in how the information is perceived and used by its consumer. Though absolute attributes are important, it is how those attributes are perceived, now and in the future, that defines information quality. Identifying quality information involves two stages: first, highlighting which attributes are important and second, determining how these attributes affect the customers in question. Accuracy can be seen as just one element of IQ but, depending upon how it is defined, it can also be seen as encompassing many other dimensions of quality. In other scenarios, it is often observed that there is a trade-off between accuracy and other dimensions, aspects or elements of the information determining its suitability for a given task. Table. 1 [13] provides a summary of dimensions used in assessing IQ.

Table 1. Information Quality Categories and Dimensions

Information Quality	Intrinsic IQ	Accuracy
		Believability
		Objectivity
		Reputation
	Contextual IQ	Value added
		Relevancy
		Timeliness
		Completeness
		Amount of data
	Representational IQ	Interpretability
		Ease of understanding
		Representation & consistency
		Conciseness of representation
		Manipulability
	Accessibility IQ	Access
		Security

In [14] authors study the unique characteristics of social media and address how existing methods fall short in mitigating the IQ issues it faces. Despite being extensively studied, IQ theories have yet to be embraced in tackling IQ challenges on social media. They redefined social media challenges as IQ challenges and they proposed an IQ and Total Data Quality Management (TDQM) approach to the Social media challenges. They mapped the IQ dimensions, social media categories, social media challenges (Table 2 and 3), and IQ tools in order to bridge the gap between the IQ framework and its application in addressing IQ challenges on social media.

The IQ dimensions discussed above can be used to assess IQ of social media. In this paper, these dimensions will be studied since they have been used widely in IQ research and they are the most cited dimensions in IQ literature [3] ,[7] ,[14] ,[15], [16], [17].

Table 2. Mapping Information Quality *Challenges* and Social Media [14]

	Accuracy	Believability	Objectivity	Reputation	Value-added	Relevancy	Timeliness	Completeness	Amount of Data	Interpretability	Ease of Understanding	Ease of Understanding Consistency	Manipulability	Conciseness	Accessibility	Security
Spam	X	X		X	X	X										
Contextual Relevance						X										
Colloquial Usage and Intentional Misspelling	X				X											
Information Overload									X		X		X	X		
Freshness of Information	X	X		X			X									

Table 3. Mapping Information Quality *Dimensions* and Social Media [14]

	Accuracy	Believability	Objectivity	Reputation	Value-added	Relevancy	Timeliness	Completeness	Amount of Data	Interpretability	Ease of Understanding	Ease of Understanding Consistency	Manipulability	Conciseness	Accessibility	Security
Blogs	L	M	L	L	L	M	M	L	M	M	H	L	M	L	L	M
Media Sharing	NA	M	L	L	L	M	M	L	M	L	M	L	L	L	M	M
Micro Blogging	L	L	L	L	L	L	H	L	L	L	M	L	L	H	L	L

Social Bookmarking	M	M	L	L	L	M	M	L	L	L	L	L	L	M	L	M
Social Friendship Network	NA	M	L	M	M	L	M	L	L	L	M	M	L	H	H	L
Social News	M	M	M	M	L	M	H	M	L	L	M	M	L	L	H	H
Wikis	M	M	M	M	L	M	L	M	H	M	H	H	H	M	H	M

They mapped the IQ dimensions to different social media categories as presented in Table 2 and 3. This shows the significance of individual dimension for different types of social media on a scale of high, medium, and low denoted by H, M, and L respectively. Not applicable (NA) is used in the case that the IQ dimension does not apply to a specific social media context.

According to their mapping, Social News is considered to add little value to the needs of its consumers, and not everyone think that its content is accurate; for the scales of significance of Social News, they assigned Low, Medium and High respectively to the IQ dimensions of value-added, accuracy and timeliness. The IQ dimensions discussed above can be used to assess IQ of social media. However, Agarwal and Yiliyasiv [3] found in their study that social media IQ problems do not map to any accessibility and security measures, and they found accuracy is not applicable for media in media sharing and social friendship networks as well. However, this remains a subjective evaluation since social media content can be subjectively and objectively measured using IQ metrics and tools, and very few researchers and social media operators have focused on or utilized IQ frameworks to address the challenges in the social media [14]. Thus, our 'Right-click Authenticate' approach has the potential of playing significant role in creating and maintaining high quality social media that deliver high quality information.

2.3 Right-click Authenticate (RCA)

The 'Right-click Authenticate' approach - previously proposed in [18] reviews, ranks, and identifies misinformation. We identified three categories of authentication: textual, imagery, and video misinformation while we concentrated on the first two: textual and imagery authentication. Using this approach, users who want to check the validity of the news could right-click and select authenticate as conceptualized in figure 1.
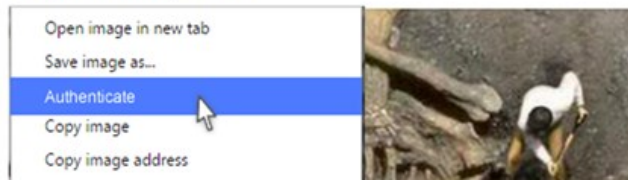
Fig.1. Conceptualizing 'Right-click Authenticate' option

'Right-click Authenticate' does not prohibit sharing of misinformation; it provides a demonstration of facts in the same layout as Wikipedia [18]. Furthermore, the authors showed that the tools and procedures that might be used to authenticate text and images are available online but may need support among different organizations.

Fig. 2. Conceptualizing 'Right-click Authenticate' results

'Right-click Authenticate' exemplifies an important step to examine and forecast the dynamic tendency of misinformation dissemination. In [19, 20], we proposed a scheme for combating misinformation online through identifying and demonstrating key variables and factors. The proof-of-concept has been constrained with conventions recognized on remarks of 2D and 3D computer simulation as well as reflective analysis subjective to individual practices of the research group. These simulations provided a way to exam the effectiveness of a control strategy before the actual employment of the control strategy.

3. Research objectives

The aim of this paper is to evaluate the RCA approach against the four metrics of IQ and thus to investigate the impact this approach can have on the 'Accuracy', 'Authority/verifiability', 'Validity', and 'Believability' dimensions of IQ. The purpose of this paper is therefore to provide an analysis describing the ways in which RCA impacts the above-mentioned metrics. In so doing, we focus on the following research question:

How 'Right-click Authenticate' approach would affect Information Quality metrics for information propagation on social media?

To achieve this, the team set out to do the following:

1) Present the current state of each metrics for IQ on Facebook. Facebook has been selected as the case since it has been considered one of the largest social media networks in the world. Although the assessment of each metric is considered subjective, the team will attempt to back their justification with evidence where applicable.

2) The team will then discuss how introducing RCA to Facebook would affect the IQ metrics. This will be result in the re-mapping of the metrics presented in Table 2 and 3.

3) Finally, the team will evaluate the impact of the change and its level of significance (if any).

4. Research outcome

The research outcome follows the research objectives outlined above.

4.1 Re-evaluating of the IQ metrics for Facebook

In evaluating the IQ challenges of Facebook, the team identified differences when it comes to using Facebook as a source of news. Table 4, shows that challenges associated with using Facebook as source of news has impact on three IQ metrics. Contextual Relevance of the information with regards to Accuracy, Believability, Value-Added, and Ease of Understanding Consistency became new IQ challenges. With regards to Information Overload, news sharing on Facebook would have Interpretability challenges. The team did not believe Manipulability of news as an Information Overload challenge and thus it was removed. Finally with regards to Freshness of Information, the team agreed that this reflected live news and added Value-Added, Relevancy, and Manipulability as new challenges. It is evident from this mapping that using Facebook as source of news introduces new IQ challenges and a sum of 16 challenges.

Table 4. Mapping Information Quality challenges and Facebook

	Accuracy	Believability	Objectivity	Reputation	Value-added	Relevancy	Timeliness	Amount of Data	Interpretability	Ease of Understanding	Ease of Understanding Consistency	Manipulability	Conciseness
Contextual Relevance	X	X			X	X					X		
Information Overload								X	X	X		R	X
Freshness of Information	X	X		X	X	X	X					X	

Table 5 maps the Information Quality dimensions for Facebook focusing on the one element associated with sharing of fake news and misinformation where in the original work of [14] it had been identified as 'Social News'.

Table 5. Mapping Information Quality social news dimension and Facebook

	Accuracy	Believability	Reputation	Value-added	Relevancy	Timeliness	Amount of Data	Interpretability	Ease of Understanding	Consistency	Conciseness

Social News	L	H	M	L	M	H	M	M	H	M	H

Our analysis shows that Accuracy should be considered low, Believability should be high, the Amount of Data is medium, Interpretability of information is medium, East of Understanding is high, and Conciseness is high. The results represent a fine tuning that reflects the changes in how Social News is viewed and perceived in recent times. The key problematic areas are the low accuracy, high believability, and low value-added.

4.2 RCA approach and its impact on IQ challenges

In considering the impact of applying RCA as a tool to help validate news and information online, the team revaluated the IQ challenges. The outcome in table 6 shows a significant reduction in IQ challenges for social media news when a tool for validating misinformation is in use. The team considered that having a tool that would allow means to validate news and information will render concerns about Accuracy, Believability, Objectivity, Reputation, Value-added, Relevancy, and Timeliness in relations to Contextual Relevance and Freshness of Information less challenging. When social media users of Facebook are able to validate if the news is factual, this will have a cascade effect on all these IQ dimensions. However, RCA does not seem to have much impact on Information Overload as expected earlier in our review since RCA does not stop the spread of information and misinformation. There has been some debate if it could remove challenge of Amount of Data, nevertheless it has been agreed that this would not eliminate this problem.

Table 6. Mapping Information Quality challenges for Facebook using RCA

	Accuracy	Believability	Objectivity	Reputation	Value-added	Relevancy	Timeliness	Amount of Data	Interpretability	Ease of Understanding	Ease of Understanding	Consistency	Manipulability	Conciseness
Contextual Relevance											X			
Information Overload								X	X	X				X
Freshness of Information														

Table 7. Mapping Information Quality social news dimension and RCA

	Accuracy	Believability	Reputation	Value-added	Relevancy	Timeliness	Amount of Data	Interpretability	Ease of Understanding	Consistency	Conciseness
Social News	M	H	H	M	M	H	M	H	H	M	H

In evaluating the impact of RCA on Social News dimension, the team found that having means to authenticate news would improve the accuracy of the information provided to a level that is considerably higher than before. However, this will depend on the number of users who will rely on such approach; as such, the team upgraded accuracy from low to medium. The team also agreed that reputation would improve as users will trust what they see more and this will upgrade IQ reputation from medium to high. The team also assessed that given how well IQ Accuracy, Believability, and Reputation stand then naturally IQ Value-added should be upgraded to medium. Finally, Interpretability having means to explain the news and provide its source will most definitely upgrade news dimension to high.

4.3 Compare and reflect on the outcomes including further research

It is evident from comparing tables 4 and table 6 is that the challenges associated with Accuracy, Believability, Objectivity, Reputation, Value-Added, Relevancy, Timeliness are no longer considered of significant relevance. In fact, the sum of challenges had been reduced from 16 to 5. As for the Social News dimension, the key challenges have been improved including Accuracy, Reputation, Value-added, and Interpretability as shown in table 7. It is therefore fair to conclude that the introduction of RCA for use by Facebook will improve IQ. It could also be deduced that improvement to IQ should be expected when applying RCA to other social media networks - although this could be done in future research. What is more, Facebook has introduced its new approach for Fact-Checking approach involving the use of third party checkers [8] with implication on IQ.

5. Concluding remarks

Managing Information Quality in the age of information and social media has introduced new challenges. Where early research has viewed social media and axillary source of news, evidence from the research shows that this is no longer the case for many online users. This, in turn, has had important impact on IQ. This paper has shown that the dimensions of Information Quality can be used to add structure to this inherent complexity. Furthermore, providing means to validate news and information can significantly improve the quality of information users can get.

References

[1] Sinclaire, J., & Vogus, C. (2011). Adoption of social networking sites: an exploratory adaptive structuration perspective for global organizations. Information Technology and Management, 12(4), 293-314. doi: 10.1007/s10799-011-0086-5

[2] Baeza-Yates, R. (2009). User generated content: how good is it? Paper presented at the 3rd workshop on Information credibility on the web, Madrid, Spain.

[3] Agarwal, N., & Yiliyasi, Y. (2010). Information Quality Challanges in Social Media. Paper presented at the International Conference on Information Quality (ICIQ) University of Arkansas at Little Rock (UALR).

[4] Baeza-Yates, R. (2009). User generated content: how good is it? Paper presented at the 3rd workshop on Information credibility on the web, Madrid, Spain.

[5] Kane, G., & Ransbotham, S. (2012). Codification and Collaboration: Information Quality in Social Media. Paper presented at the Thirty Third International Conference on Information Systems, Orlando.

[6] Chai, K., Potdar, V., & Dillon, T. (2009). Content quality assessment related frameworks for social media. Computational Science and Its Applications–ICCSA 2009, 791-805.

[7] Strong, D. M., Lee, Y. W., & Wang, R. Y. (1997). Data quality in context. Communications of the ACM, 40(5), 103-110.

[8] Pardis Pourghomi, Fadi Safieddine, Milan Dordevic, and Wassim Masri (May, 2017) How to Stop Spread of Misinformation on Social Media: Facebook Plans vs. Right-click Authenticate Approach. IEEE International Engineering and MIS Conference 2017, Monastir, Tunisia, May 8-10, 2017.

[9] N.P. Nguyen, G. Yan, M.T. Thai, and S. Eidenbenz, "Containment of misinformation spread in online social networks," in Proceedings of the 4th Annual ACM Web Science Conference, pp.213-222, 2012.

[10] Matt Mahoney "The Limits of Fact-Checking Facebook," MIT Technology Review, (December 20, 2016).

[11] "Ipsos/BuzzFeed Poll - Fake News," December 2016, [Online]. Available at: http://ipsos-na.com/news-polls/pressrelease.aspx?id=7497 (Last Accessed on 9 February 2017)

[12] E. Shearer, and J. Gottfried, "News Use Across Social Media Platforms," Pew Research Center. Washington, USA, 2016.

[13] Fisher, C., Lauria, E., Smith, S. C., & Wang, R. (2008). Introduction to Information Quaity. MIT Information Quality Program.

[14] Agarwal, N., & Yiliyasi, Y. INFORMATION QUALITY CHALLENGES IN SOCIAL MEDIA

[15] Lee, Y. W., Strong, D. M., Kahn, B. K., & Wang, R. Y. (2002). AIMQ: a methodology for information quality assessment. *Information & Management, 40*(2), 133-146. doi: 10.1016/s0378-7206(02)00043-5

[16] Stvilia, B., Gasser, L., Twidale, M. B., & Smith, L. C. (2007). A framework for information quality assessment.

[17] Chen, C. C., & Tseng, Y.-D. (2011). Quality evaluation of product reviews using an information quality framework. *Decision Support Systems, 50*(4), 755-768. doi: http://dx.doi.org/10.1016/j.dss.2010.08.023

[18] F., Safieddine, W. Masri, and P. Pourghomi, "Corporate responsibility in combating online misinformation," International Journal of Advanced Computer Science and Applications (IJACSA), vol. 7, pp.126-132, 2016.

[19] M. Dordevic, F. Safieddine, W. Masri, and P. Pourghomi, "Combating Misinformation Online: Identification of Variables and Proof-of-Concept Study," in Conference on e-Business, e-Services and e-Society, pp. 442-454, Springer International Publishing, September 2016.

[20] F. Safieddine, M. Dordevic, and P. Pourghomi, "Means of Combating the Spread of Misinformation on Social Media: 3D simulation," In press.