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Published in:
Communications of the ACM

DOI:
[10.1145/3397189](https://doi.org/10.1145/3397189)

Publication date:
2020

Document Version
Peer reviewed version

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):
Visser, J., Lawrence, J., & Reed, C. (2020). Reason-Checking Fake News. *Communications of the ACM*, 63(11), 38-40. <https://doi.org/10.1145/3397189>

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**Reason-Checking Fake News**

Journal:	<i>Communications of the ACM</i>
Manuscript ID	CACM-19-12-3576
Manuscript Type:	Viewpoints
Date Submitted by the Author:	21-Dec-2019
Complete List of Authors:	Visser, Jacky; University of Dundee, Computing Lawrence, John; University of Dundee, Computing Reed, Chris; University of Dundee, Computing

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Manuscripts

Reason-Checking Fake News

Jacky Visser, John Lawrence, Chris Reed

December 21, 2019

While deliberate misinformation and deception are by no means new societal phenomena, the recent rise of fake news [5] and information silos [2] has become a growing international concern, with politicians, governments and media organizations regularly lamenting the issue. A remedy to this situation, we argue, could be found in using technology to empower people’s ability to critically assess the quality of information, reasoning and argumentation through technological means. Recent empirical findings suggests that “false news spreads more than the truth because humans, not robots, are more likely to spread it” [10]. Thus, instead of continuing to focus on ways of limiting the efficacy of bots, educating human users to better recognize fake news stories could prove more effective in mitigating the potentially devastating social impact misinformation poses. While technology certainly contributes to the distribution of fake news and similar attacks on reasonable decision-making and debate, we posit that technology – and *argument technology* in particular – can equally be employed to counterbalance these deliberately misleading or outright false reports made to look like genuine news.

From Fact-Checking to Reason-Checking

The ability to properly assess the quality of premises and reasoning in persuasive or explanatory texts – *critical literacy* – is a powerful tool in combating the problem posed by fake news. According to a 2017 Knight-Gallup survey, one in five U.S. adults feels “not too confident” or “not confident at all” in distinguishing fact from opinion in news reporting (<https://knightfoundation.org/reports/american-views-trust-media-and-democracy>). Similarly, in the United Kingdom, the National Literacy Trust recently reported that one in five British children cannot properly distinguish between reliable online news sources and fake news, concluding that strengthening critical literacy skills would help in identifying fake news (<https://literacytrust.org.uk/research-services/research-reports/fake-news-and-critical-literacy-final-report>).

Efforts to combat the effects of fake news focus too often exclusively on the factual correctness of the information provided. To counter factually incorrect – or incomplete, or biased – news, a whole industry of *fact-checkers* has developed. While the truth of information that forms the basis of a news article is clearly of crucial importance, there is another, often overlooked, aspect to fake news. Successfully recognizing fake news depends not only on understanding whether factual statements are true, but also on interpreting and critically assessing the reasoning and arguments provided in support of conclusions. It is, after all, very possible to produce fake news by starting from true factual statements and drawing false conclusions by applying skewed, biased, or otherwise defective reasoning. We therefore argue that *fact-checking* should be supplemented with *reason-checking*: evaluating whether the complete argumentative reasoning is acceptable, relevant and sufficient [3].

Argument Technology for Critical Literacy

Five years ago, we introduced the Argument Web in *Communications of the ACM*: an integrated platform of resources and software for visualizing, analyzing, evaluating, or otherwise engaging with reasoned argument and debate [1]. Since then, argument technology has matured into an established research field, attracting widespread academic and industrial interest. Earlier this year, for example, IBM presented the results of their ‘grand challenge’ on argument technology in a live debate between the Project Debater system and two human debating champions (<https://research.ibm.com/artificial-intelligence/project-debater>).

Commissioned by the BBC, we have developed a suite of argument technologies, built on the infrastructure of the Argument Web. The resulting software tools are aimed at providing insight into

1
2
3 argumentative debate, and at instilling the critical literacy skills needed to appraise reasoned persuasive
4 and explanatory communication. In addition to identifying reasoning patterns and fallacies, our soft-
5 ware addresses the issue posed by echo chambers in which people are less exposed to opinions diverging
6 from their own, while already held views get reinforced. Several cognitive processes are involved in this
7 process – such as *confirmation bias* [6], which discourages the consideration of alternative positions in
8 a dispute, and the *backfire effect* [8], which leads to further entrenchment of viewpoints when presented
9 with conflicting facts.

10 The *Polemicist* application (online at <http://polemici.st>) addresses this looming one-sidedness of
11 argumentative positions. The application lets the user take on the role of moderator in a virtual radio
12 debate: selecting topics, controlling the flow of the dialogue, and thus exploring issues from various
13 angles. The textual data is drawn from the Argument Web database of analyzed episodes of BBC Radio
14 4's Moral Maze (<https://bbc.co.uk/moralmaze>). On this weekly radio program, recurring panellists
15 and invited subject experts debate a morally divisive current affairs topic. The ensuing debate is often
16 lively, combative, and provocative, producing a wealth of intricate argumentative content. Polemicist
17 produces responses given by the actual Moral Maze participants from the Argument Web database and
18 assigns them to software agents modeled on the participants. Playing the role of moderator lets the
19 user rearrange the arguments and create wholly novel virtual discussions between the contributions of
20 participants that did not directly engage in the original debate, while still reflecting their stated opinions.

21 *Test Your Argument* (available at <https://bbc.co.uk/taster/pilots/moral-maze>) aims to both
22 foster critical literacy skills and prompt users to consider alternative viewpoints. The software challenges
23 users with a number of argumentation puzzles designed to help develop an understanding of the core
24 principles of strengthening and critiquing arguments. The examples are again drawn from debates on
25 BBC Radio 4's Moral Maze. Test Your Argument was launched on BBC Taster in December 2017, and
26 has since been visited over 10,000 times, with a rating of 4/5, and 88% of the evaluations saying that
27 the BBC should do more along these lines.¹

28 *Argument Analytics* serves as an online second-screen supplement to BBC Radio and Television
29 broadcasts. Trialed in 2017 on selected episodes of Moral Maze, the data-driven infographics are designed
30 to provide a deeper insight into the debate. For instance, the interaction between arguments *pro* and
31 *contra* are diagrammatically visualized, alignment between participants' stances is mapped out, and a
32 timeline shows which parts of the debate lead to the most conflict. An example of Argument Analytics
33 for the 11 October 2017 episode of Moral Maze dedicated to the 50-year anniversary of the Abortion Act
34 in the United Kingdom is available at <http://bbc.arg.tech>.

36 Argument Mining for Reason-Checking

37
38 The latest addition to the suite of argument technologies developed for the BBC is *The Evidence*
39 *Toolkit* (available at <https://bbc.co.uk/taster/pilots/evidence-toolkit-moral-maze>) – see Fig-
40 ure 1. This online application is designed to encourage users to dissect and critically appraise the
41 internal reasoning structure of news reports. The Evidence Toolkit launched on 15 March 2018 (<http://bbc.co.uk/news/school-report-43391188>) as part of BBC's *Young Reporter* initiative (formerly
42 called 'BBC School Report'). BBC Young Reporter is a UK-wide opportunity offered to some 60,000
43 11- to 18-year-old students to develop their media literacy skills by engaging first-hand with journalism
44 and news-making (<https://bbc.co.uk/academy/en/collections/youngreporter>). The 2018 initia-
45 tive addressed the issue of fake news. To let students develop the means to distinguish real news from
46 fake news, the BBC commissioned the iReporter game (<https://bbc.co.uk/ireporter>) from Aardman
47 Animations targeted at 11- to 15-year-olds, and The Evidence Toolkit from the Centre for Argument
48 Technology (<http://arg.tech>) for 16- to 18-year-olds.

49
50 The Evidence Toolkit guides students through a series of steps to identify claims, arguments, counter-
51 arguments, reasoning types, and evaluation criteria on the basis of scholarship in Critical Thinking and
52 Argumentation Theory [3, 9]. To help students understand the theoretical concepts, examples are given
53 from episodes of BBC Radio 4's Moral Maze. Since BBC Young Reporter is intended to be primarily
54 used in the classroom and teachers will often not be argumentation experts themselves, The Evidence
55 Toolkit comes with teacher notes, available through the BBC website ([https://bbc.co.uk/academy/](https://bbc.co.uk/academy/en/articles/art20180313125234328)
56 [en/articles/art20180313125234328](https://bbc.co.uk/academy/en/articles/art20180313125234328)).

57
58 Upon identifying the main claim and reasons in the news article, the software helps users classify the
59 reasoning in the news article based on the type of evidence provided. Reasons can be connected to claims

60
¹All user statistics reported in this article are obtained directly from the host and are correct at the time of writing.



Figure 1: The Evidence Toolkit interface.

in many different ways. Drawing on theories of argumentation and persuasion [9], users are presented with a compact set of options not requiring any specific theoretical background knowledge. Reasoning is classified as fact-based or opinion-based, which in turn can be subdivided further. Opinion-based reasoning, for example, subdivides into evidence drawn from *experts* (providing authoritative backing), from *popular sentiment* (of the masses or of a particular community), and from *personal experience* (whether the author's own or that of a witness).

Each type of reasoning is associated with a specific template of critical questions pointing at the evaluation criteria for the reasoning [11]. In answering these questions, the user builds a confidence level in the support for the claim. Identifying any counter-considerations is another essential step in judging the impartiality of news articles. Again, the software helps students identify any such objections, often linguistically marked with indicative phrases such as “on the other hand”, “admittedly” or “to some extent”.

In addition to a choice of five articles from various news sources across the political spectrum that are manually pre-analyzed by a team of experts to identify claims, reasons, and objections, The Evidence Toolkit employs automated methods for *argument mining* (also called *argumentation mining* in the literature) to allow the students to select their choice of article from the BBC News archives. The

implemented argument mining technology automatically extracts the argumentative content from the news articles – provided the chosen article has any explicit argumentative content in it to begin with. Argument mining builds on the successes of Opinion Mining and Sentiment Analysis [7] to identify not only *what* views are being expressed in a text, but also *why* those views are held [4] – the software automatically processes the natural language text to produce the analysis otherwise performed by human experts.

At the time of this writing, The Evidence Toolkit has accumulated over 22,000 tries. The software has been well-received, earning a rating of 4.15 out of 5 (where the average for applications on BBC Taster lies around 3.5). The user feedback moreover showed not only an accessible user experience (78% found it easy to use), but a successful one: 84% said the critical thinking tools explained in The Evidence Toolkit help to check the reliability of news, with 75% saying that it made them think more deeply about the topics at issue in the news articles. Putting critical literacy high on the BBC’s agenda and applying argument technology to drive it also appears to reflect positively on the organization itself, with 73% stating that The Evidence Toolkit positively changed their view of the BBC.

The suite of argument technology developed for the BBC aims to address the major societal challenge posed by intentional obfuscation and misinformation in the modern media landscape. In collaboration with the BBC – and with the producers of BBC Radio 4’s Moral Maze in particular – we have approached critical literacy from several angles, developing quantitative debate analytics, interactive ways of engaging with argumentative material, and argument mining technology. With a distribution to over 3,000 educational institutions in the United Kingdom, The Evidence Toolkit constitutes, to the best of our knowledge, the first public deployment of argument mining technology at scale. The further development of argument technology for reason-checking could provide a much needed weapon in combating fake news and reinforcing reasonable social discourse.

Acknowledgements

This research was supported in part by EPSRC in the UK under grant EP/N014871/1, and in part by funding from the BBC. We would like to thank the entire ARG-tech team that supported the development of software and resources for The Evidence Toolkit, and to recognize the input and support from Sharon Stokes, Head of BBC Young Reporter. Finally, we also want to acknowledge our enormous debt to Christine Morgan, Head of Religion & Ethics Radio at the BBC, and to her production team on Radio 4’s *Moral Maze* for their long term support and enthusiasm for this initiative.

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The screenshot displays the 'The Evidence Toolkit' interface. At the top, it features the title 'The Evidence Toolkit' with the subtitle 'Tools for getting from news to truth', an 'ABOUT' button, and logos for 'ARG-tech' and 'University of Dundee'. The main content area shows a news article from 'Daily Mail' by Sarah Vine titled 'Fake beggars are exploiting the British public - and the real homeless'. The article text is annotated with various colored boxes and icons indicating different types of reasoning or evidence. A 'HELP' section on the left explains the Critique Template. A 'TRUST TOOLBAR' on the left lists sources like 'ECDC Statement' and 'Charity boss calls town's 'fake homeless' campaign 'a disgrace''. On the right, a 'CRITIQUE TEMPLATE' section asks questions about the source's credibility and impartiality, with a feedback icon.

The Evidence Toolkit
Tools for getting from news to truth

ARG-tech University of Dundee

Daily Mail Sarah Vine – The Daily Mail

Fake beggars are exploiting the British public – and the real homeless

There is no doubt that it is heartbreaking, especially when the weather is this harsh, to see a person sleeping rough, bundled up in layers of blankets among cigarette butts and street debris.

Stop to speak to these poor souls and you'll discover tales of neglect and misfortune, often addiction, sometimes abuse. Offer them a cup of hot soup or a coffee and they will gladly accept. Quickly, you see the human being behind the suffering.

There is no crime in being poor or homeless. But lately, a new and different breed has become visible on the streets of Britain: the professional beggar. Criminals who prey on the public's natural desire to help them by giving all the appearance of being homeless and destitute — while they are actually nothing of the kind.

Their victims are not only the tourists and commuters who fall for their pitiful patter; but also the real homeless, who suffer because the fake beggars sap the goodwill of passers-by.

Popular tourist destinations including Cambridge, London, Windsor and Ely — where recent attempts by the authorities to rid the streets of them have made national headlines — are plagued by these charlatans. **Example**

Anyone who dares confront the problem — like the two local business owners in Torquay who exposed those posing as beggars by naming and shaming them on social media — risks getting it in the neck from charities with vested interests and from hard-line Left-wingers.

For these supposed moral guardians, the reality of the situation is irrelevant — just as long as they can parade their concern and highlight the evils of 'austerity Britain' and a heartless Conservative government that doesn't care.

Yet the facts appear indisputable: of the 17 'homeless' identified in Torquay, just two — two! — turned out to be genuine. **Statistical**

And, as Angela Parmenter, Ely's frustrated housing manager, put it, these people don't want her council's support because it is possible to earn substantial amounts of money on the streets.

Of course, organised gangs of beggars — many from Albania or Romania — have long been a problem in poorer European countries such as Italy, Portugal and Greece. There, women with babes in arms will follow you in the street, harass customers in restaurants, or thrust worthless trinkets into your hand, demanding money in exchange.

Often they are bound up in other criminal activities, such as prostitution and drug dealing.

While I don't condone such behaviour, on one level I can at least understand it: such countries have only very basic levels of healthcare, while proper jobs are hard to come by and charities are hopelessly oversubscribed. **Counter**

HELP
Having identified the type of reasoning from the Reasoning Palette, the next step is to cast a critical eye at the reasoning with the help of the Critique Template. Each type of reasoning is associated with a specific template comprising several questions. Have a think about the questions and offer your answer to each one.

TRUST TOOLBAR

- ECDC Statement [eastcambus.gov.uk]
- Charity boss calls town's 'fake homeless' campaign 'a disgrace' [devonlive.com]

CRITIQUE TEMPLATE

You've identified this as expert evidence. Do you think that:

- the source actually made the attributed statement? 🟡 🟠 🔴
- the source is a credible expert on this subject? 🟡 🟠 🔴
- the source is duly impartial and not profiting from lending their support? 🟡 🟠 🔴
- other experts agree with the source? 🟡 🟠 🔴

The Evidence Toolkit interface