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### Analyzing Online Expression Affordances on IRC and Twitter

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# Ego Media: Life Writing and Online Affordances

*King's Digital Lab*

## Introduction

This research seeks to contribute to a growing body of research that acknowledges the specificities of platforms, and their materiality, as an important factor in the study of online cultures and sociality. Different platforms have different features and affordances; this is a foundation of much of the research on social media over the past decades.<sup>1</sup> But it also raises the question of where those differences come from: what forces are responsible for these differences, how does a platform end up with a specific set of features, to what extent are user forms and practices determined by technology, and what role does the agency of the platform users have in determining how its features take shape?

In this, I position myself in the field of platform studies. Platform studies were first named as such by Bogost and Montfort in 2009 as a label for their work on videogame consoles and how their specificity influenced games created for that platform. Since then, the idea of platform studies has been much debated; initially received somewhat skeptically as a method that had merit for video game consoles but not much beyond that,<sup>2</sup> over the past decade increasingly many authors have appropriated the spirit if not the letter of Bogost and Montfort's approach to study platforms in the broader sense of the word.<sup>3,4</sup> Crucially, this also includes online social platforms.

Coupled with the fact that in some aspects the software has the same kind of limiting influence as the hardware, e.g., in the case of what a web browser or mobile operating system is capable of, and what interactional affordances an interface offers, a platform studies-esque in-depth investigation of an online social platform should not be constrained by the differences between videogame consoles and social platforms. On the contrary, both are computational platforms that can be the object of such an analysis.

More specifically, one may wonder what to focus on, if the goal of a platform study is to study a platform in all its particulars (of which there will surely be many). Here too I follow Bogost and Montfort who for their analysis of the VCS videogame console "selected [...] six cartridges from the many hundreds that have been developed because they particularly enlighten the discussion of the VCS platform and creative production upon it;"<sup>5</sup> likewise, I focus on instances of use of Twitter and IRC that are especially illustrative when it comes to their respective platforms, the genres of expression afforded by them, and how the people producing those expressions relate to them.

It is this dynamic – between a platform's specificities and how people express themselves through those, in negotiation with those specificities – that can be mapped through a platform studies–

oriented approach. More precisely, in this article I will investigate how a platform's features and affordances are developed, and what factors influence that development. My goal here is to acquire a better understanding of how the platforms through which we express ourselves are built, and what external and internal factors influence this development and consequently shape the platform.

How to define "particularly enlightening" in this context? Bogost and Montfort do not discuss an overall method for their selection, only their motivations for individual case studies chosen, which indicate that their examples were significant historically (one of the first games released for the console and one of the first third-party games), groundbreaking (representing a genre not seen before), or particularly successful (economically or critically).<sup>6</sup> Informed by the platform studies approach, I will do so through two case studies of platform features that both would become important to the platform and featured a relatively turbulent development process with a great deal of involvement from users. These are hashtags, on Twitter, and chatbots, on IRC. Both are features – or applications of features – that were, at least initially, very particular to those platforms; and both were not developed in a top-down way, originating with users seeking to find a way to do on these respective platforms what wasn't possible out of the box. As such, they provide a good basis for a comparative analysis of the two platforms and what kind of factors played a role in the development of their features.

## **Case study: A history of the hashtag**

In the case of Twitter, I am especially interested here in the "co-development of [Twitter's] meanings, uses, and affordances"<sup>7</sup> – the dynamic between Twitter as a company, making its own platform, and the people using the platform, who often provided early versions or other types of inspiration for what would later become an official Twitter feature. Hashtags serve as a useful case study here, being such a feature that originated at least partially with people using the platform rather than the company managing it.

In an analysis of this dynamic, Alex Halavais notes that "these appropriations often displaced social practices that better represented the diversity of users and their needs" (p. 30). Other authors have also explored the effects of platforms' adoption of this "user-led platform innovation"<sup>8</sup>; Noortje Marres notes that "individual users' activities became less creative" after Twitter's formalization of retweeting,<sup>9</sup> while Stefanie Duguay notes that such formalization makes it easy for people to share content "at the tap of a button."<sup>10</sup>

This process of people co-designing Twitter features together with the platform itself has, then, been covered in literature. What I intend to do here is to investigate the process more empirically. This approach can then be contrasted with, but also considered an addition to, the work of, for example, Alex Halavais who in his 2013 analysis of Twitter describes the platform through both a general history and an additional focus on specific features: in his case @replies, retweets and

#hashtags, features that “make Twitter what it is” (p. 31). Such an analysis aligns well with the set-up of this section, a platform study seeking to investigate the dynamic between a platform’s development and what people do with the platform offered to them.

My goal in this case study then is not to replicate Halavais’s research, but to investigate similar aspects of Twitter from a more historical perspective and provide more detail where Halavais sometimes glances over the particulars, for example, noting that “some have suggested that the hashtag does have an originator, Chris Messina” (p. 36). Chris Messina’s role is, as I will describe in this section, is more complicated than the label “originator” might suggest, and a more comprehensive and empirical appraisal of the various factors contributing to the inception and eventual success of – among other features – the hashtag can thus offer a valuable contribution to both earlier analysis of this theme as well as the overall objective of this section of thoroughly investigating the dynamic between a platform and the people using it.

The hashtag is then a potent example of an appropriation that did not (initially) align with Twitter’s own ideas for the platform. While hashtags – keywords prefixed with the # character that can be included in tweets to “tag” or label them, or “pragmatic communicative marker[s] that serve to coordinate discussions and establish more or less stable and consistent groups of contributors”<sup>11</sup> – are an important part of Twitter as of 2018 and have been appropriated by other platforms (such as Instagram and Facebook) as well, they started out as a proposal by people using Twitter for a way to categorize their tweets; Twitter however had its own ideas and was slow to adopt the syntax. As the development of the hashtag and the process of adopting it as an official Twitter feature provides a very useful insight into the process through which a social platform’s features emerge from an amalgamation of other platforms, users’ concerns, and platform interests, I will trace its history briefly below.

The hashtag, or at least its syntax, was not original to Twitter: the # character had been used as a way to signify keywords among computer users for decades. Boyd et al., in a 2009 paper on Twitter conversational practices, claim that “the practice of using hashtags may stem from a history among computer programmers of prefacing specialized words with punctuation marks, such as \$ and \* for variables and pointers, or the # sign itself for identifying HTML anchor points.”<sup>12</sup> While HTML is unlikely to be the source of hashtag syntax (as I will discuss next), it is true that the # sign is one of many examples of prefixes indicating that a word is a label or tag for something. A significant and related early example in online social platforms are the way the names of chat channels on IRC were signified (e.g., #pokemon would be the name of a channel about the Japanese video franchise); while channel names were not tags per se, they are similar in function as they provide a way to label a conversation with a certain theme. This is probably the first instance of this usage of the # character as a way to prefix such a label or tag; earlier, IRC channels had been denoted by numbers, and later by the + character, until the # was settled on as a prefix in 1990. According to programmer Chris Messina, who first proposed using hashtags on Twitter, the IRC channel naming convention was a direct inspiration for his syntax.<sup>13</sup>

As an illustration of how small-platform design decisions can have impact in another context decades later, it is useful to briefly discuss why the # character – which persists today – was chosen as a prefix in the early 1990s. Using the # character as a prefix was a more or less an arbitrary choice. That channel names needed a prefix at all was a result of how IRC handled changes to people’s “mode,” or the privileges they held, like the ability to remove people from a channel or to talk at all. Like people, channels could also have a mode, which indicated various settings such as whether a channel could be joined by anyone or just those who knew its password. There was one command to change both the mode of a person and a channel; this did not lead to ambiguous commands as nicknames could not start with a number, and channels could not contain nonnumeric characters. This worked well until a feature was introduced that allowed people to open channels with arbitrary names. To make it possible to distinguish between channels and nicknames, channels with a text name were prefixed with +. But due to technical limitations, only one +channel could be joined at the time. As an extension of this functionality, a new type of channel was introduced, and up to ten of these could be joined simultaneously. #, a character that was otherwise unused and also could not be the first character of someone’s nickname, was used to differentiate these channels from the more limited +channels. Why the # character, specifically, was chosen as a prefix is unclear; it was used in other IRC contexts, such as as a prefix for administrative announcements, but it is not apparent from the surviving development discussion why it was used for channel names as well.

Twitter, over a decade later, was the first platform to use IRC’s more or less accidental channel name syntax as a way to signify a tag, and was unique in how it made tags part of content of a tweet, rather than a separate bit of metadata. But more generally, as a practice tagging was very much a central feature of many Web 2.0 platforms at the time Twitter became popular. Platforms like Flickr, a photo sharing site, and del.icio.us, a place where people could save their online bookmarks, prominently used tagging to make it easy for their users to find certain types of content. These tags were often explicit metadata, bits of data connected to the respective content but separate in both the user interface and the underlying data structure. For example, Flickr showed a vertical list of tags under a photo, while del.icio.us displayed a horizontal list of keywords under a link’s title. Twitter initially had no such features, prompting users to brainstorm about how a similar facility could be added to that platform as well. The first recorded usage of the Twitter-specific #syntax was by programmer Chris Messina on August 23, 2007, in a tweet:

[how do you feel about using # (pound) for groups. As in #barcamp [msg]?

Two days later, Messina posted a more elaborate article on his own blog describing his thoughts on how tweets could be grouped and categorized in a more detailed way. A number of factors informed his proposal of using this precise syntax, such as the fact that the # character “works consistently on cell phones” as opposed to other characters – at this point in time, SMS messaging was still an important method of interacting with Twitter. He also mentions a number of other platforms that informed his thoughts; IRC and Flickr are mentioned, for example, with the # prefix

explicitly linked to IRC's channel naming syntax.

Another platform that inspired Messina's proposal was Jaiku, a Finnish microblogging platform that was acquired by Google in 2007 and closed in 2012. Jaiku allowed people to create channels that could contain "jaikus" (the platform's name for its tweet-like messages) but also content from external sources like blogs, news feeds, or even Twitter streams. Jaiku's channels were overview pages that showed all content linked to a particular tag or theme. Instead of showing up in the body of a jaiku – like hashtags show up in the body of tweets – Jaiku's channel names would show up listed separately from a jaiku's content and could be clicked on to view other content within the channel. Perhaps inspired by fellow Finnish platform IRC, Jaiku chose to denote channel names with the # prefix.

Jaiku, del.icio.us, and Flickr were far from the only platforms on which various forms of tagging and categorizing were a central feature. Multiple platforms were built on or inspired by the "folksonomy" concept (a portmanteau of folks and taxonomy: a taxonomy created by folks, i.e., people using the platform), a paradigm in which a platform's own users categorized and indexed content on that platform by adding tags or other metadata to them. Social bookmarking sites like del.icio.us and StumbleUpon heavily relied on crowdsourcing the categorization of their content, with people tagging content and discovering similar content tagged by other users in turn. Flickr's tags were also used to construct overview pages where visitors could see an up-to-date slideshow of recent photos of, for example, skyscrapers or beach scenes. In a 2009 review of the developments surrounding folksonomy and social tagging, Jennifer Trant describes 2005 as "the year tags went mainstream,"<sup>14</sup> citing media attention and the increasing popularity of these social bookmarking platforms. Though Trant's analysis discusses various platforms and their take on tagging, Twitter is not mentioned, perhaps because it had only just been introduced at the time of writing. But it is clear that, at the time, tagging existed in various forms and was an important part of many online social platforms.

In that light, it is not very surprising that sooner or later Twitter would adopt a similar categorization feature, and this is especially apparent in the hashtag's early usage. As originally proposed, it was supposed to be used to create clearly distinct categories of tweets, much like Jaiku's channels. Note that Messina's tweet-based proposal explicitly discussed "using # (pound) *for groups*" (emphasis added) – his proposed syntax was not necessarily intended to be used for the loose, implicit style of labeling that hashtags would eventually be used for. The word *hash tag* (then still with a space) was first used by consultant Stowe Boyd in a blog post discussing Messina's proposals; Messina consistently called them "channels." Messina's proposal was a contribution to a wider discussion about groups or categories on Twitter; only a few weeks before, Jason Goldman, a Twitter representative, mentioned that such a feature was "at the top of [their] requested feature list" on customer service platform GetSatisfaction.<sup>15</sup> There also was a considerable overlap between Twitter's initial user base, which grew from Silicon Valley startup culture and the crowd at the SXSW technology conference, and users of folksonomy-based sites

such as del.icio.us and Jaiku. It is therefore reasonable to expect that tagging would have been part of many early Twitter users' social media practice.

Indeed, informal tagging was already happening before the #hashtag syntax became widely adopted; at the SXSW conference, visitors prefixed their tweets with "sxsw" to make them easier to find for others,<sup>16</sup> and the special "join sxsw" SMS command that Twitter added for that conference gives the impression of a precursor to a feature that would allow joining other things than just "sxsw." Such an extension of the feature never materialized, and the "join sxsw" command was only active during the conference. But the popularity of such features indicates that there was a desire for better facilities through which to reach a particular demographic with tweets, e.g., people visiting the same conference or talking about the same topic. Indeed, the #prefix syntax was not the only method proposed for grouping tweets; a more abstract structure of "groups" one could join to receive all tweets explicitly sent to that group (reminiscent of the original TxtMob concept) was discussed, and Goldman's post on GetSatisfaction even mentioned a possible syntax for such a feature, indicating that the feature was being considered by Twitter itself as well.

The platform was still very much based on SMS messaging at this point in time, and both Goldman's and Messina's proposals seem to have had texting commands in mind when describing possible syntaxes. Messina's blog post contained a list of commands that could have been used to follow and unfollow specific hashtags (or channels, as Messina called them, inspired by IRC and Jaiku), which also gives a good impression of the functionality he envisioned the feature to make possible:

```
follow #tag: subscribe to all updates tagged with #tag
follow username#tag: subscribe to all updates tagged with #tag from a specific user
leave #tag: unsubscribe to a tag; you will still get updates with this tag from your friends
leave username#tag: unsubscribe to a specific from a specific user
remove #tag: completely remove all incoming posts tagged with #tag, even from your friends
#tag message: creates a status in the #tag channel
#tag !message: creates a status that is only visible to people subscribed to channel tag #tag16
```

The list of commands also implies that hashtags would always be put at the beginning of a tweet ("#tag message"), the # essentially being a very short command. Using a single character to denote tags was therefore not just a nod to existing platforms, but also a way to keep the texts sent to Twitter as short as possible, which was desirable considering Twitter's reliance on relatively cumbersome SMS interfaces and the character limit of tweets. Other text commands were also short words (follow, track, stop) or one-character acronyms (d for direct messages, or the proposed g for group messages).

Any new commands – such as using # as a command to post to groups – would have required Twitter to implement support for them before they could be used. But in their basic form, hashtags were a simple way of categorizing tweets that, crucially, did not require Twitter's blessing; people

could and did start using them immediately after Messina's original proposal, and they provided an easy way of grouping tweets visually or via search features even without dedicated features. And given its usage at multiple other platforms, old and new, the #prefix was not just a way of keeping commands as brief as possible but also a good candidate for making such tags more obvious and less likely to be confused (by both people and Twitter's internal algorithms) with ordinary text.

Twitter's creators were not impressed, initially: they found the #syntax "too harsh" and "for nerds" when Messina spontaneously decided to visit the Twitter office to discuss how it could be supported officially. Messina was "friends with many Twitter employees,"<sup>17</sup> which explains why he had some sort of access to Twitter's offices, though this attempt proved fruitless, as Messina's pitch was dismissed by Williams and Stone out-of-hand. Instead of adopting Messina's ideas, they planned to implement a more comprehensive and user-friendly tagging mechanism at a later time<sup>18</sup> or categorize tweets automatically via machine learning.<sup>19</sup> But the new syntax had been picked up by an increasing number of people since Messina first used it, and while Twitter mostly ignored the feature as far as official support was concerned, hashtags proved popular in spite of this; in a ten-day period in 2009, 315,000 distinct hashtags were used, the most popular ones being used by thousands of people.<sup>20</sup>

Eventually, ignoring gave way to embracing, and in 2009 hashtags were made clickable in tweets, so people could easily look up other tweets containing the same tag. While there never was an official announcement of support, technology blog TechCrunch reported that "you may have noticed that Twitter has started hyperlinking hashtags" on July 2, 2009. It should be noted that Twitter already offered features to show only tweets containing particular phrases (such as hashtags) before this, via various search features and text commands – making them clickable merely made this easier, though it had a positive side effect of making hashtags more visible as well, and making it clear that they were now officially part of Twitter's platform and interfaces. Clicking is still the only way hashtags can be interacted with on Twitter; ways to follow hashtags explicitly never materialized, and neither Messina's proposal nor Goldman's examples of a group syntax were ever made available to Twitter's users. In 2009, Twitter did introduce "lists," a feature that allowed people to make lists containing people of their choice, with an overview page showing the latest tweets by the people on that list; but there are important differences between lists and groups, such as that lists can only contain authors, not individual tweets.

Hashtags were also attractive from a technical perspective. Outwardly, the tags were not metadata like they were on Flickr and various social bookmarking sites; they were part of a tweet's body, and adding them simply meant including them as part of the tweet's text. This is especially relevant because earlier in 2007, Twitter had introduced a feature called Track, which allowed people to receive all tweets containing a particular phrase on their phone. Because hashtags were, in essence, phrases in a tweet, they worked very well with Track, as people could choose to Track a particular hashtag and easily receive all tweets referring to it. Hashtags offered a more or less standardized way of referring to things, which was compounded by the network effect – popular hashtags would



be seen by people, who would then use the same hashtag to “join the conversation.” As such, hashtags worked quite well with Twitter’s features at the time, which would have given them an advantage over categorizing tweets by adding explicit metadata to them – something that would have meant more work adapting existing features or adding new ones. Tracking was a mobile-only feature – the only way to enable it was to send an SMS message containing a “track” command to Twitter – and perhaps partly due to the decreasing importance of SMS messaging as infrastructure the feature was removed around the end of 2009. Again, there was no explicit announcement of this – but Twitter’s own help pages cease mentioning the feature around this time. By that time Twitter’s search features and the fact that hashtags were made clickable and searchable provided an alternate way of keeping track of them.

Hashtags as they were appropriated by users in the end – as part of the tweet body rather than a message prefix or command – also fit into a wider discussion about “microformats” that was going on at the time. Microformats were various proposals to make websites easier to index for computers while simultaneously keeping the human viewer in mind in how the website was displayed. An example is putting HTML tags around the various metadata-like parts of a review (title of what is being reviewed, final score, author, etc.). These tags would then be invisible to the viewer, showing them an ordinary review, while still indicating to any search engine or crawler that it was a specific kind of information that could be indexed and archived. While Twitter’s hashtags are not invisibly marked as such, the # is relatively innocuous, and the fact that hashtags can be part of a running text means they can be incorporated in an ordinary message while still affording search engines to easily index the tweets as linking to a particular tag. As such they are very microformat-like, fitting in well with the contemporary technological trends in how to mark up metadata. And, as blogger Stephanie Booth mentioned in response to Messina’s 2007 proposal, “here there is an extra incentive to do it: space is limited.”

The hashtag is only one example of the many Twitter features that are clearly preceded by existing usage patterns. Before pictures could be attached to tweets, services like Twitpic were widely used by people to upload pictures and then link to them in tweets; such services often offered their own interfaces and apps that allowed sending a tweet from that interface with the picture embedded. Other types of content Twitter allows as attachments followed a similar process; videos and polls were often hosted on external sites and then linked to in tweets before Twitter allowed them to be embedded within a tweet “natively.” Such features can easily be seen as Twitter reacting to a demand; clearly the platform already affords sharing such types of content through simple hyperlinks, and as this happens more often it is increasingly useful for Twitter to make these into full-fledged features of its platform, with their own place in the platform’s interfaces.

It should be noted that such features are replacements or implementations of already existing usage patterns, and not responses to demands for features that are wholly nonexistent; the hashtag was being used by many already and solved a problem Twitter had not yet found a good solution for. But in cases where there was a less clear path from user proposal to officially supported

feature, Twitter has often taken its time before requests from people using the site were addressed. In 2014, an alt-right conspiracy theory dubbed “GamerGate” brought game journalists and developers head-to-head with players over the presumed feminist bias and cronyism in the games industry. (For a more complete account of GamerGate and the social media harassment that formed a large part of it, see, e.g., *Game Changers* (2016) by Golding and van Deventer. It is also discussed by [Rob Gallagher](#) here.) The debate, much of which took place on Twitter, was aggressive, and some prominent people involved in the debate had their personal data shared via tweets, inviting threats and harassment. Following this and other instances of widespread harassment, people called upon Twitter to provide better tools to address and report such harassment. While there were limited facilities for blocking or reporting accounts, Twitter was widely criticized for not providing facilities to block harassment or deal with it in other ways. While it did introduce limited features to filter out “low-quality” tweets later in 2016 and 2017, this presents a contrast with the quick pace at which hashtags were appropriated by Twitter.

Hashtags then present a good case study for an investigation into how an online social platform adopts new features in cooperation with the people using it. Hashtags can be said to have been co-designed by users, as they developed the syntax and popularized it without any official support from the platform (at least initially). However, it should be emphasized that a variety of contextual factors contributed to the success of this, such as the contemporary sociotechnological climate, with microformats and folksonomies being in vogue. Likewise, Twitter had a number of existing features and affordances, such as the Track feature and a popular SMS-based interface, that further served as catalysts for the features. While hashtags thus suggest that there is considerable room for people to innovate within the confines of a platform, this agency is not only circumscribed by the platform’s direct affordances but also by such external and temporary circumstances.

## **Case study: Bots on IRC**

This specific context that enabled the success of hashtags on Twitter makes it useful to compare it with other cases of user innovation on online social platforms. As a contrast to Twitter’s almost accidental adoption of hashtags, another interesting case study of user innovation within the confines of a platform is offered by IRC, a 1990s-era text chat platform. IRC may have been intended to be a protocol for internet chat, or “text based conferencing” as it was formally described.<sup>21</sup> But its relative simplicity and openness afforded a large amount of agency for people to appropriate the protocol for more advanced applications. IRC is a decentralized platform, with people connecting to a server of choice, using any client that implements the IRC protocol; both servers and clients can be created and maintained by anyone who feels like it, in contrast to Twitter where access to the platform is controlled by Twitter, Inc. As IRC is mostly protocol-based, people were free to create their own software implementing that protocol and offer new features on top of those built into the protocol. Many of those third-party applications were, essentially, [chatbots](#).

Outside of Guillaume Latzko-Toth's work,<sup>22,23</sup> not much has been written about such co-development of features on IRC. But like Twitter's hashtags, the platform does offer compelling examples of such development of features that partially originates with its users.

As IRC is a primarily a chat network, such third-party applications often take the shape of a client that enters a chat channel and then reacts to text commands or sends its own chat messages based on an external signal such as activity on a certain website. Bots are often continuously online, running on an always-on computer, and as such can be relied on to provide some of the features that IRC itself lacks, such as replaying conversations that happened while one was offline or seeing when someone else was last active. They can also be used to store personal information entered through chat commands, so it becomes possible for others to get a quick overview of what kind of people they share a channel with; even though IRC itself provides nothing like user profiles, such a feature can thus be considered to be part of IRC if provided through a third-party chatbot.

Chatbots are not unique to IRC, though IRC is perhaps the first platform on which they were particularly prolific.<sup>24</sup> Many IRC bots are relatively simplistic programs, responding to predefined text commands in a predictable manner; while they are a useful tool to fill some of the niches IRC itself has, they are mostly automatons rather than realistic chat partners. As developments in artificial intelligence afforded more sophisticated conversations, social network sites like Facebook, WeChat, and WhatsApp have also embraced the concept, with chatbots that have functionality to allow people to, for example, order flowers, book a cab ride, or look up what the weather will be like tomorrow. IRC chatbots are often less sophisticated than such AI-driven software, and the *chat* in chatbot refers to the interface through which they communicate rather than the activity they are meant to facilitate.

This is especially true for the earlier bots on the platform. One of the oldest and most enduring examples of such a chatbot is NickServ, a chatbot one can talk to to register their nickname on IRC and which will then subsequently prevent people from reusing that nickname if they do not authenticate themselves properly after connecting.<sup>25,26</sup> NickServ is a particularly old example; in *alt.irc*, the IRC-themed newsgroup, the service is first mentioned in January 1991, and many networks still offer a version of it two and a half decades later. But while NickServ is and was ubiquitous, it was far from the only chatbot even in 1991. Mailing lists and newsgroups at the time mention many other network-wide services, some more useful than others; a post on *alt.irc* from December 1992 summarizes the proliferation of services as follows:

The first bot was a simple /on join hello thingy. Damn annoying, that was; glad it's mostly gone. Things took off from there. The first true, independant [*sic*] robot I can recall was HugServ, for sending hugs. Just what everyone needed. There followed the growth of the IRC-Useless-Service-of-the-Week, up to and including ServServ, which kept track of all the rest. I always felt that it should have been called "MetaServ" but nobody listened.

## Discussion

These two case studies together reveal how multifaceted the interplay between a platform and the people using the platform can be when it comes to innovating new features within the (often limited) space offered by the platform. In Twitter's case, Messina's hashtag proposal was not so much a ready-for-use feature offered and adopted, but rather a catalyst in an ongoing move towards some sort of group-based organization for tweets. The demand for such a feature had been articulated by others, elsewhere; and next to Messina's proposal there were alternative ideas under consideration by both Twitter itself (in its ideas for AI-based grouping) and people active on the platform (in the discussions about groups). That hashtags were to become the practical implementation for these desires was not so much the case of it being the best way of building such a feature but rather a combination of various factors: Twitter's lack of leadership on the feature, effective synergy with existing Twitter features, and a well-connected Twitter user to kickstart the conversation around it.

Even if IRC is a very different platform when it comes to leadership, organization, and even features, a similar pattern can be seen in the development of chatbots on the platform. Chatbots were in many cases developed to fill a niche, a feature that was desired but not likely to be implemented in the core of the platform, hence necessitating user initiative. In some cases, such as for NickServ, the resulting innovations were embraced by a large part of the user base to the extent that NickServ is now found on most major IRC networks. Unlike on Twitter, however, there is less of a need to reach a critical mass of adoption in the case of such innovations on IRC. Whereas Twitter is a centralized platform where, practically speaking, all messages are sent in the same public context, IRC is a platform where one may create their own context by opening a new server or chat room. Thus depending on what IRC server one connects to, there are different policies regarding chatbots, and what bots are popular likewise changes from platform to platform. Some offer general-purpose bots that anyone may invite to their channel; in other cases it is left to users to run their own services or bots as long as these conform to the rules set by the network administrators.

In both cases, however, user innovation and co-development is not guaranteed; the circumstances need to be right. Hashtags made sense at the time, given the lack of *any* Twitter feature that allowed grouping of tweets and a concurrent introduction of similar features on other platforms. Additionally, its interface was more reliant on SMS-based features at the time, which suited the use of hashtags well. The folksonomy hype is long over as of 2019, and Twitter's main interface is no longer SMS messages but has moved to apps and its website. Given these changed circumstances, it is very much an open question if hashtags would be the solution at this time in Twitter's history. The perfect storm that produced hashtags no longer exists. That is not to say that a similar problem would not be solved with a similar solution nowadays; but equally, hashtags are clearly steeped in 2005–2010-era internet culture and are very much a product of that era.

Likewise, chatbots made sense at the time for IRC, as a way to address some of the perceived shortcomings of the platform and as a way to simply add features that made no sense to add on a

platform level but did make sense as, for example, a channel-specific service. Chatbots as they exist on IRC are very particular to that platform; while they are superficially related to more modern chatbots one may encounter in customer service experiences, they are divergent in terms of purpose, technology, and sophistication. Rather than seeking to emulate a human conversation, IRC bots were mostly chatbots because chat was the only conduit through which the platform could be extended. Had the platform afforded discrete plug-ins, or even a basic feature such as registering a user account, these gaps would not have needed to be filled with a chat-based approximation of such functionality.

Other bots were set up to address the lack of persistent user profiles. On a platform that was, among other things, used to flirt and set up dates, not being able to look up someone's gender could be inconvenient. A Norwegian programmer therefore set up a bot that would, when given a name, respond with information on whether that name was generally masculine or feminine.<sup>27</sup> Other services were more focused on a particular channel or group of channels; these typically offer entertainment-oriented commands for people to use so they can look up information, play simple games, or leave messages for people that are offline. An early example was the gm (for game master) bot that hosted a game called *Hunt the Wumpus*. *Wumpus* was an early computer game, its first version released in 1972, in which people had to guess where in the game world the titular Wumpus was hiding, based on hints. In the IRC version, players would type commands in a dedicated channel that were then replied to by gm, indicating whether the Wumpus had been found or whether the player had perhaps fallen into a trap.

gm and many other earlier bots were single-purpose software programs, meant to facilitate one specific kind of interaction and not much else. Later, more general-purpose bots were created. One of the most popular ones was Eggdrop, first released in 1996 to cope with mischievous bots trying to disrupt conversation in the #gayteen chat channel. Usually such bots offered a way to customize the commands they would accept and how they would respond to them. A contemporary popular version of such a bot is CloudBot, first released in 2011. As of February 2017, it has been “forked” (copied and changed by someone else) 203 times on GitHub, a platform for open source projects, indicating that such services are still in demand and actively developed.

Because IRC is a relatively simple protocol, that at its core comes down to sending text commands back and forth between a server and a chat client, writing such a service or bot is relatively easy. Many popular clients also contain features that allow people to add simple preprogrammed reactions to specific phrases. The first instance of this is when in September 1990 Michael Sandrof added a command to *ircII*, a very popular early chat client, that “[let] you set up actions which can occur automatically when certain events occur” according to a description on *alt.irc*. But writing a dedicated program that interacts with an IRC server is not difficult either, and configurable stand-alone bots such as CloudBot or Eggdrop are used widely on all IRC networks.

It is perhaps this extensibility that has allowed IRC to remain in use and even evolve while the core protocol has been practically unchanged since the early 1990s. Even though the underlying

technology is the same and no single entity has the authority to change or extend it, that technology through its simplicity and the fact that its specifications are freely available has afforded the development of new services and features on top of it. Even though IRC had stagnated as a protocol, the platform itself was alive, because the protocol and network structure afforded writing bots and services that would add new features to the platform.

But as bots could be developed by anyone – all it took for one to run was a computer with a connection to an IRC server – they were not always benign. Andrew Leonard, in his 1997 history of bots across various platforms, describes various kinds of hostile IRC bots, such as floodbots (designed to overwhelm a channel with spam), clonebots (that would return with another instance of themselves once kicked from a chat channel), and annoybots (that simply harass a specific user, for instance, by following them from channel to channel or sending inane messages). This was obviously detrimental to the experience of those just looking for chat, and “by late 1995, much of IRC community regarded all bots as menaces to society”, and “by 1996 the bot climate had gotten so bad on IRC that most IRC operators were banning all bots and botrunners from server access on principle”.<sup>28</sup> As an EFNet operator put it in a Usenet post from February that year, “[g]et em off our g’damned net before we blow your bot away with a [lethal] dose of packet. :)”

This led to an arms race between IRC operators and bot programmers: programmers trying to make their bots less recognizable as such, and operators finding new ways to check whether someone on their network was actually human. Eventually, things stabilized and most networks now allow bots again, though many still have rules concerning their behavior. For example, from the most popular IRC networks, QuakeNet still tells anyone connecting that “[no] flooding (including flood/clonebots)” is allowed; Rizon similarly warns that “[no] clones or malicious bots” will be tolerated, while Snoonet nominally requires all bots to be registered with the network. But the various measures that were developed to counter bot-induced chaos did have more practical consequences too: the “great split,” in which the original IRC network split into EFNet and Undernet, was partly caused by disagreement on how to best prevent people from taking over channels or stealing nicknames.

Even earlier, bots were a factor to be reckoned with when designing the platform. For example, at one point, in June 1992, there was a proposal on the *ircd3* mailing list to allow people to achieve operator status over a channel – which would allow them to moderate discussion there – via a democratic vote. One of the objections against this was that people could easily game this system via a set of vote-bots and thus gain control over multiple channels illicitly, and the feature never made it through. On the other hand, it was just as early that bots were recognized as a way to provide features IRC did not offer on its own. Per a message to *operlist*:

Many of the concepts that are present in IRC come from evolution and not from intelligent thinking from the beginning. IMHBOFHO, there shouldn't be a thing such as “nick collisions” or a need to have bots stay around 24hrs a day simply to provide +o. Unfortunately, the current IRC environment almost dictates.

It is noteworthy that the popularity of benign and malicious bots, and the subsequent cat-and-mouse game, only ensued on IRC and not on BITNET, even if that was in many ways a very similar network and should therefore at first glance have been susceptible to similar problems. As the direct precursor to IRC, BITNET's Relay Chat was a similar platform that, however, ran in a centralized manner on the far more technologically limited BITNET network, itself a precursor to the later and far more flexible and capable internet. An important difference here was that bandwidth and computing power on BITNET-connected systems were scarce, and as such those hosting the servers that comprised the network – mostly universities – kept a tighter leash on what happened on the platform. A “Bitnet Relay-OP,” describes how “the authorities of Bitnet authorized the Relay to work only if it will be severely moderated and censored” in an e-mail to the same *operlist* in January 1992. The “authorities” here likely refers to CREN (not to be confused with CERN, the European research institute at which Tim Berners-Lee invented the World Wide Web in 1989), the organization overseeing BITNET. In a reply to the same message thread another operator, likewise says that “[u]nlike IRC, no offense, we keep the BITNET (CREN) rules and regulations extremely tight, and we make sure that the users will get the best service which is possible to be given.”

Thus any mischievous bots would have faced harsh consequences such as disconnection, whereas the environment on IRC was less strict in comparison, allowing for a prolific ecosystem of real people and bots, both useful and annoying. Chat on its own presented a problem for BITNET given its demands on the network; bots, which at times threatened to overload even the (larger) IRC network, were not feasible in such an environment. Consequentially, BITNET was purely focused on chat; it did not have features or services that allowed playing games with other people or saving personal information for interested chat partners.

## **Conclusion**

Both on IRC and Twitter, then, it is clear that key features – in this case, hashtags and chatbots respectively – are deeply intertwined with both the platform's own affordances and the historical context within which they were developed. In this sense, these features – and more broadly, the platforms constituted by these features and others – are very much a product of their time.

Following this, these findings underline the value of a platform studies-oriented approach in analyzing online social platforms. Rather than taking important features such as hashtags for a given, a deeper understanding of where they come from and how they were developed can reveal not only why these individual features exist but also what factors play a role in the development of a platform and, by extension, the usage of that platform.

Of course more research would be needed to map this more completely. This essay discusses but two features of two platforms; exactly because the story of these features is so particular, it is difficult to generalize findings to other platforms and features, though the historical and contextual approach to the materiality of online social platforms would seem to apply more generally. A

similar analysis could be done for, for example, the @reply on Twitter or Facebook's photo tagging feature. Such analyses can then add to our understanding of online social platforms and of which forces shape our conversation on and through these platforms.

## Endnotes

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