

‘Comments in Tags, Please!’: Tagging practices on Tumblr

Elli E. Bourlai
Indiana University
Wells Library, Room 032
1320 E. 10th Street
Bloomington, IN 47405-3907
United States
ebourlai@indiana.edu

ABSTRACT

Tumblr is one of the most popular content sharing websites, where the use of keyword tags that enhance the searchability and visibility of posts is prominent. However, this resource has been creatively exploited by some users beyond its folksonomic use: Since Tumblr does not have a separate comment section for posts, the tag section may also be used for tags with discourse functions such as expressing an opinion, a reaction, or including asides. This article explores the practice of including comments in tags, taking into account the specific technological features of Tumblr’s tagging system, as well as the role of the communities within the website.

The corpus analyzed in the study comprises two datasets collected from the general ‘Trending’ page of Tumblr and 60 fan communities (‘fandoms’). Comment tags and their identified discourse functions (opinion, reaction, aside) are analyzed quantitatively for differences regarding use, structure, and sentiment. The analysis shows significant differences between the comment tags and traditional keyword tags, as well as among comment tags with the three different discourse functions. The results suggest that social tagging practices on Tumblr are influenced both by the technological specifications of the platform and the social structure of the website.

KEYWORDS

Social tagging; discourse analysis; Tumblr; fandoms; computer-mediated communication

1. Introduction

Tagging is defined as the practice of creating and adding user-generated labels for the purposes of annotating an online resource, for example a post, an image, or a website (Marlow, Naaman, boyd, & Davis, 2006). In the past few years, social tagging has attracted considerable attention from the research community. With the emergence of Web 2.0, user generated taxonomies, also referred to as *folksonomies* (Vander Wal, 2005), have become increasingly more popular on websites such as Delicious, Flickr, Twitter, Tumblr, and Instagram. The majority of studies have approached the subject from a Web Design and Information Science perspective; more recently, research has explored social tagging from a linguistic perspective on Flickr and Twitter (Lee, this issue).

Despite the important role of tags on Tumblr, there is very little research on its tagging practices, or on the social network website in general. Chang, Tang, Inagaki, and Liu (2014) provide a statistical overview of Tumblr and its communication practices; however, they do not address social tagging. Even though Bourlai and Herring (2014) include Tumblr tags in the data they analyze as an important part of the posts, they focus on the semantic and pragmatic differences between text and image use. Hillman, Procyk, and Neustaedter (2014) only mention the importance of keyword tags regarding their use in finding and joining the online fan communities on Tumblr called 'fandoms'. The only study exploring Tumblr tags at the time of writing is the work of Xu, Compton, Lu, & Allen (2014), who analyze user behavioral patterns in a dataset of 10.2 billion posts and 23.2 million users. They provide a statistical analysis of tag use in their dataset, focusing on the number of tags per post, the most popular topics on the website according to tags, as well as popularity patterns of tags. Thus, there is very little information about the discourse function of tags on Tumblr.

The present article attempts to fill in the gap described above by exploring social tagging practices on Tumblr from a discourse perspective. More specifically, the study focuses on the practice of including comments in the tag section and the discourse functions of such comment tags. In order to better understand the nature of the comment tags, they are analyzed and compared with traditional keyword tags with regard to their use, their linguistic structure, and sentiment presence. Moreover, comment tags are further analyzed for the three discourse functions identified: opinion, reaction, and asides. The results suggest that social tagging practices on Tumblr are influenced by both the technological specifications of the platform and the social structure of the website.

2. Social Tagging on Tumblr

Tumblr was founded in 2007 by David Karp and was acquired by Yahoo in June 2013 due to its popularity. As of August 2017, Tumblr has 363 million blogs and 152.3 billion posts (Tumblr, 2017). A user may sign up in order to create a blog (or multiple blogs) where they have the option of seven different types of posts based on the kind of content shared: *text*, *photo*, *link*, *chat*, *quote*, *audio*, *video*. Another type of post, *answer*, is created when a blog owner replies publicly to a private message received by another user. Users may visit blogs individually to view all their posts, or follow them in order to view their most recent posts in a central feed page called *Dashboard* (similar to Twitter's Timeline). Users also have the option of searching for individual posts including specific keywords, or explore trending posts and tags in the *Explore* page.

A Tumblr post has three distinct writing spaces: a title section (optional), a body section, and a tag section. The appearance of these sections may differ on individual blogs when a post is published, because users have the option of customizing their blogs using 'themes'. Based on the theme of a blog, the tag section may appear smaller or even not appear at all. Figure 1 is an example of a post on a blog where the theme requires hovering over the tags individually with the cursor in order to make them appear.

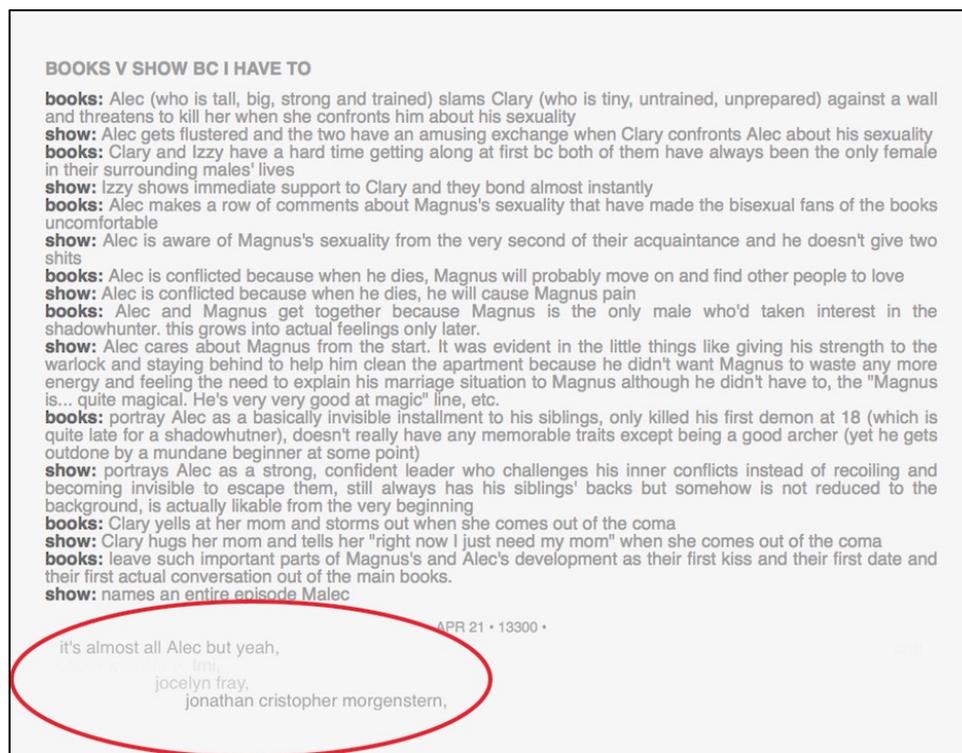


Figure 1. Example of post in individual blog with customized theme: tags are only visible by hovering over with cursor.

However, all posts that appear in the Dashboard of a user have a uniform look, regardless of the theme of the blog they belong to. Figure 2 is an example of a post as it appears on the Dashboard. It should be noted that

tags always include the hash sign (#) on the Dashboard, but may or may not include it on an individual blog based on its theme.

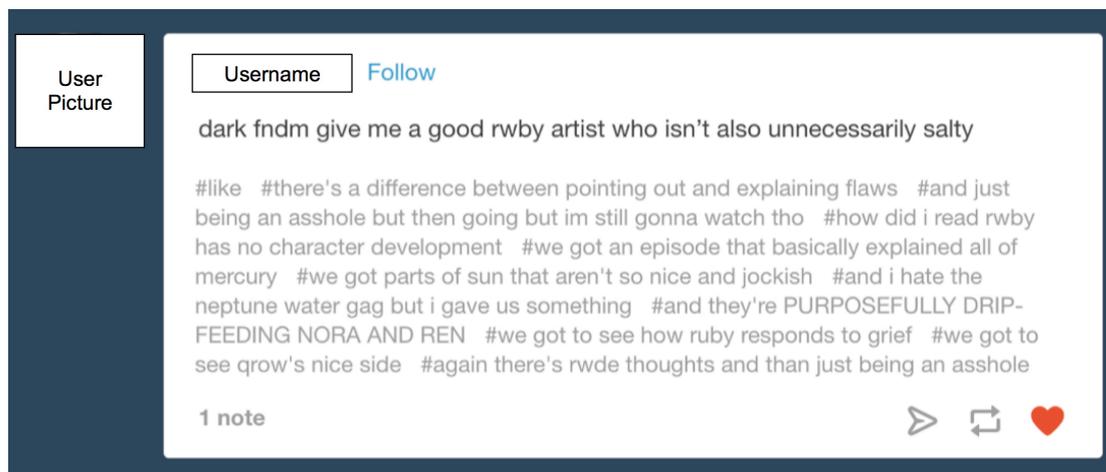


Figure 2. Example of post in Dashboard: tags are always visible and include the hash (#) sign.

Tumblr is predominantly a platform for sharing multimedia content. Based on a dataset of 586.4 million posts analyzed by Yahoo Labs (Chang et al., 2014), the most popular post type is photo (78.11%). Tags play a salient role for enhancing the searchability and visibility of such content. According to Tumblr's help page, there is no limit to the number of tags per post; however, only the first 20 show up in searches. Tags are separated by hitting the 'Enter' key, and, similarly to Flickr tags (but unlike Twitter and Instagram¹), they may include spaces and other special characters, such as punctuation marks, asterisks, and other symbols.

As seen at the bottom right of Figure 2, users have the options of sharing a post outside Tumblr, 'reblogging' (similar to the retweet option in Twitter), or liking; the number of shares, reblogs and likes that a post receives are called *notes*. Tumblr posts do not have a comment section². If a user wishes to comment on a post, they may do so by reblogging the post: The original post will be indented as quoted content, and the content added by the user will appear above or below. As a result, posts that are reblogged multiple times can become lengthy and the original content may get lost in the background. However, when reblogging a post, the tags of the original post are not included with the rest of the content and users may add their own. These technological limitations and affordances in the design of Tumblr seem to have prompted users to become more creative with their tagging practices on Tumblr: Instead of "cluttering" the original post content with comments, they started adding their comments in the tag section. Consequently, the tag

¹ Twitter and Instagram only allow alphanumeric characters and underscores () in their hashtags; since April 2015, emojis may also be used in hashtags on Instagram.

² In May 2016, Tumblr added a comment feature that may be activated by blog owners, so that other users may leave comments without reblogging the original post. At the time of writing this paper, this feature does not seem to be widespread or uniformly used.

section on Tumblr, originally designed to include keyword tags that enhance the visibility and searchability of a post, is now also used as a writing space for adding comments without changing the content or appearance of the original post.

Keyword tags are defined in this study as descriptive labels that enhance the visibility and searchability of a post. If a post were to be archived, these tags would comprise its metadata, since they describe and provide information about the content of the post. Keyword tags on Tumblr may range from generic topics (*photography*) to specific TV show names (*ouat* for *Once Upon A Time*). There are different tags or variations of tags that refer to the same subject, and users often include as many as possible to reach a wider audience. Several online articles include guides for successfully using keyword tags on Tumblr to be discovered and “drive maximum engagement” (Ray, 2015). A lot of these online guides also suggest using popular tags from “across categories” to receive more notes (Mason, 2013), and include lists of the most popular tags (Moreau, 2016; Parker, 2015). They also emphasize the importance of using only relevant popular tags to avoid creating spam (Mason, 2013; Ray, 2015; Parker, 2015). Another use of keyword tags is for organization purposes. Some users include tags with symbols such as asterisks to help them organize content in their blog for personal use, or tags such as *answered* to help users find publicly answered private messages (Answer posts) on their blog. Since the focus of this article is the practice of including comments in the tag section, keyword tags are not further analyzed for possible discourse functions. Rather, they are included in this study as a traditional use of tags to be compared with the less conventional use for commenting.

Comment tags play no role in enhancing the visibility and searchability of a post and would not be considered metadata labels like keyword tags. They are part of the content and would normally be included in the body section of a post. By placing part of the content in the tag section, users indicate a logical or structural division in the post. In the following example (Figure 3), the user has reblogged content from another user and added their own content in the tag section; this way, the original post and the comments are separated, as they would be in platforms that feature comment sections for posts. Thus, the post may be reblogged further by other users, without being “cluttered” with the content of previous reblogs. The post includes two comment tags (*#im laughing so much*, *#omg*) and 18 keyword tags that refer not only to the characters depicted in the pictures and the shows they belong to, but also to other related shows and characters.



where's the difference tho?

Apr 26 2016 +1281

— *filed under:* #im laughing so much #omg #simon lewis #shadowhunters #alberto rosende #sizzy #climon #saphael #tmi #the mortal instruments #alvin and the chipmunks #simon seville #jimon #malec #clary fray #alec lightwood #jace wayland #cassandra clare #magnus bane #issabelle lightwood

Figure 3. Example of post containing keyword and comment tags.

Additionally, users may engage in this practice to express their membership in a specific community within Tumblr. The following post³ (Figure 4) circulated around 2013 in the online fan communities (*fandoms*) that thrive on the website, as the 'proper etiquette' of commenting on posts:

³ <http://aoidaich.tumblr.com/post/50082613362/this-has-been-a-psa>

Today on:
Should I add a comment to this post?

- Do you have information to add? ✓ ok!
- Is the post about you? ✓ ok!
- To say "THIS^^^^^^^^^^ XD" ? ✗ DONT
- To say: "I love this show ^^" ? ✗ DONT
- jajaja i estoy añadiendo un comentario al azar en español XD ✗ DONT (unless the OP is spanish too)
(this goes for other languages other than english too)

"But I want to express my opinions or thoughts on this post!"

- Good! Then just write it in the tags. Go wild.

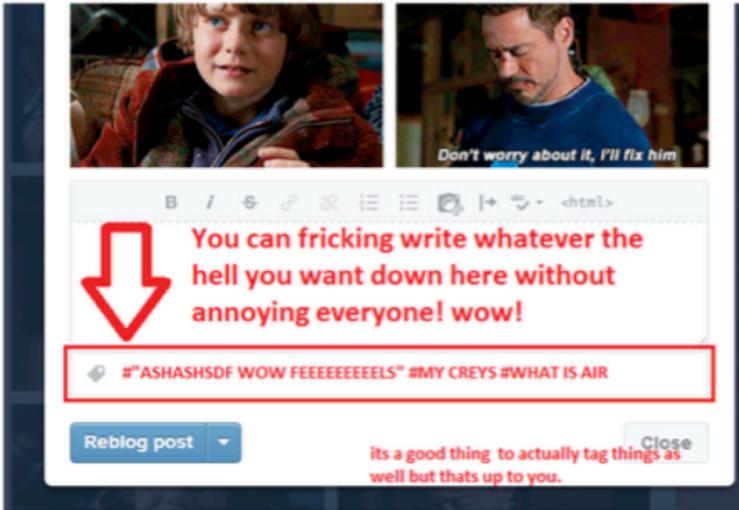


Figure 4. Guidelines for 'proper commenting etiquette' circulating on Tumblr in 2013.

This excerpt from comments of users on a reblogged version⁴ of the original post seems to imply that the practice was indeed followed by many

⁴ <http://hisako87.tumblr.com/post/50185902395/nutfound-muura-tgweaver-kawomaeda-this>

members of the fandoms where it became popular, resulting in 'hiding comments in tags' instead of including them in the body section of the post:

“Reblogging because I’VE BEEN GRUMPYGROANING ABOUT THIS VERY THING WITH MY FRIEND FOR AGES. About how nobody seems to comment on anything anymore and just hides everything in tags, making artists have to check every single fucking reblog separately to see if there’s EVEN A TINY BIT OF FEEDBACK.”

The social structure of Tumblr is an important factor to take into account when analyzing user behavior on the website. Users on Tumblr interact around shared interests, creating what Porter (2004) would characterize 'virtual communities'. The most active and famous virtual communities on Tumblr are the *fandoms*. Tumblr even has an official blog that provides information about the popularity of fandoms on the website (Tumblr Fandometrics, 2016). Hillman et al. (2014) who studied fandoms on Tumblr emphasize the importance of tags and jargon in fandom membership. Herring (2004) suggests that jargon is a discourse behavior that is indicative of a virtual community, along with norms of appropriateness, like the post with the commenting guidelines in Figure 4. Consequently, it could be argued that fandom members may express their membership and adherence to their community rules by following this practice of commenting in the tag section based on the guidelines provided on that post.

3. Discourse Functions of Comment Tags

In order to identify the discourse functions of comment tags, the author examined a sample dataset taking into account the functions found in previous literature, such as the studies of Wikström (2014) and Barton (2015). Some of the functions in previous literature were deemed more applicable to keyword tags, rather than comment tags; others were not deemed applicable to Tumblr tags overall. It was decided that three main functions would provide a classification with no overlapping: *opinion*, *reaction*, and *aside*.

Opinions are comment tags that express a user's views, thoughts, remarks, or observations on the content of a post or something directly related to the content of the post. For example, in the post presented in Figure 3 the user expresses an opinion regarding 'salty' artists and character development in the web series RWBY over several tags.

Reactions are comment tags that express a user's reaction to the content of the post or something directly related to the content of the post. For example, the comment tags in the post of Figure 3 express the surprise/disbelief and amusement of the user upon seeing the comparison of the two characters in the pictures.

Finally, **asides** are comment tags that include statements indirectly related or not related to the content of the post. The following example (Figure

5) is a post where a user shows a picture of the farm she created in the video game *Stardew Valley* and express her pride for her creation. However, the comment tags *#i'm at the point where money is no longer a concern #and so everything is all about the ~AESTHETIC* are indirectly related to the content of the post, because the user makes general statements about her status in the game.

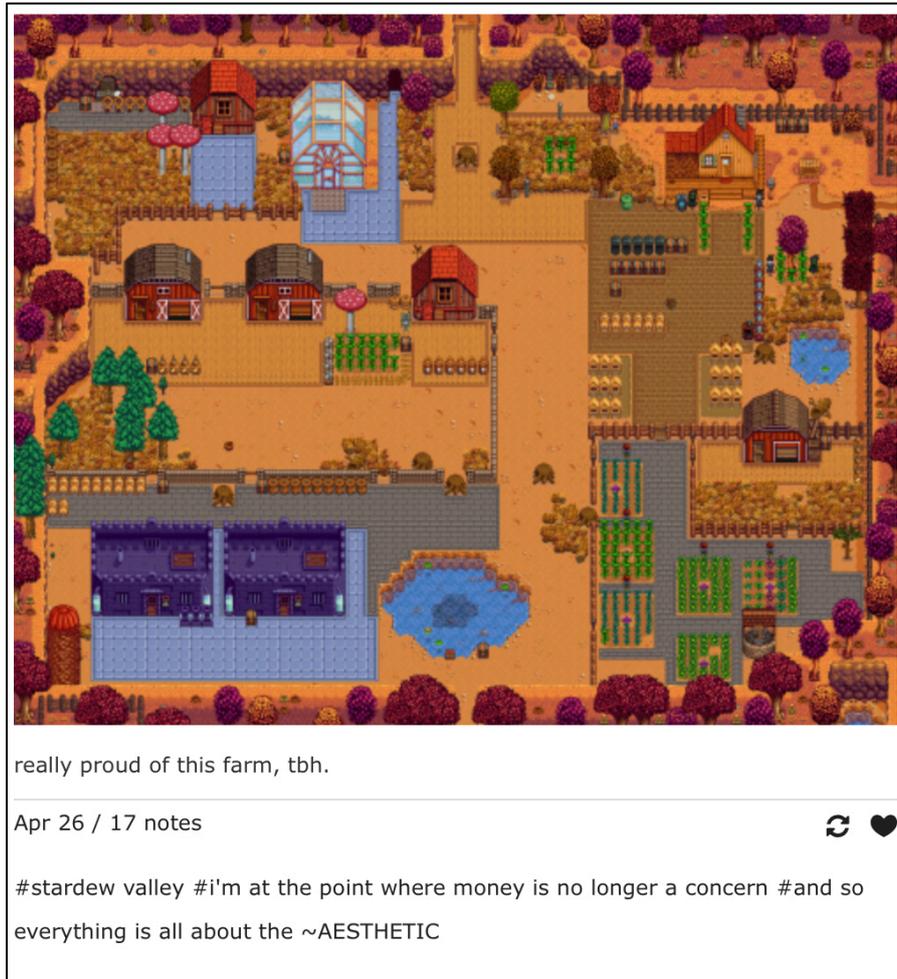


Figure 5. Example of post containing comment tags with discourse function of asides.

In order to better understand the social tagging practice of adding comments in the tag section and its discourse functions, it is important to examine the role of both social and technological factors in its development. The popularity of comment tags within certain communities of Tumblr may be evaluated by comparing a dataset comprising posts by the general Tumblr user population with a dataset comprising posts by fandom members. The role of the technological limitations and affordances of Tumblr's tagging system may be examined by looking at the structural features of comment tags. Additionally, it would be helpful to examine the presence of sentiment to have a more rounded evaluation of comment tags and their discourse

functions based on previous research. Bourlai and Herring (2014) found that posts including images were more likely to carry sentiment and have higher sentiment intensity; moreover, posts including images were mostly positive, whereas text posts were highly negative. Similarly to mode choice, the choice of tag types and their functions may not be arbitrary when expressing sentiment on Tumblr. Giaxoglou (this issue) and Lee and Chau (this issue) also foreground sentiment in their research of affect/emotion in Instagram hashtags for political movements.

4. Research Questions

This study attempts to address the following research questions:

RQ1: Do keyword and comment tags differ in (a) use, (b) structure, and (c) sentiment presence?

RQ2: Do the three discourse functions of comment tags differ in (a) use, (b) structure, and (c) sentiment presence?

5. Methodology

5.1. Overview

The present quantitative study was conducted in two stages employing a Computer-Mediated Discourse Analysis (CMDA) approach (Herring, 2004). In the first stage, three coders including the author conducted a manual content analysis on a test sample for three of the variables examined in the study: tag category, discourse function of comment tag, and sentiment presence. The inter-rater agreement scores were 96.8% for the first variable, 92.5% for the second variable, and 97.3 % for the third variable.⁵ The author completed the manual content analysis of the above variables for the rest of the corpus. In the second stage, a corpus analysis of the structural features of tags was conducted using automated tools.

5.2. Data

Since Tumblr does not have a public timeline like Twitter, it was decided that the *Explore* page would provide data generated by the general Tumblr user population for comparison with the online fan communities within the website. The tab with the *Trending* posts within that page was deemed the best choice (despite its bias toward popular posts) compared to the other tabs (*Staff Picks*, *GIFs*, etc.) The *Trending* page offers a limited number of posts;

⁵ Two of the coders who are active Tumblr users had even higher agreement scores in all three variables; this suggests that a certain familiarity with the platform and its tagging practices is required for such an analysis.

consequently, the collection of the 1,000 posts for the *Trending* dataset took place in 2016 on April 19-23 during popular posting times⁶. The process of collection included copying the URLs of posts only in English, removing any duplicates, and using the *Tumblr API v2*⁷ to collect the actual content of each post with all its metadata (username, post URL, datestamp, type of post, tags, notes).

A similar process was followed for the *Fandom* dataset: Instead of employing the built-in function of the Tumblr API that collects the most recent posts including specific keyword tags, it was decided to use fandom keywords on the *Search* page to find the most recent posts. This method was selected in order to make the *Trending* and *Fandom* datasets more comparable with regard to the types of tags included in the posts. An initial examination of the *Trending* dataset showed that it included posts with both keyword and comment tags, posts with only keyword tags, or posts with only comment tags. The built-in function of the Tumblr API would collect only posts with both keyword and comment tags, or only keyword tags, thus excluding posts with only comment tags and resulting in a dataset biased toward keyword tags. By using the *Search* function that returns posts including the keyword either within the content or the tags, it was ensured that posts containing only comment tags were also included in the *Fandom* dataset. The fandoms selected were based on the list of the most popular fandoms for the week ending on April 18th by the official Tumblr Fandometrics blog⁸. The blog divides fandoms into six categories: *TV Shows*, *Movies*, *Musical Acts*, *Celebrities*, *Video Games*, and *Web Stuff*. The top 10 fandoms in each category used in this study are included in the Appendix. The author collected 20 posts from each fandom within each category during popular posting times on April 24-26 in 2016, totaling 1,200 posts for the *Fandom* dataset. Similar to the *Trending* dataset, the URLs were copied and the Tumblr API was used to collect the content and metadata.

5.2. Analysis

The analysis of the corpus was conducted at two levels: post level and tag level. At the post level, the posts were automatically coded for post type and fandom category. At the tag level, a content analysis approach was used: each tag was manually analyzed for tag category by examining the function of the tag in relation to the post and its content. If it could be used as a metadata label for the post, it was coded as a keyword tag. If it could not be used as a metadata label but was rather additional content, it was coded as a comment tag. Comment discourse functions were also analyzed in relation to the

⁶ Popular posting times on Tumblr are between 7 p.m. and 10 p.m. EST, according to <http://blog.viraltag.com/2015/07/06/cool-kids-tumblr/>

⁷ <https://www.tumblr.com/docs/en/api/v2>

⁸ <https://thefandometrics.tumblr.com/>

content of the post to evaluate if they expressed an opinion, a reaction, or an aside. Regarding the presence of sentiment, the tags were coded for carrying positive or negative sentiment overall, as opposed to being neutral: For example, *#i am living* was coded as carrying sentiment, because it is a popular phrase for expressing a positive reaction on Tumblr. In contrast *#rogue one* was coded as not having sentiment, because it is the title of a movie and the word ‘rogue’ does not express a negative user sentiment.

The analysis of the structural variables was done employing methods from Structural/Descriptive Linguistics and Corpus Linguistics, which are included at the first level of the CMDA approach (Herring, 2004). Based on previous research (Cunha, et al., 2011; Pöschko, 2011; Bourlai et al., 2016), tag length was selected as one of the structural features examined, both in terms of characters and words. In addition, the presence of at least one special character in the tags was included as a variable, since Tumblr tagging system is one of the very few that allow characters other than the alphanumeric and the underscore; for this reason, the underscore was excluded from the following special character set: () ` ~ ! @ # \$ % ^ & * - + = | \ { } [] : ; " ' < > , . ? /. Symbol characters and emojis are also allowed in Tumblr tags, so they were included in the special character set. The corpus was analyzed using Python regular expressions to identify the presence of the above structural variables and count their frequencies.

Table 1 lists the variables used in the analysis both at post and tag level:

Unit of analysis	Variables	Values
Post	Post Type	<i>Text, Photo, Link, Chat, Quote, Audio, Video, Answer</i>
	Fandom Category	<i>TV Shows, Movies, Musical Acts, Celebrities, Video Games, Web Stuff, N/A⁹</i>
Tag	Tag Type	<i>Keyword, Comment, Unclear</i>
	Discourse Function of Comment Tag	<i>Opinion, Reaction, Aside, Other/Unclear, N/A¹⁰</i>
	Tag Length - Characters	<i>Numerical Value</i>
	Tag Length - Words	<i>Numerical Value</i>
	Presence of special characters	<i>Yes, No</i>
	Presence of Sentiment	<i>Yes, No, Unclear</i>

Table 1. List of variables and their values in codebook.

⁹ The label N/A (Not Applicable) was used for the posts in the Trending dataset.

¹⁰ The label N/A (Not Applicable) was used for keyword tags which were not further analyzed for possible discourse functions in the study.

Depending on the variable tested, the following tests and models were used with the *IBM SPSS Statistics 23.0* software: Pearson’s Chi-Square test, Chi-Square Goodness of Fit test, Mann-Whitney U test, and Kruskal Wallis H test.

6. Results

6.1. Use

The most popular type of tags in both datasets is keyword tags; however, the Fandom dataset contains more than twice as many comment tags as the Trending dataset, suggesting that comment tags are more popular among fandom communities compared to the more general population of Tumblr.

Tag Category	Trending Dataset		Fandom Dataset	
	Frequency	Percentage	Frequency	Percentage
Keyword	5,147	87.5%	6,936	76.8%
Comment	523	8.9%	2,077	23.0%
Unclear	209	3.6%	20	0.2%
Total	5,879	100.0%	9,033	100%

Table 2. Distribution of tag types in corpus.

The unclear cases were filtered out and excluded from any further statistical analysis for the rest of the study. The datasets show significant differences overall in keyword and comment tag use, $\chi^2 (1, N= 14,683) = 456.212, p < .001$.

As we can see in Table 3, the means for the keyword tags per post are very similar in the two datasets. However, the results of the Mann-Whitney *U* test that was conducted to evaluate the difference in the use of comment tags between the two datasets are significant, $Z = -20.397, p < .001, r = 0.43$: The Trending dataset had a mean rank of 819.51, while the Fandom dataset had a mean rank of 1,334.66.

Tag Category	Trending Dataset		Fandom Dataset	
	Mean	SD	Mean	SD
Keyword	5.15	4.19	5.78	5.00
Comment	0.52	1.15	1.73	1.91

Table 3. Tag type statistics per post.

The results also suggest significant differences in the use of comment tags among post types, $\chi^2 (6, N= 2,600) = 3,425.013 p < .001$. They do not

occur with equal frequency in all types of posts: comment tags are more likely to be included in photo and text posts, followed by chat posts.

Post Type ¹¹	Comment Tags	
	Frequency	Percentage
Text	936	36.0%
Photo	1,120	43.1%
Quote	53	2.0%
Link	14	0.5%
Chat	292	11.2%
Video	61	2.3%
Answer	124	4.8%
Total	2,600	100.0%

Table 4. Distribution of comment tags among post types.

Similarly, the use of comment tags is significantly different among the fandom categories in this study, $\chi^2(5, N= 2,077) = 28.145$ $p < .001$. Comment tags are used with similar frequencies among most of the fandom categories, however they occur with higher frequency in the Web Stuff category, as well as the TV Shows category.

Fandom Category	Comment Tags	
	Frequency	Percentage
TV Shows	367	17.7%
Movies	337	16.2%
Musical Acts	321	15.5%
Celebrities	316	15.2%
Video Games	310	14.9%
Web Stuff	426	20.5%
Total	2,600	100.0%

Table 5. Distribution of comment tags among post types.

Regarding the discourse functions of comment tags, the differences between the datasets are statistically significant overall, $\chi^2(2, N= 2,599) = 24.619$, $p < .001$. Reaction is the most popular discourse function in both datasets; however, opinions have a higher frequency in the Trending dataset, whereas asides are more popular in posts by the fandom communities.

Discourse Function ¹²	Trending Dataset		Fandom Dataset	
	Frequency	Percentage	Frequency	Percentage
Opinion	173	33.1%	494	23.8%

¹¹ There were no Audio posts in the corpus, consequently the value is not included in tables.

¹² There was only one Other/Unclear case in the analysis of the discourse functions of comment tags, consequently it was excluded from any further statistical analysis for the rest of the study.

Reaction	235	45.0%	955	46.0%
Aside	114	21,8%	628	30.2%
Total	522	100.0%	2,077	100%

Table 6. Distribution of comment tag discourse functions in corpus.

As we can see in Figure 6, the overall distribution pattern of discourse functions in comment tags is significantly different among post types, $\chi^2 (12, N= 2,599) = 107.188, p < .001$. The most prevalent discourse function is reaction, especially in quote, link, video and photo posts. However, asides are the most popular in answer posts. Opinions are more popular in video, chat and text posts.

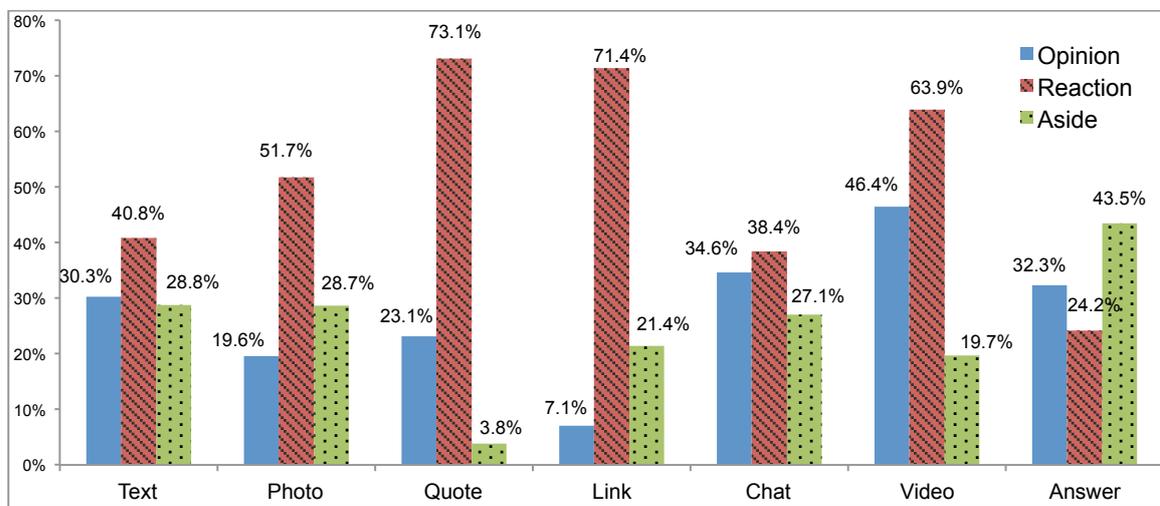


Figure 6. Discourse functions of comment tags per post type in corpus.

Finally, there are significantly different patterns of discourse functions in comment tag use among fandom categories, $\chi^2 (10, N= 2,077) = 90.589, p < .001$. Similarly to post types, reaction is the most popular in all fandom categories except for video games; they are especially prominent in celebrities and musical acts, where they account for more than half of the tags analyzed. Asides are the second most popular among fandom categories, but have the highest frequency in video games, and are exceeded by opinions in TV Shows.

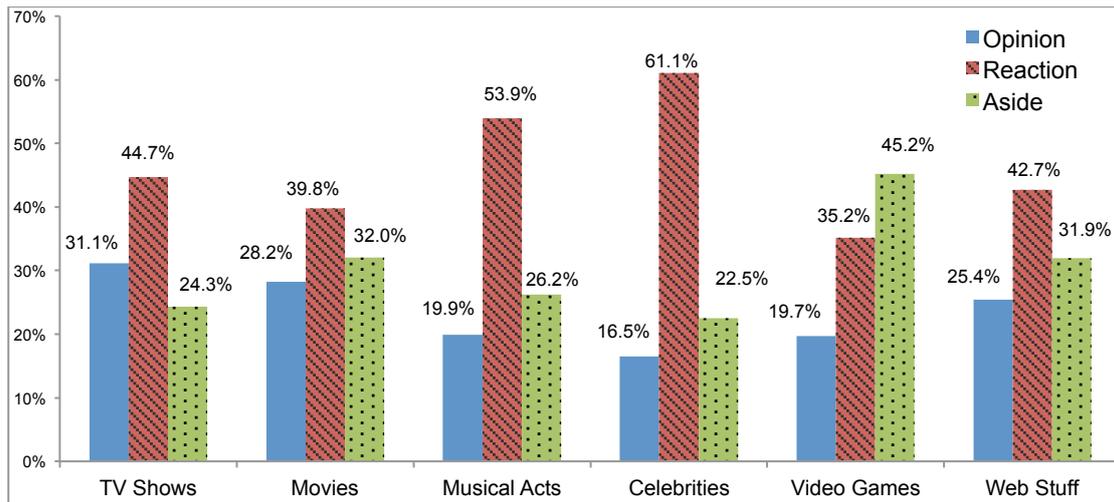


Figure 7. Discourse functions of comment tags per fandom category in corpus.

6.2. Structure

Keyword and comment tags exhibit several structural differences. As can be seen from Table 7, special characters are used in less than half of the keyword tags in this corpus, but in 85.6% of the comment tags. The differences in special character use between the two tag types are statistically significant, $\chi^2(1, N = 14,683) = 1,340.101, p < .001$.

Presence of special characters	Keyword Tags	Comment Tags
Yes	46.1%	85.6%
No	53.9%	14.4%
Total	100%	100%

Table 7. Presence of special characters in tag types.

Regarding the length of the tags, both the number of characters¹³ and number of words¹⁴ are significantly different in the two tag types. As seen from the results below, the average number of characters for comment tags is 24.15 compared to 9.81 for keyword tags, and the average number of words for comment tags is 4.88 compared to 1.61 for keyword tags. Consequently, comment tags are approximately three times longer than keyword tags.

Variables	Keyword Tags	Comment Tags
-----------	--------------	--------------

¹³ The mean ranks of keyword tags and comments tags for number of characters were 6,654.89 and 10,535.19, respectively; Mann-Whitney $U = 7,405,609.5, Z = -42.41, p < .001, r = 0.35$.

¹⁴ The mean ranks of keyword tags and comments tags for number of words were 6,516.11 and 11,180.16, respectively; Mann-Whitney $U = 78,734,180.5, Z = -54.93, p < .001, r = 0.45$.

	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Number of Characters	9.81	5.23	24.15	18.85
Number of Words	1.61	0.84	4.88	3.80

Table 8. Statistics for length of tag types.

Comment tags serving different discourse functions also have significant differences in structure, $\chi^2 (2, N = 2,599) = 140.896, p < .001$. All comment tags include special characters in their majority, however those expressing reactions have lower frequency of spaces, non-alphanumeric characters, and emojis (see highlighted number in Table 9).

Presence of special characters	Opinion	Reaction	Aside
Yes	95.5%	76.9%	90.6%
No	4.5%	23.1%	9.4%
Total	100%	100%	100%

Table 9. Presence of special characters among discourse functions in comment tags.

There are also significant differences regarding tag length in terms of characters and words. Opinions and asides are similar in length, but asides are almost half the length of both (see highlighted numbers in Table 10). A Kruskal Wallis H test showed that there was a statistically significant difference in number of characters among the three discourse functions, $\chi^2 (2) = 401.802, p = < .001$, with a mean rank of 1,656.17 for opinion, 986.65 for reaction, and 1,482.37 for aside. A second Kruskal Wallis H test showed that there was a statistically significant difference in number of words among the three discourse functions, $\chi^2 (2) = 370.701, p = < .001$, with a mean rank of 1,648.24 for opinion, 1,002.93 for reaction, and 1,463.39 for aside

Variables	Opinion		Reaction		Aside	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Number of Characters	31.75	19.04	16.69	14.20	28.86	20.97
Number of Words	6.35	3.77	3.49	2.88	5.81	4.31

Table 10. Statistics for length of tags among discourse functions in comment tags.

6.3. Sentiment

There were 37 unclear sentiment presence cases in the corpus that were filtered out and excluded from further statistical analysis. Keyword and comment tags have an impressive difference in sentiment: keywords are almost exclusively neutral, whereas more than half of the comment tags carry sentiment. The overall sentiment distribution among tag types is significantly different, $\chi^2(1, N = 14,646) = 4,774.584, p < .001$. However, according to the binomial tests in Table 11, the differences within each tag category are only statistically significant for keyword tags.

Tag Category	Observed Prop. (Yes)	Observed Prop. (No)	Significance
Keyword	.03	.97	<.001
Comment	.51	.49	.287

Table 11. Binomial test results for sentiment presence among tag types.

Comment tags with different discourse functions exhibit significantly different patterns of sentiment presence overall, $\chi^2(2, N = 2,576) = 458.069, p < .001$. As expected, reactions carry sentiment in their majority, as opposed to asides that are neutral in their majority. Presence of sentiment is almost evenly distributed in opinions, with a slightly higher frequency for neutrality. The binomial tests conducted show statistical significance in sentiment presence differences within each discourse function type, which is lower for opinion.

Tag Category	Observed Prop. (Yes)	Observed Prop. (No)	Significance
Opinion	.44	.56	.002
Reaction	.72	.28	<.001
Aside	.23	.77	<.001

Table 12. Binomial test results for sentiment presence among tag types

6. Discussion

Revisiting the research questions posed in section 4, the results show that the comment tags on Tumblr differ in use and structure from the more traditional keyword tags that are used in most social tagging systems. Similarly, there are significant differences among the discourse functions

identified in comment tags. These differences are found in all aspects examined: use, structure, and sentiment presence.

The majority of tags used in both datasets are keyword tags. Taking into account that Tumblr is a microblogging service for sharing multimodal content, it is not surprising that users predominantly tag their posts with descriptions and information about the content to enhance their visibility and searchability. Moreover, as explained in section 2, users tend to use multiple tags or versions of tags referring to the same topic in order to maximize the reach of their posts. This results in a high number of keyword tags in both the Trending and Fandom datasets. However, there seems to be a community influence on the practice of comment tags: their frequency is almost three times higher in the Fandom dataset compared with the Trending dataset. According to Marlow et al., social tagging systems “rely on shared and emergent social structures and behaviors, as well as related conceptual and linguistic structures of the user community” (2006, p.31). Thus, it is very possible that the fandom communities with their ‘related conceptual and linguistic structures’ have played a crucial role in the development of Tumblr’s social tagging system, which includes the practice of comment tags explored in this article.

The distribution of comment tags among post types also provides an interesting insight. Photo posts are the most popular posts on Tumblr (Chang et al., 2014) and they are reblogged in higher frequency. Multiple reblogs with added textual comment in the body section would create noise in the original post and make the post longer with each reblog. Since tags are not included in the reblogged content (each user who reblogs a post has to add their own tags), users prefer to add their content in the tags in order to keep the post ‘clean’ and facilitate the reblogging process. Chat posts are dialogues (usually fictional) that other users may relate to, and are reblogged in the same way as photo posts. In both cases, there is a post-comment or photo-caption division implied between the body and the tag section. The same could be argued for the Text posts, since a significant number of the Text posts in the dataset are fictional stories that are reblogged by users to be further shared with the community. Moreover, added textual content over existing textual content may make it even more visually challenging to locate the original content. The insights from examining the distribution of comment tags among post types also help us understand the higher frequency of comment tags in the TV Show and Web Stuff categories: those categories included the most Photo posts, usually reblogged from other users.

Regarding the structural characteristics of comment tags, the results suggest that the technological features of the tagging system on Tumblr also play an important role. Most social tagging websites allow only alphanumeric characters and underscores (_) in their tags. This means that longer hashtags comprised of multiple words are more difficult to read and understand; thus, they should be avoided according to online ‘hashtag etiquette’ guides (Desta,

2014; Doctor, 2012). This is especially true in the case of tags that are used for enhancing the searchability and visibility of a post, such as keyword tags. Cunha et al. (2011) found that the most popular hashtags on their Twitter dataset tend to be short, whereas sentence-long tags have very low frequency. They attribute this to the fact that they are more difficult to read and memorize, and they invite more spelling mistakes and variations, which affects searchability and visibility. This is also reflected in the keyword tags examined in this study: Despite the fact that Tumblr allows special characters such as spaces, punctuation marks, symbols, and emojis, the average number of words included in keyword tags is 1.61 and less than half contain special characters. However, approximately, 86% of the comment tags contain at least one special character and they are approximately three times longer than keyword tags. Barton (2015) also found tags that comprise phrases and “even whole sentences” (p. 64) in Flickr, which has a similar tagging system to Tumblr (see also Barton, this issue). Moreover, he found that tags relate to each other in the tagging space, which is true for Tumblr as well; for example, the following comment tags taken from the post in Figure 2 are a single sentence separated in tags:

#like #there's a difference between pointing out and explaining flaws #and just being an asshole but then going but im still gonna watch tho

This suggests that longer tags with no function in the visibility and searchability of posts are more likely to appear in tagging systems that allow spaces and other special characters. In addition, Barton (2015) argues that Flickr tags relate to the whole photo page and that they can be salient in meaning-making. As explained in section 2, comment tags are part of the content and have been placed in a different section to indicate a logical or structural division. Consequently, they should be analyzed as part of the content in the post, rather than examined as additional or contextual information that is usually derived from keyword tags. Additionally, a large number of posts include keyword tags with repeated, existing information in various versions to ensure maximum visibility for the posts. In a discourse analysis of the content of posts, such tags may create ‘data noise’; thus, Tumblr researchers may wish to filter them out. Since keyword and comment tags exhibit structural differences, they could be used as features in a ‘tag type’ classifier to facilitate clearing up ‘noise’ in Tumblr data.

The sentiment differences between keyword and comment tags are not very surprising if we examine the data closely. The vast majority of keyword tags in the corpus are names of people, TV shows, movies, etc.; thus, they do not carry any sentiment. The few keyword tags that carry sentiment refer to more ‘generic’ topics, for example *#depression*, *#black lives matter*, *#happy girl*, *#unrequited love*, and *#best of 2016*. In order to better understand the higher sentiment presence in the comment tag category, we have to look at

the discourse functions they serve (see also Lee and Chau, this issue for a discussion of affective hashtags on Instagram). Reactions usually include some type of sentiment, for example *#omg*, *#i'm living*, *#DISAPPOINTED*, *#look at his pretty face [crying emoji]*. Example of reactions without sentiment are *#i bought the DVDs after seeing this* and *#let's check wikipedia*. Tags with opinions in the corpus usually provide arguments with facts, but they may also use words that express sentiment. Using an example from above, *#there's a difference between pointing out and explaining flaws* does not carry any sentiment, but the tag that follows it does: *#and just being an asshole but then going but im still gonna watch tho*. Asides are usually factual statements, such as in the post of Figure 5: *#i'm at the point where money is no longer a concern*. There are fewer asides that carry sentiment, for example the tag *#i don't know why I picked the one with the shitty quality*, which is a comment regarding the quality of the image included in the post, but is not related directly to its topic: the romantic struggle of two characters in a TV show.

The discourse function with higher occurrence in comment tags is reaction. Tumblr is especially known as a source of 'reaction GIFs': short clips of movies or TV shows which communicate a variety of reactions, and are used on Tumblr and other platforms to express users' reactions in a visual manner (Bourlai & Herring, 2014). Thus, it may be argued that users express their reactions in a similarly creative manner using tags. A closer examination does not reveal any insights regarding the difference in the frequencies of opinion and asides in the two datasets, and it is concluded that it may be a result of the particular data collected. Reaction is also the most popular discourse function among post types, especially in Quote, Link, Video and Photo posts, where users are more likely express their reaction to the shared content. Answer posts in the dataset mainly belong to blogs of users role-playing fictional characters. The higher frequency of asides in these posts may be explained by the fact that many users write meta-comments on their performance as the fictional character, or statements that have to do with their real life and are not related to the topic of the post. Finally, the very high frequency of reactions in the Musical Acts and Celebrities fandom categories seems to stem from the fact that a lot of users in the dataset tend to express their reactions to the physical appearance and behavior of the people they admire. Users in the TV Shows category are also very likely to share their opinions about specific characters or episodes, whereas users in the Video Game category are more likely to include general statements about their experiences as gamers or with a specific game, and events in their life that are not related to the content of the post.

As far as structural features are concerned, tags expressing opinion and asides are fairly similar. However, there are fewer comment tags expressing reaction in the dataset that include special characters. They are also shorter and include fewer words on average. A number of reaction tags in the dataset are single words like *omg*, *yasss*, *dying*, *ugh*, *hahaha*, *shit*. This

means that they do not include spaces, which belong to the special character set; it also explains the lower averages of it in both the character and the word number.

7. Conclusion

The results of this study contribute to the knowledge about Tumblr's social tagging system and the discourse functions of social tagging in general. Except for the system-intended folksonomic use of traditional keyword tags, this article showcases a creative use of the tag section by the users to express opinions, reactions and asides. We may conclude that the social tagging practice of adding comments in the tag section occurring on Tumblr is both a result of the social structure of the platform and its technological design: The practice seems to be more popular among the fandom communities, and the tag format allows for longer, legible tags. The comment tags of Tumblr exhibit several features that differentiate them from the traditional keyword tags used in the majority of online platforms: They are approximately three times longer, they include special characters such as spaces in their majority, and they are more likely to carry sentiment. They are also more likely to occur in Photo, Text and Chat posts. The three identified discourse functions of comment tags also present differences in use, structure, and sentiment. Reaction is the most popular discourse function of comment tags, especially in Quote, Link Video and Photo posts, and the Musical Acts and Celebrities fandom categories. They are also more likely to carry sentiment, but less likely to include special characters; however, they are shorter both in terms of characters and words than the tags expressing opinions and asides.

One limitation of the study regards the sampling methodology. Even though collecting posts from the Trending section on Tumblr provides the closest sample from the general Tumblr population, it is, unfortunately, biased toward popular posts. However, at the time of writing this paper, there is no public timeline on Tumblr that would be an ideal source for a more representative sample. Moreover, there might be posts belonging to fandoms in the Trending dataset because of their popularity. As a result, it is possible that the number of comment tags is higher in the Trending dataset due to popular fandom posts that ended up in the Trending tab of Tumblr's *Explore* page. Finally, the interpretation of the results is solely based on the data and the author's user experience on Tumblr. The addition of interviews with users would provide more insights for their social tagging behaviors.

Several suggestions for future research directions emerge from the analysis of the tagging phenomenon presented in this article. As mentioned above, a qualitative approach in combination with the quantitative methodology in this study, such as user interviews or questionnaires, would be greatly beneficial to our understanding of tagging on Tumblr. A more

practical implication of the study regards the differences identified in the structure of the tag types: a classifier using the structural characteristics of the tags as features could automatically filter out keyword tags that may create 'noise' in discourse analysis focusing on the content of the post. Finally, a comparative study of Tumblr's social tagging practices with similar platforms would further enrich our understanding of the factors that shape social tagging systems; the present study is a step toward that goal.

REFERENCES

- Barton, D. (2015). Tagging on Flickr as a social practice. In R. Jones, A. Chik, & C. Hafner (Eds.), *Discourse and Digital Practices: Doing Discourse Analysis in the Digital Age*. London: Routledge, pp. 48-65.
- Bourlai E., & Herring, S. C. (2014). Multimodal communication on Tumblr: "I have so many feels!" *Proceedings of WebSci'14*, June 23-26, Bloomington, IN.
- Bourlai, E. E., Herring, S.C., & Abdul-Mageed, M. (2016, November). *Distinguishing functional types of hashtags: A structural approach*. Paper presented at the 3rd International Conference of the American pragmatics Association (AMPRA 2016), Bloomington, IN.
- Chang, Y., Tang, L., Inagaki, Y., & Liu, Y. (2014). What is Tumblr: A statistical overview and comparison. *SIGKDD Explorations*, 16(1), 21-29.
- Cunha, E., Magno, G., Comarela, G., Almeida, V., Gonçales, M. A., & Benevenuto, F. (2011). Analyzing the dynamic evolution of hashtags on Twitter: a language-based approach. In *Proceedings of the Workshop on Languages in Social Media (LSM '11)* (pp. 58-65). Stroudsburg, PA: Association for Computational Linguistics.
- Desta, Y. (2014, February 24). #HashtagEtiquette: 8 People Who Are Doing It Wrong. Retrieved from <http://mashable.com/2014/02/24/hashtag-etiquette/#.9XwriUxhZqP> (Accessed 13.01.2017)
- Doctor, V. (2012, November 9). What NEVER to do with hashtags. Retrieved from <https://www.hashtags.org/featured/what-never-to-do-with-hashtags/> (Accessed 13.01.2017)
- Herring, S.C. (2004). Computer-mediated discourse analysis: an approach to researching online behavior. In S. A. Barab, R.Kling, & J. H. Gray (Eds.), *Designing for Virtual Communities in the Service of Learning* (pp. 338-376). Cambridge University Press: New York.
- Hillman, S., Procyk, J., & Neustaedter, C. (2014). 'Alksjdf;lksfd': Tumblr and the fandom user experience. *Proceedings Of The Conference On Designing Interactive Systems: Processes, Practices, Methods, And Techniques, DIS 2014* (pp.775-784). New York, NY: ACM. doi:10.1145/2598510.2600887

- Marlow, C., Naaman, M., boyd, d., & Davis, M. (2006, August). HT06, tagging paper, taxonomy, Flickr, academic article, to read. In *Proceedings of the seventeenth conference on Hypertext and hypermedia* (pp.31-40). New York, NY: ACM.
- Mason, S. (2013, June). How to get more notes on Tumblr. Retrieved from <http://uncommonlysocial.com/how-to-get-more-notes-on-tumblr/>. (Accessed 13.01.2017)
- Moreau, E. (2016, February). 10 popular Tumblr tags to browse. retrieved from <https://www.lifewire.com/popular-tumblr-tags-to-browse-3486067> (Accessed 13.01.2017)
- Parker, E. (2015, May 7). What are the most popular tags? Should I use those? Retrieved from <https://www.linkedin.com/pulse/what-most-popular-tumblr-tags-should-i-use-those-sarah-parker> (Accessed 13.01.2017)
- Porter, C. E. (2004), A Typology of Virtual Communities: A Multi-Disciplinary Foundation for Future Research. *Journal of Computer-Mediated Communication*, 10(1). DOI: 10.1111/j.1083-6101.2004.tb00228.x
- Pöschko, J. (2011, November 8). *Exploring Twitter Hashtags*. Retrieved from <http://arxiv.org/pdf/1111.6553.pdd>
- Ray, M. (2015, July 6). How to become one of the cool kids in Tumblr. Retrieved from <http://blog.viraltag.com/2015/07/06/cool-kids-tumblr/#sthash.S631ROza.VSIQTXGF.dpbs> (Accessed 13.01.2017).
- Tumblr. (2017). *About* page. Retrieved from <http://www.tumblr.com/about> (Accessed 24.08.2017)
- Tumblr Fandometrics (2016). *About Fandometrics* page. Retrieved from <https://thefandometrics.tumblr.com/about> (Accessed 16.07.2016)
- Vander Wal, T. (2005, November 2). *Folksonomy definition and Wikipedia*. Retrieved from <http://www.vanderwal.net/random/entrysel.php?blog=1750> (Accessed 08.06.2016)
- Wikström, P. (2014). #srynotfunny: communicative functions of hashtags on Twitter. *SKY Journal of Linguistics*, 27, 127-152.

Xu, J., Compton, R., Lu, T., & Allen, D. (2014). Rolling through tumblr: Characterizing behavioral patterns of the microblogging platform. *In Proceedings Of The 2014 ACM Web Science Conference*, (13-22). New York, NY: ACM. doi:10.1145/2615569.2615694

APPENDIX

Top 10 fandoms per category used in the *Fandom* dataset.

TV SHOWS	MOVIES	MUSICAL ACTS
<ol style="list-style-type: none"> 1. Miraculous: Tales of Ladybug and Cat Noir 2. Steven Universe 3. The 100 4. Shadowhunters 5. Supernatural 6. Gravity Fall 7. Once Upon a Time 8. Teen Wolf 9. The Walking Dead 10. Game of Thrones 	<ol style="list-style-type: none"> 1. Captain America: Civil War 2. Zootopia 3. Star Wars: The Force Awakens 4. Suicide Squad 5. Deadpool 6. Doctor Strange 7. Rogue One: A Star Wars Story 8. Batman v Superman: Dawn of Justice 9. Lord of the Rings 10. Fantastic Beasts and Where to Find Them 	<ol style="list-style-type: none"> 1. 5 Seconds of Summer 2. Taylor Swift 3. Twenty One Pilots 4. Mystery Skulls 5. One Direction 6. Selena Gomez 7. Rihanna 8. Justin Bieber 9. Beyoncé 10. Fifth Harmony
CELEBRITIES	VIDEO GAMES	WEB STUFF
<ol style="list-style-type: none"> 1. Sebastian Stan 2. Chris Evans 3. Alycia Debnam-Carey 4. Kylie Jenner 5. Robert Downey Jr. 6. Kendall Jenner 7. Matthew Daddario 8. Tom Hiddleston 9. Daisy Ridley 10. Eliza Taylor 	<ol style="list-style-type: none"> 1. Undertale 2. Pokémon 3. Fire Emblem Fates 4. The Sims 5. The Legend of Zelda 6. Fallout 4 7. League of Legends 8. Stardew Valley 9. Dragon Age: Inquisition 10. Overwatch 	<ol style="list-style-type: none"> 1. Homestuck 2. danisnotonfire 3. AmazingPhil 4. RWBY 5. Jacksepticeye 6. Markiplier 7. Check, Please! 8. Game Grumps 9. Troye Sivan 10. Sprinkle Of Glitter