Footprints of Fascination: Digital Traces of Public Engagement with Particle Physics on CERN's Social Media Platforms

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Introduction

The scientific community recognizes that its online communication with the public may shape civic engagement with science. Social media (SM) play a growing role in this context, yet it is not known if or how different platforms support various types of engagement.

Research Questions

1. How do users engage with scientific information on different SM platforms, when controlling for content?
2. What are the characteristics of the most popular scientific information items on SM in terms of user interactions?

Research Field

The European Organization for Nuclear Research (CERN) is an international scientific research organization. In its laboratory, near Geneva, researchers study particle physics using large and complex scientific instruments. By this study's beginning in October 2014, CERN had over a million Twitter followers on its English-language account and 12K on its French one. Additionally, it had 343K followers on Facebook; 104K on Google+; and 100 on Instagram, all English-language accounts.

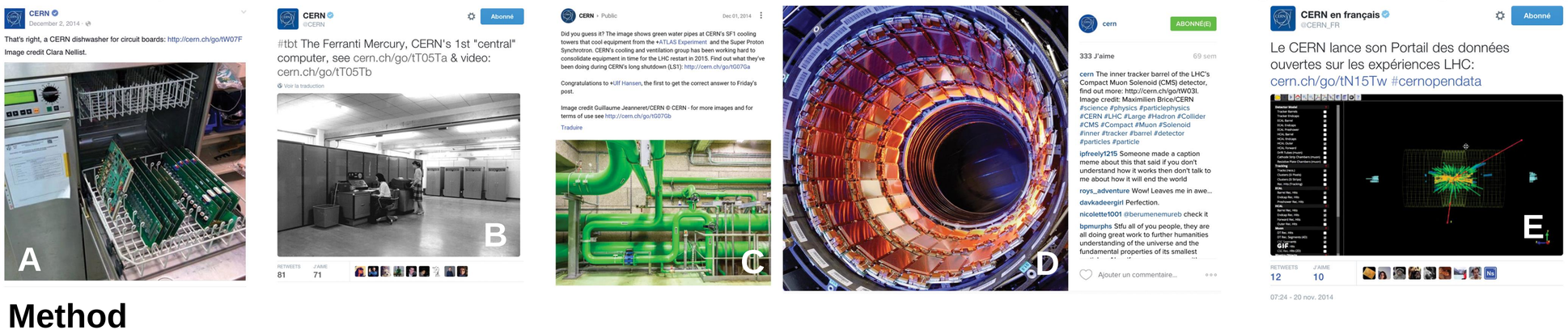

Fig 1. Examples of the five social media platforms studied. A. Facebook; B. Twitter English; C. Google+; D. Instagram; E. Twitter French.

Method

User interactions with 48 items cross-posted on five of CERN's SM platforms (Twitter English & French, Facebook, Google+ and Instagram) were quantitatively compared over an eight-week period in 2014. Dependent variables included likes, comments, shares, click-throughs, visit durations on CERN's site and retention rates (the percent of visitors who clicked on the link and then clicked on other links within the page).

Selected Findings

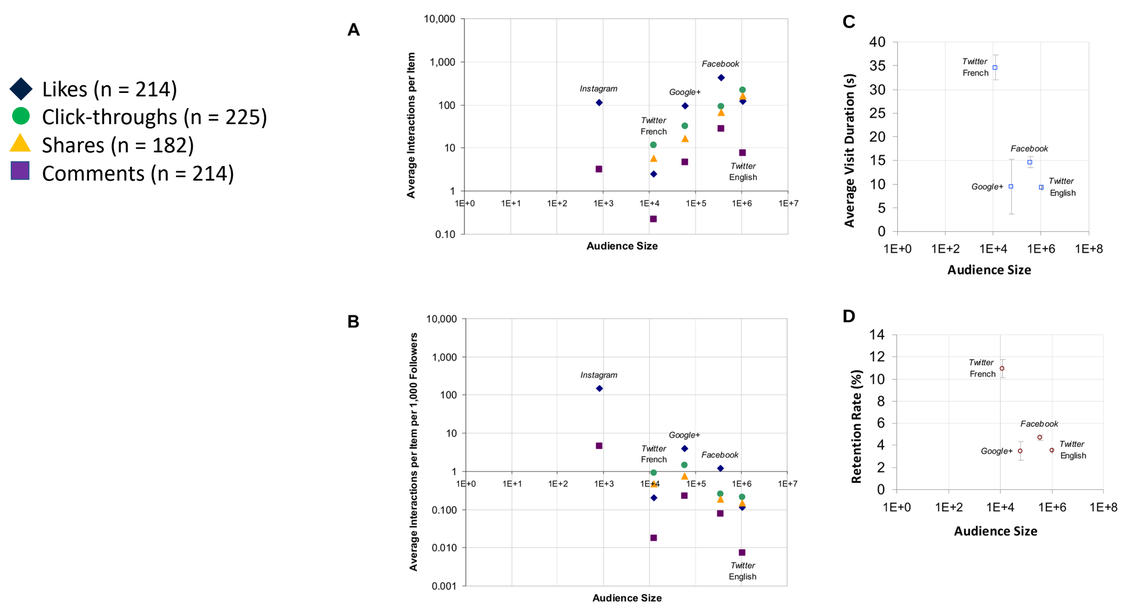

Fig 2. (A) As audience size of an SM platform grows, the total rate of engagement with content tends to grow as well, for certain behaviors. **(B)** However, per user, engagement tends to decline with audience size ($-.326 < \rho < -.222$, $p < 0.01$). Perhaps in new accounts, "early adopters" tend to be more engaged users, or large audiences might include many inactive followers. **(C-D)** Visit durations and retention rates correlate weakly negatively with audience size ($-.175 < \rho < -.146$, $p < 0.01$).

	Recurring High Engagement Topic Code	Type	Image Caption	Recurred as High Engagement Item on…
1.	Fabiola	News	"CERN Council selects Italian physicist, Dr Fabiola Gianotti, as CERN's next Director-General"	Facebook, Twitter English, Twitter French
2.	Open Data	News	"CERN launches Open Data Portal to make public the data of LHC experiments" (Fig 1E)	Facebook, Google+, Twitter English, Twitter French
3.	Pipes	Guess What It Is	"CERN's cooling & ventilation systems get refreshed" (Fig 1C)	Google+, Twitter French
4.	1st Computer	Throwback Thursday	"The Ferranti Mercury, CERN's 1st 'central' computer" (Fig 1B)	Facebook, Twitter English
5.	CMS	Wow	"The LHC's Compact Muon Solenoid (CMS) detector" (Fig 1D)	Instagram, Twitter English, Twitter French
6.	Dishwasher	Wow	"That's right, a CERN dishwasher for circuit boards" (Fig 1A)	Facebook, Google+, Instagram, Twitter English, Twitter French

Table 1. Recurring high engagement topics. Some characteristics are (1) news items receiving attention from traditional media, or (2) a surprising or awe-inspiring image (e.g., "Pipes", "CMS" and "Dishwasher").

Discussion

Largely, public engagement with science is similar irrespective of platform, e.g., the same topics tend to receive high engagement across platforms. However, engagement can also differ between platforms: e.g., by audience size, and, perhaps, by language. To our knowledge, this is the first characterization of public engagement with science across SM platforms. Although the study is limited to particle physics, our findings may help benchmark SM analytics for other domains as well.

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