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The Role of Social Media during Social Movements – Observations from the #metoo Debate on Twitter

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Abstract

In recent years, the development of information communication technologies (ICT) such as social media changed the way people communicate and engage in social movements. While conventional movements were fought in the streets, social media enabled movements to take place online. In this paper, we aim to investigate the role of social media during social movements which evolve online. Specifically, we examined Twitter communication during the #metoo debate. To this end, we applied methods from social network analysis to identify influential users participating during the debate. Conducting a manual content analysis, we classified 200 power users into roles. Likewise, a manual classification of 1,271 tweets found distinct communication categories. The results overall point to different motives: First, the communication was deeply concerned with the issue of sexual harassment, calling for attention and action. Second, we found reason to believe that self-serving and branding intentions drove participation.

1. Introduction

Over the past years, social media have come to a wide use in social movements. High connectedness, fast information diffusion, and lower individual costs are some of the reasons why a shift to the online sphere has been observed [10]. One way this has been studied is *hashtag activism* which is defined as an approach "to raise awareness of an issue and encourage debate" [36:15] via the use of hashtags on social media. While hashtag activism and the way it is structured is a thought-provoking field in itself, we are more generally interested in who participates in these movements and what is shared by whom.

Previous studies have already investigated content communication through social media in social movements [35], differences in communication patterns between two different Social Media sites [21], and the role of specific actors within these movements [38]. However, these pieces have so far not been put together. Less is known about the specific content that is shared by specific user groups. Yet, to broaden the understanding of social movements on social media, it is crucial to understand the dynamics of communication among distinct groups participating in a social movement on social media.

We, therefore, examined one recent example of such a social movement, that is the #metoo movement. We investigated which kinds of user roles were involved in sharing and publishing tweets related to the hashtag #metoo during the time from September 30, to November 30, 2017. Additionally, we were not only interested in the users themselves but also in the content they shared. Therefore, we present findings on the following research questions:

RQ: How do influential roles participate over the course of an online social movement on Twitter?

In order to answer the research question, as a first step, we collected tweets by relevant keywords. Based on the tracked data, we conduct a social network analysis [32] to identify influential users participating in the #metoo debate during the examined time period and to assess underlying structures. Subsequently, we undertook a comprehensive manual content analysis [22] to classify the identified users into roles and then categorized the shared tweets into explicit content categories. In this research, we understand roles as specific user groups in accordance to [33]. Thus, we examine which content was published by the top 200 power users and which information of the #metoo tweets were most retweeted.

We expected that the identified roles altered in their sharing behavior and, consequently, influenced the movement differently. We subsidized deeper insights into the specific case of #metoo and generated continuative understanding of how social media activism functions, concerning different roles and their motives. Ultimately, we intended to increase our understanding of the contribution and potential, but also possible downsides of social media use in social movements.

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This study is structured as follows: First, we present an overview of the status quo of the literature about social movements in social media. Second, we outline a summary of our research design. Subsequently, we present the findings of examined case #metoo. Last, we provide a conclusion and an outlook for further research.

2. Related work/Status quo

2.1 Social movements in social media

The development of ICTs has changed the involvement of users in social media and online communities. Previous studies have shown that this happened via lowering individual costs of participating, increasing general accessibility to information [23], fostering connectivity between users [12], and creating a platform where users can generate content themselves [3].

This is not only reflected on the individual level but affected social movements as well. In contrast to more organized offline social movements where individuals remain mostly passive, social movements on social media enable individuals to move from this passive state of participation to self-organized participation [20]. Organization and coordination rely much more on a personalized expression of identity, communication, and sharing than on more traditional forms like formal organizations and leaders [17]. Therefore, social movements became much more self-organized and leaderless [18]. On the individual level, social media enabled people to make informed decisions about the participation in general, while simultaneously increasing the chances that people participate [23] and it facilitated coordination of protest [18].

With this in mind, it does not come as a surprise that social media can work, indeed, as a catalyst of a movements success and facilitates information spread. Taken this further, it was claimed that more and more social movements became successful *because* of social media. Examples of such social media enabled movements are the Arab Spring [28], Occupy Wall Street in the US [15, 17], Los Indignados in Spain [37] and the #YoSoy132 movement in Mexico [11]. Although these protests were founded offline, they were no longer only fought in the streets but also online. In agreement with the before-mentioned features of social media it was found that these can contribute to a movement's success both online and offline [4]. This new development came, however, with some costs. Phrases such as keyboard warrior or slacktivism suggest that, although participation in general seemed high, actual identification with a movement can still be low.

We suggest that the #metoo debate brought something new into play again: the movement was initiated online and only eventually affected offline events (for a more detailed account, see section 3.1). With this change of direction, namely from the online to the offline world, the central role of social media became even more evident. To understand the hows and whys of this change, we propose with this study to start looking at participating individuals and their behavior online.

2.2 User behavior on twitter and its impact on social movements

Social movements, whether offline or online, break down to individuals' actions. To investigate the observed change of direction, it is, therefore, important to understand how individuals behaved on the respective platforms. For the case of #metoo we, accordingly, reflected on user behavior within the Twitter-sphere.

Through the opportunity of real-time sharing, Twitter is one of the most popular ways to spread information among a wide audience, impact a public discourse in society and engage users in social discussions [13, 27, 34]. One recent study which examined three different movements (Occupy Wall Street, Indignados, and Aganaktismenoi) from three different countries, found that Twitter indeed helped to popularize the cause and broaden the call for the public to engage [35].

In addition to that, [21] found reason to believe that user behavior between different social media platforms varied and could possibly alter a movements development. While during the #metoo movement Reddit users were more likely to share details of their own stories, Twitter users focused on being engaged in the online community and supported victims by posting hashtags, sharing news, URLs or articles and, most importantly, they encouraged others to engage in the (online) social movement [21]. Besides that, Twitter users also shared their stories but by focusing on the point that they were being harassed without sharing lots of details [21]. Concerning the use of hashtags, one exceptional example for its use in social movements on social media came from the Black Lives Matter debate. Hashtag-use not only fostered public attention but also helped to connect individual people of the movement [5].

Likewise, it is crucial to differentiate different users concerning their general impact on social networks. For example, users having a higher social status provide information which is then spread by lower

status users within a social network [6]. Therefore, celebrities are more likely, first to spread information, and second to be retweeted. Alongside celebrities, it was found that posts from other highly followed users like leftists, activists or bloggers are more likely to be retweeted [30]. Concerning not only the impact of specific users but also the content, recent research found evidence for a difference in what type of content is posted by whom. For example, call for actions are rather rare and are mostly tweeted by activists [35].

Moreover, studies examining predictors of retweet-probability on social media identified tweet features which increase retweet-probability, for instance, specific hashtags, usage of URLs and content characteristics [34]. The special focus on retweet-probability can be justified because it was found that Twitter's retweet functionality was a central key mechanism for information diffusion on this platform [6, 24]. Thus, retweeting others takes a central role in the context of analyzing influential online communication [31]. Besides these features, especially the usage of emotional and affective language is regarded as a reason why some content is more likely to be retweeted than other. Positive as well as negative emotions receive more feedback than others and can catch attention as well as cognitive involvement [30]. This concludes that language affects the tendency to retweet some content more than less affective content.

Likewise, it was shown that specific content that people retweeted is inseparably linked to the construction of one's self-image and self-promotion [6]. In turn, people tend to retweet in order to spread information to new audiences as well as an act of friendship or loyalty by drawing attention to content [34]. Therefore, users might want to engage others in a conversation to eventually build a collective group identification and encourage them in social actions [6].

Moreover, if we want to enrich the knowledge of how social media is deployed during social movements, we need to ask differentiated questions. For better understanding how people engage in online social movements and how this differs from the offline world, we need to know *who* participates on social media during social movements, and *how* people create content and interact with the published information.

3. Research design

3.1 Case description

In 2006 the social activist Tarana Burke introduced the phrase 'Me Too' to empower women who have experienced sexual abuse. However, the grassroots campaign did not go viral until October 2017 when The New York Times published an article accusing the Hollywood producer Harvey Weinstein of sexual misconduct [16]. In response to the rising allegations, the actress Alyssa Milano tweeted[1] "*If you have been sexually harassed or assaulted write 'me too' as a reply to this tweet.*". Following, the hashtag spread virally: it was used more than 500.000 times on twitter after 24 hours and evolved into a social movement against sexual harassment and sexual assault, especially in the workplace. Inspired by Milano's tweet, users on Twitter and other social media platforms shared, commented and discussed their own personal experience related to sexual misconduct. The hashtag was seen and shared not only on Twitter which even dedicated the hashtag its own icon but also through other social media platforms like Facebook and Reddit, as well as various online news articles. Although the hashtag-movement was originated in the United States, it gained worldwide recognition. Within days it spread to countries all over the world, leading not only in the US to tangible consequences in the physical world such as marches in the streets [14].

3.1 Data collection and analysis

For our empirical analysis, we collected tweets regarding the #metoo-debate in 2017 from Twitter. Overall, we examined two months of online communication, from September 30 (22:00 UTC) 2017 to November 30 (23:00 UTC) 2017. Twitter has been proven to be a substantial tool for information exchange during social movements [26], as one of the features of Twitter is the function of real-time interaction by retweeting others [9, 27]. By conducting an exploratory prior analysis on trending hashtags and topics, specific hashtags showed to be most frequently used during the debate, covering the majority of related online communication. Thus, we collected tweets containing at least one of the following hashtags: #metoo, #meninists, #antifeminism, #norightsforwomen, #weinstein, #sexism, #menot, #CN_sexism, #gender, #itwasme. Due to its origin in the United States, we focused on Twitter communication in English. The fundamental data for this study were collected through the Search API[2] of Twitter with a self-developed Java crawler, using the library Twitter4J[3]. The gathered data is stored in a MySQL database, from where we conducted further analysis steps.

[1] https://twitter.com/Alyssa_Milano/status/919659438700670976/photo/1, last access: 06.10.2019

[2] https://dev.twitter.com/rest/public/search, last access: 06.10.2019

[3] http://twitter4j.org, last access: 06.10.2019

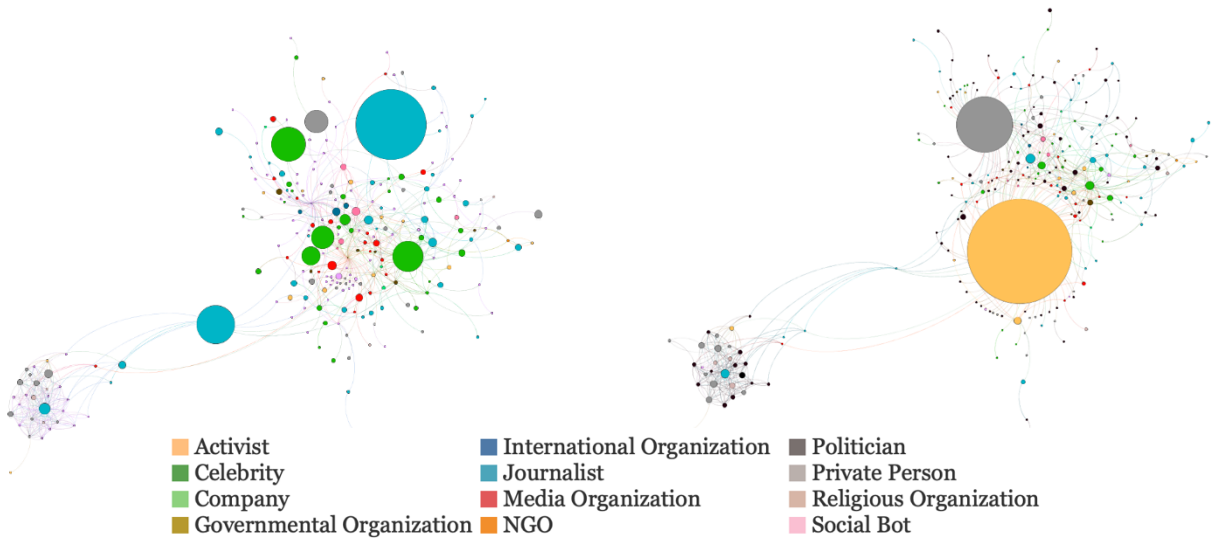

Figure 1. Visualized networks. Left: node-size by in-degree; right: node-size by out-degree

In order to identify the participants and their role in the communication, we focused on power users and used social network analysis methods in combination with manual content analysis to categorize the participants into roles [32]. According to [33], power users can be classified as participants who receive the highest numbers of retweets within a network. To examine the majority of case-related Twitter communication, we analyze the tweets by the top 200 power users by indegree. The size of this sample represents the most retweeted, and therefore, most influential users during the examined time period. Thus, the classification of active roles is based on the majority of gathered Twitter communication as well as the most influential users within the dataset. The long-tail users by indegree are not considered for the role classification, due to the small degree of influence within the network.

To this end, we classified the top 200 power users into roles and performed a categorization technique based on the suggestions of [22]. We defined a category for every present power user and its three most retweeted tweets during the examined period. If the subsequent power user and its tweets did not match this category, we defined a new one. This methodical step was conducted by three independent researchers. In order to identify power users and patterns between distinct roles within the network, we analyzed and visualized the graph given by the retweet network with the open source tool Gephi. The approach of social media analytics includes a set of methods to examine social media data upon the stages of (1) discovery, (2) tracking, (3) preparation, and (4) analysis [32].

The nodes (vertices) of our network are Twitter users and the edges are retweets, thus, the given network is a directed network. The edge weights are the number of retweets. To produce the visualizations, we ran the layout algorithm ForceAtlas2. Subsequently, the filter Giant Component is applied to remove nodes which are not connected to the main network. Furthermore, the filter Degree Range is used to get a clear visualization of the network. The size of each node represents the number of retweets from a node. The color of the nodes represents the assigned role of the participants. In-degree is the value of how much a node has been retweeted, whereas the outdegree describes the value of how much a node has retweeted itself. Since the data is represented in a directed network, the in-degree is also an indicator for the popularity of the retweeted tweet or the retweeted participant by quantifying the frequency of being retweeted. Additionally, we also calculated the overall follower count and the betweenness centrality value based on the directed network. The betweenness centrality represents the degree to which a node is in a position of brokerage by summing up the fractions of the shortest paths between other pairs of nodes that pass through it [8].

To answer the second RQ, we conducted a manual content analysis of the communication of the top 200 power users. Overall, we regarded the ten most retweeted tweets by each user of the top 200 power users. However, not every power user posted at least ten tweets. Thus, we manually categorized a total sample of 1,271 Tweets into descriptive and content categories. Each individual tweet served as one unit of analysis. Due to the large number of the tweets and their heterogeneous content, two complementary approaches were selected to best represent the material, namely descriptive and content-related categories (see categorization plan). Following the procedure of [22], categories were developed, partly theoretically, partly empirically driven. Analysis based on descriptive information included the following categories: (1)

number of hashtags used, (2) presence or absence of an URL to an external source, (3) tweet contained media other than text, (4) tweet was a retweet, and (5) tweet contained an "@mention", whereas analysis based on content-related information included these categories: (1) tweet contained a call for action (e.g. requesting, challenging, promoting, inviting, summoning someone to do something), (2) tweet contained a testimony of sexual harassment (e.g. report, declaration, first-person experience), (3) sharing of opinion (e.g. evaluation, appreciation, addition, analysis) and (4) reference to a third party (reporting on something/-one, direct and indirect quotes). Because tweets could vary between simple keywords and several sentences, it was decided that categories were not mutually exclusive, but that one tweet could be categorized with multiple categories.

Furthermore, the development of all categories followed an iterative process. Three independent raters developed, tested and were then trained to analyze the tweets. In three rounds of categorization, each rater categorized 50 tweets, respectively. To ensure the quality of the rating, after each round of categorization inter-coder reliability was tested with Krippendorff's Alpha and the KALPHA macro by [19] for ordinal variables and multiple raters. According to the performance of randomly chosen 10% of all tweets the intercoder reliability was high after the third round of categorization. As could be expected, Krippendorff's Alpha for all descriptive categories reached 1, indicating 100% coder's agreement. Content-related categories reached medium to high Alpha values: call for action α_K = .87, testimony α_K = .90, personal opinion α_K = .75, and reference to a third party α_K = .69, respectively.

4. Research findings

4.1 Participating roles in social movements on Twitter

The initial dataset consisted of 959,128 tweets and retweets by 609,169 accounts. The diameter of the extracted network is 32 whereas the average path length is 10.40. Furthermore, the network consists of 97.51% nodes and 93.75% edges after filtering with the Giant Component filter.

Table 1. Descriptive network metrics

Metric	In-degree	Out-degree	Degree
Min	0	0	1
Max	48,885	1,289	48,885
Mean	1.57	1.57	3.14
SD	87.76	3.09	87.86

Table 1 shows the descriptive network characteristics of the analyzed network. To filter data among the most influential accounts during the examined period, we calculated each node's in-degree. Therefore, we identify the power users during the social movement. As a procedural step, we created two network graphs containing the top 200 power users and by doing so displayed possible relationships between the most influential roles within the network. Furthermore, Figure 1 shows a comparison between the most influential (size by in-degree) and most active (size by out-degree) roles within the top 200 power users during the examined period

Subsequently, we created a dataset of the top 200 power users during the examined time period. In order to classify the identified power users into roles, we extracted three tweets per account. In total, we manual analyzed the content of 600 tweets and 200 accounts. Following the categorization technique based on [22], we defined a category for every present account. If the tweets and profile information of the subsequent account did not match a category, we defined a new role category. This methodical step involved three independent researchers who came to a mutual agreement and Krippendorff's alpha of 0.898, signaling inter-coder reliability [19].

Table 2 shows the distribution of the identified roles in the analyzed dataset.

Table 2. Identified Roles

Role	%	Example
Journalist	20.5	private and public accounts of Journalists
Private Person	20.5	ordinary citizens or civilians
Celebrity	18.5	public figures such as artists or musicians
Media Organization	13	newspaper and TV like CNN, Washington Post
Activist	6.5	public declared (social) activist
Politician	4.5	politicians such as Donald Trump or Hillary Clinton
Social Bot	4	artificial accounts which try to act like humans
NGO	3.5	e.g. accounts of Amnesty International or WWF
International Organization	1.5	e.g. accounts of the United Nations or NATO
Company	1.5	accounts of companies such as Amazon or Apple

Governmental Organization	0.5	accounts hosted by the government like the White House
Suspended Accounts	5	Users suspended by Twitter

4.2 Behavior of participating roles in social movements on Twitter

This section presents the findings of the manual content analysis regarding the dynamics of participating roles during the #metoo debate. The findings show to what extent the identified roles differ among the descriptive and content categories. First, we present descriptive characteristics of the shared content. Second, we show results considering the specific content of the shared tweets during the movement.

Figures 2 and 3 show the distribution of the assigned roles identified in the extracted sample for each descriptive and content category. The most represented roles in the descriptive and content categories are Media Organizations, Journalist, Private Person as well as Celebrity, followed by Social Activists. The role Journalist leads the descriptive category "Number of Hashtags" as well as the tweet content category "Sharing of Personal Information". The role Private Person leads only the descriptive category "@Mention", however, this role is still strongly represented in categories such as "Sharing of Personal Information" or "Testimony".

Moreover, the role Media organization is represented most in the descriptive categories "URL to external source" and "Media Content In The Tweet". Further, the role Media Organization is the most represented one considering the tweet content category "Reference". Furthermore, the role Celebrity turns out to be the leading role in the content categories "Testimony" and "Call for Action" whereas this role is underrepresented considering the descriptive categories.

Figure 4 shows the dynamics of Twitter communication during the #metoo debate of the examined of the time period. The first peak of communication along all four content categories can be observed on October 15, 2017, the day when the hashtag #metoo went viral. The second peak can be

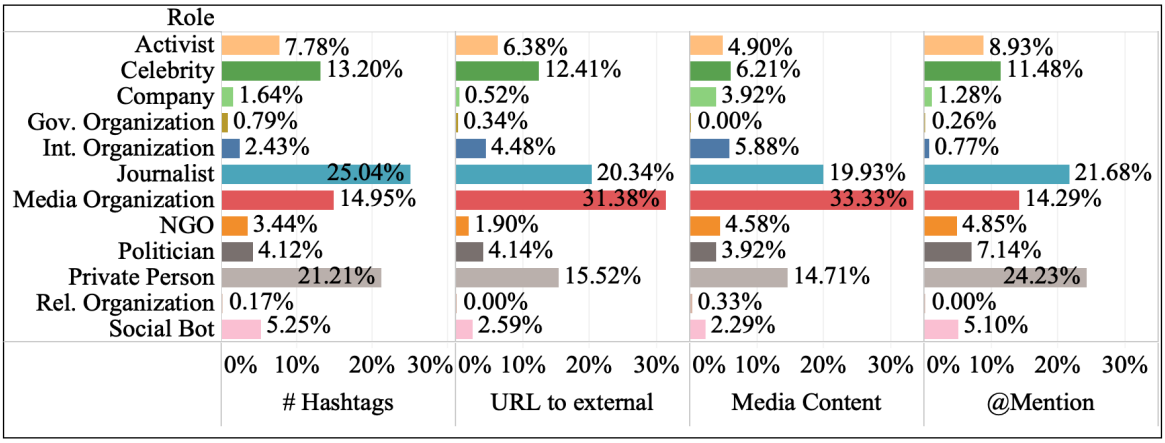

Figure 2. Descriptive content metrics of top 200 power users

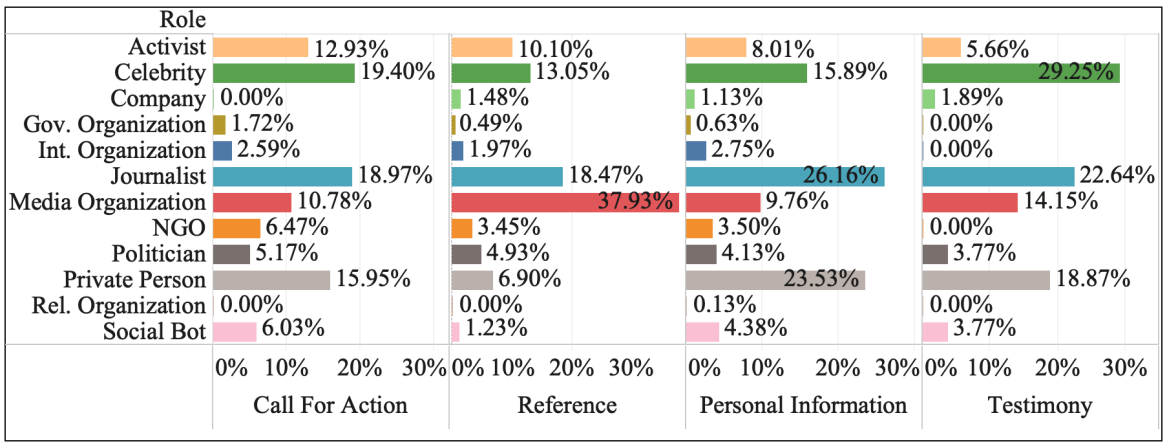

Figure 3. Tweet content categories of top 200 power users

found at around mid of November 2017 which we connected to several offline occasions, for example the #MeToo survivor's march on November 12, and New York Senator Kirsten Gillibrand who publicly referred to the #metoo movement when discussing sexual harassment by known politicians on November 16. Moreover, regarding the specific categories, the category "Sharing of Personal Information" is the leading category regarding the top 200 power users. Followed by tweets which call for a specific action and refer to other information. Examining the evolving dynamics showed that the communication peaks of the distinct content categories were overall coherent. However, the strength of the amplitudes of each category is still different.

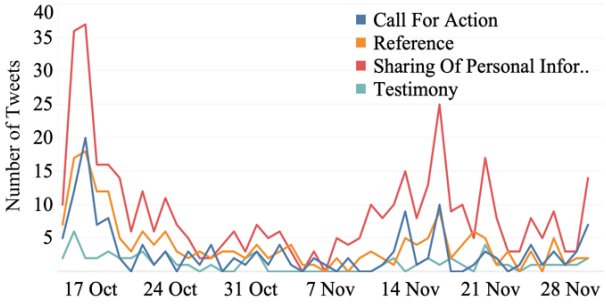

Figure 4. Dynamics of Twitter communication

5. Discussion

5.1 Participating Roles in Social Movements on Twitter

This study provides findings regarding influential actors, defined as power users [26, 33], and their communication patterns during the social movement #metoo on Twitter. According to [33], the tweets of power users might have a higher informational value and are more likely considered by individuals' opinion formation. Thus, we identified 12 distinct influential roles participating during the social movement. Those roles received the most retweets during the event, therefore, shaping a large part of the communicational agenda.

Our findings point to the roles Journalist (20.5%), Private Person (20.5%), and Media Organizations (13%) as some of the most influential roles during the #metoo debate. This is mostly in line with prior results examining social movements like Occupy Wall Street, Indignados, and Aganaktismenoi [35]. However, we noticed that one user group, namely the role Celebrity, diverged from findings by [35]. The identified role Celebrity (18.5%) was much more influential than the role Media Organizations. We explained this finding with the origin of the #metoo debate which was initiated by a celebrity. Yet, it is also in line with previous findings, showing that high status individuals are more likely to be retweeted [6], and the base rate probability (celebrities were the most followed group of users on Twitter in 2017 [33]).

Social bots which have been found to influence conversations on Twitter before [29] were less represented in our analysis (4%), but even more so than companies (1.5%). Both roles were less associated with the specific movement but might have infiltrated #metoo-related communication on Twitter by using distinct hashtags, to profit from the increased attention by referring to the own profile or external commercial websites (e.g. *"#TrapaDrive #MGWV #MeToo #1DDrive Retweet Follow everyone Follow back […]"*) [1].

Activists (7%), politicians (5%), NGOs (4%), and other small organizations (6%) contributed less to the debate on twitter about #metoo. Previous studies have shown that activists were usually more involved in debates online [35], whereas the results for politicians, NGOs and other small organizations are similar to previous findings.

Concludingly, we found that the most influential communicators within the #metoo debate were similar to previous movements with the exception of celebrities which received an uncommonly large share of retweets.

5.2 Content shared - Dynamics of Roles participating in Social Movements on Twitter

Concerning the sharing of content, we revealed underlying differences between roles. Addressing this, we provide new insights about the participating roles and the type of content which drove the discussion on Twitter during the course of the debate.

First, the high amount of sharing personal opinions and testimonies by Journalists should be highlighted. In this, journalists behaved very similarly to Private Persons. However, considering the findings of previous studies our results complement these well. [25] revealed that journalists made use of personal, humoristic messages. The author explained this behavior as brand building, "*driven more by a desire to form relationships with their audience than by journalists' work in information gathering*" [25:932]. Although the results must be regarded with care due to the non-representative sample, we found reason to believe that the observations of the author were sound. Yet, as our focus was less on Journalists and their motives per se, and more driven by exploratory aims, we can only bolster those observations with our own.

Journalists and Private Persons were also similar in their high use of hashtags and @mentions, both functions to gain attention and become more connected.

Findings concerning Celebrities were less surprising; the category coded most was testimony, followed by call for action. Considering the character of the initial tweet, a testimony and a call for action, other celebrities followed, sparking even more tweets. This points to similar findings as [2] who found that celebrities hold an important role within social media-driven social movements, namely gathering attention to issues. Especially, the acknowledged strong influence of Alicia Milano's initial tweet underlines this claim. This fits also well with [10] idea of emotional mobilization which is said, among psychological states of a collection of individuals, to be essential to start a social movement. The wording of Milano's tweet contained both the needed outrage and the hope of a possible change.

In comparison with the high amount of shared testimonies and calls for action by Celebrities, Private Persons shared less intimate content. We see reasons to believe that, although financial and technical costs are lower when using social media communication [39], psychological costs remain high. The benefits of disclosing personal information, especially highly stigmatized information such as sexual harassment, on the internet must outweigh its risks. Again, we can only suspect possible explanations to our observations, but it is likely that either was disclosing costs of Celebrities and Journalists lower than those of Private Persons or disclosing gains of Celebrities and Journalists were higher. This points again to a possible branding motive.

Likewise, Media Organizations behaved as expected. They displayed a high use of referencing and sharing of media content, such as videos and pictures, indicating less creation of original content, but the distribution of it.

On a side note we also want to draw attention to the behavior of social bots. Even though the overall contribution of social bots was rather small, we nevertheless noticed that bots held a constant role in the movement. The manual content analysis showed that bots even shared testimonies and called for action like real human beings. As testimonies and calls for action were central to the movement, bots could have positively facilitated the movement by imitating human behavior.

Subsequently, we want to share another noteworthy observation we made which was that the content category "sharing of personal information" was by far the most retweeted, followed by "reference" and "call for action". In contrast to that testimonies were the least retweeted. This raises continuative questions like which characteristics make a tweet more likely to be retweeted and why is this so? Previous research found, for example, that tweets expressing moral emotions were more likely to be shared [7].

Summarizing our results, we found that the behavior of Journalists and Private Persons was very much alike, indicating that on a content level these two roles could have been categorized as one grand role. The major contribution of Celebrities was sharing of testimonies.

6. Conclusion and Outlook

Conclusion. In our case study we investigated a) which roles exist within the #metoo debate via identifying the most influential users, and b) how those roles communicated. We found different roles, like Journalists, Media Organizations and Celebrities, but also Private Persons and Activists, who drove the spread of #metoo in their own ways. Investigating the content shared by each group, we found substantial differences. The results point to different motives when sharing content via Twitter, from self-serving and branding intentions to goals which actually call for attention and action towards the cause of sexual harassment.

Contributions. This study contributes to knowledge by identifying distinct influential roles during a social movement which evolved mainly online. This step is necessary to understand the differences between online and offline evolving social movements. Furthermore, using a new dataset, first indicators for key actors and their behavior over the course of a movement were examined, for example the large contribution to the movement by Celebrities and Journalists. Likewise, the findings outline also practical implications. For example, the most likely shareable content was "Sharing of Personal Information". Thus, this finding could help several stakeholders such as social activists or NGOs to promote their agenda better.

Limitations. Nevertheless, the explanatory power of our results is limited, as we worked descriptive and less analytical. However, this step is necessary to provide scholars a foundation for further research in online social movements. Moreover, the content categories were comparatively broad as the material was highly heterogenous. Additionally, the results of the content analysis are restricted to the content which was shared by power users. It is possible that there is a difference between tweets that are highly and little retweeted. It could be, for example, that testimonies shared a lot, but were less likely to be retweeted.

Further Research. Furthermore, we suggest a more fine-grained analysis for each role which could reveal underlying differences in a more differentiated way. To this end, a comprehensive analysis of minorities such as less retweeted users within the network might provide new findings considering the dynamics of social movements on social media. In this context, further research might aim to analyze the sentiment of online communication during a social movement related to distinct roles and content categories based on the findings of this study.

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7. References

[1] Abokhodair, N., D. Yoo, and D.W. McDonald, "Dissecting a social botnet: Growth, content and influence in Twitter", In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*. 2015, 839–851.

[2] Alatas, V., A.G. Chandrasekhar, M. Mobius, B.A. Olken, and C. Paladines, *When Celebrities Speak: A Nationwide Twitter Experiment Promoting Vaccination in Indonesia*, Cambridge, MA, 2019.

[3] Ali, S.R., and S. Fahmy, "Gatekeeping and citizen journalism: The use of social media during the recent uprisings in Iran, Egypt, and Libya", *Media, War and Conflict 6*(1), 2013, pp. 55–69.

[4] Bashir, M., "Framing an online social movement: How do the leadership and participants of the Egyptian 6th of April Youth Movement frame their Facebook activism?", *Dissertation*, 2012. www.i-r-i-e-net

[5] Bonilla, Y., and J. Rosa, "#Ferguson: Digital protest, hashtag ethnography, and the racial politics of social media in the United States", *American Ethnologist 42*(1), 2015, pp. 4–17.

[6] Boyd, D., S. Golder, and G. Lotan, "Tweet, Tweet, Retweet: Conversational Aspects of Retweeting on Twitter BT", *Proceedings of the Annual Hawaii International Conference on System Sciences*, (2010), 1–10.

[7] Brady, W.J., J.A. Wills, J.T. Jost, J.A. Tucker, and J.J. Van Bavel, "Emotion shapes the diffusion of moralized content in social networks", *Proceedings of the National Academy of Sciences*, (2017), 7313–7318.

[8] Brandes, U., "A Faster Algorithm for Betweenness Centrality", *Journal of Mathematical Sociology 25*, 2001, pp. 163–177.

[9] Bunker, D., M. Mirbabaie, and S. Stieglitz, "Convergence Behaviour of Bystanders : An Analysis of 2016 Munich Shooting Twitter Crisis Communication", *The 28th Australasian Conference on Information Systems*, (2017), 1–11.

[10] Castells, M., *Networks of outrage and hope: Social movements in the Internet age*, John Wiley & Sons, 2015.

[11] Diaz Cepeda, L.R., "#Yosoy132: A Networked social Movement of Mexican Youth.", *Instituto de Ciencias Sociales y Administración*, 2015.

[12] Dijck, J. Van, and T. Poell, "Understanding Social Media Logic", *Media and Communication 1*(1), 2013, pp. 2–14.

[13] Ehnis, C., M. Mirbabaie, D. Bunker, and S. Stieglitz, "The role of social media network participants in extreme events", *25th Australian Conference of Information Systems*, 2014.

[14] Erickson, A., "In 2018, #MeToo — and its backlash — went global", *The Washington Post*, 2018. https://www.washingtonpost.com/world/2018/12/14/metoo-its-backlash-went-global/?noredirect=on&utm_term=.2bc1530daaf1

[15] Jensen, M.J., and H.P. Bang, "Occupy Wall Street: A new political form of movement and community?", *Journal of Information Technology & Politics 10*(4), 2013, pp. 444–461.

[16] Kantor, J., and M. Twohey, "Harvey Weinstein Paid Off Sexual Harassment Accusers for Decades", *The New York Times*, 2017. https://www.nytimes.com/2017/10/05/us/harvey-weinstein-harassment-allegations.html

[17] Kavada, A., "Creating the collective : social media , the Occupy Movement and its constitution as a collective actor constitution as a collective actor", *Information, Communication & Society 18*(8), 2015, pp. 872–886.

[18] Kidd, D., and K. Mcintosh, "Social Media and Social Movements", *Sociology Compass 109*, 2016, pp. 785–794.

[19] Krippendorff, K., and A.F. Hayes, "Answering the Call for a Standard Reliability Measure for Coding Data", *Communication methods and measures 1*(1), 2007, pp. 77–89.

[20] Leong, C., S.L. Pan, S. Bahri, and A. Fauzi, "Social media empowerment in social movements : power activation and power accrual in digital activism", *European Journal of Information Systems*, 2018, pp. 1–32.

[21] Manikonda, L., G. Beigi, H. Liu, and S. Kambhampati, "Twitter for Sparking a Movement , Reddit for Sharing the Moment: # metoo through the Lens of Social Media", *11th SBP-BRiMS 2018*, (2018).

[22] Mayring, P., "Qualitative Content Analysis", *Forum Qualitative Sozialforschung*, 2014.

[23] Meek, D., "YouTube and Social Movements: A Phenomenological Analysis of Participation, Events and

Cyberplace", *Antipode 44*(4), 2011, pp. 1429–1448.

[24] Mirbabaie, M., C. Ehnis, S. Stieglitz, and D. Bunker, "Communication roles in public events – A case study on twitter communication", *IFIP Advances in Information and Communication Technology 446*, 2014, pp. 207–218.

[25] Molyneux, L., "What journalists retweet: Opinion, humor, and brand development on Twitter", *Journalism 16*(7), 2015, pp. 920–935.

[26] Oh, O., C. Eom, and H.R. Rao, "Research Note—Role of Social Media in Social Change: An Analysis of Collective Sense Making During the 2011 Egypt Revolution", *Information Systems Research 26*(1), 2015, pp. 210–223.

[27] Oh, O., N. Tashmasbi, R.H. Rao, and G.-J. Vreede, "A Sociotechnical Vie of Information Diffusion and Social Changes: From Reprint to Retweet", *International Conference on Information Systems*, (2012).

[28] Rane, H., and S. Salem, "Social media, social movements and the diffusion of ideas in the Arab uprisings", *Journal of International Communication 18*(1), 2012, pp. 97–111.

[29] Ross, B., L. Pilz, B. Cabrera, F. Brachten, G. Neubaum, and S. Stieglitz, "Are social bots a real threat? An agent-based model of the spiral of silence to analyse the impact of manipulative actors in social networks", *European Journal of Information Systems*, 2019.

[30] Stieglitz, S., and L. Dang-Xuan, "Political communication and influence through microblogging - An empirical analysis of sentiment in Twitter messages and retweet behavior", *Proceedings of the Annual Hawaii International Conference on System Sciences*, (2012), 3500–3509.

[31] Stieglitz, S., M. Mirbabaie, and M. Milde, "Social Positions and Collective Sense-Making in Crisis Communication", *International Journal of Human-Computer Interaction 34*(4), 2018, pp. 328–355.

[32] Stieglitz, S., M. Mirbabaie, B. Ross, and C. Neuberger, "Social media analytics – Challenges in topic discovery, data collection, and data preparation", *International Journal of Information Management 39*, 2018, pp. 156–168.

[33] Stieglitz, S., M. Mirbabaie, L. Schwenner, J. Marx, J. Lehr, and F. Brünker, "Sensemaking and Communication Roles in Social Media Crisis Communication", *Proceedings der 13. Internationalen Tagung Wirtschaftsinformatik (WI 2017)*, (2017), 1333–1347.

[34] Suh, B., L. Hong, P. Pirolli, E.H. Chi, P. Alto, and P. Alto, "Want to be Retweeted? Large Scale Analytics on Factors Impacting Retweet in Twitter Network", *IEEE International Conference on Social Computing*, (2010), 177–184.

[35] Theocharis, Y., "The Wealth of (Occupation) Networks ? Communication Patterns and Information Distribution in a Twitter Protest Network", *Journal of Information Technology & Politics 10*(1), 2013, pp. 35–56.

[36] Tombleson, B., and K. Wolf, "Rethinking the circuit of culture: How participatory culture has transformed cross-cultural communication", *Public Relations Review 43*(1), 2017, pp. 14–25.

[37] Tye, M., C. Leong, F.T.C. Tan, B. Tan, and Y.H. Khoo, "Social media for empowerment in social movements: The case of Malaysia's grassroots activism", *Communications of the Association for Information Systems 42*(1), 2018, pp. 408–430.

[38] Xiong, Y., M. Cho, and B. Boatwright, "Hashtag activism and message frames among social movement organizations: Semantic network analysis and thematic analysis of Twitter during the #MeToo movement", *Public Relations Review 45*(1), 2019, pp. 10–23.

[39] Yuce, S., N. Agarwal, R.T. Wigand, M. Lim, and R.S. Robinson, "Studying the Evolution of Online Collective Action: Saudi Arabian Women's 'Oct26Driving' Twitter Campaign", In W.G. Kennedy, N. Agarwal and S. Jay Yang, eds., *Social Computing, Behavioral-Cultural Modeling, and Prediction*. Springer International Publishing, 2014, 404–411.