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Do communication content functions drive engagement among interest group audiences? An analysis of organizational communication on Twitter

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The value experience perceived by users and the extent of interactivity on social media show how engaging audiences are. Few studies have looked at what drives this value experience in organizational communication. This study explores the functional use of communications by interest group organizations (IGOs) and discerns their effect on user engagement with and without multimedia inclusion on Twitter. A bi-term topic modeling technique is used to analyze posts from 121 organizations, and a generalized linear regression model to assess the link between the content functions and user engagement. The results show that the information and communication content functions include event updates and people recognition. Further, *report*, *event*, *period*, and *people* communication functions drive a higher engagement with multimedia inclusion, while *unite*, *sign*, and *glean* communication functions are more likely to increase engagement without multimedia elements. This study bridges the gap in the service literature as it pertains to non-profit organizations (i.e., interest group organizations) by exploring organizational communication using communications content functions of Twitter posts. This study is the only one to investigate content functions beyond the categorizations of message functions and the relationship between content functions and user engagement.

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Introduction

Interest group organizations are formal non-membership-based organizations that engage audiences to influence their beliefs and interests through communication (Gessese, 2020). They cultivate large following and harness their collective actions to influence policy, address injustices or promote a worthy cause. IGOs have found new ways to spread their causes with the advent of social media. The social media is currently the most popular communication channel among organizations around the world (Oshua and Broockman, 2020) because they offer real-time interactivity and rich engagement options with audience and offer a media to attract the attention of high profile political, business, and social leaders who have a presence on social media (Iqbal et al., 2020).

Communication on social media aims to engage users. To engage an audience shows the extent of intimacy and the value experience perceived from an online exchange (Nadejda et al., 2021). Engagement shows the level of physical, cognitive, or emotional state of a user's relationship with an entity (Pillai and Ghosh, 2022). There have been successful and unsuccessful campaigns for engaging users online (Sleigh and Vayena, 2021). For instance, the use of social media like Twitter and Facebook, have influenced social campaigns such as #bringbackourgirls or #EndSARS in Nigeria, civil rights movements such as #blacklivesmatter in the U.S (blacklivesmatter.com), fund-raising events such as the #icebuckets challenge (Frederick, 2016).

The need to understand the actions that portray effective engagement has increased as the adoption of social media for communication increases. For instance, evaluations on actions such as "following", "sharing", "liking", "commenting", and "dislikes" etc. have soared, and studies have studied them to discern how they drive sufficient engagement (DeFilipis et al., 2022; Lin and Chung, 2020). These actions are now metrics for effective communication online (Gvili and Levy, 2018). The frequency of such user reactions toward shared content depicts the effect of the shared communication content on the audience (Aririguzoh, 2022). Despite this understanding, many organizational entities continue to struggle with achieving effective engagement, which retrospectively suggests the need for more discernment into this issue (Joo et al., 2020). While Joo et al. (2020) highlights the constant evolution of these digital technologies as a challenge, Chung (2017) and Joo and Cahil (2019), also observe limited knowledge on the types and influence of engagement factors.

Among IGOs, the challenge of collective action persists as a crucial issue (Kanol and Nat, 2021). In that, changing trends, demographical complexities, and the different causes pursued present overarching challenges to engage audiences (Aririguzoh, 2022). Thus, questions on how shared communication content influence engagement actions remain largely unaddressed (Joo et al., 2020; Komendantova et al., 2021). For instance, does communication content functions play any role in engaging users? also, in what forms are communication contents most pliable to engagement actions? These are some questions that remain relevant. Therefore, cognizance to the above background there is the need to understand the role of communications content functions on user engagement. This study thus seeks an understanding into communications content functions of IGOs on Twitter, as factors driving message retransmission, by pursuing the following questions:

(a) What are the communication content functions created by IGOs on social media?
(b) How do communication content functions affect user engagement?
(c) What is the cognizance of multimedia inclusion with communication content functions on user engagement?

Review of literature

IGOs and the use of social media. From the popular resource-based view, scholars present different viewpoints on IGOs use of social media (Binderkrantz, 2012). Some scholars view social media as weapons for aiding resource-poor organizations such as non-governmental organizations and civil society groups (Eyal, 2016), while others see them as arsenals for already established organizations like corporations and businesses.

Both views illustrate the potential resource capacity of organizations to use social media (Binderkrantz, 2012), but the argument about why and how an organization might want to use social media remains inconclusive. Why an organization employs social media technologies does not rest on its resource capacity, but on how the organizational use of social media is conceptualized (Kanol and Nat, 2021).

Chalmers and Shotton (2016), focused on understanding the motivation for social media use by non-profit organizations. Considering this, Kanol and Nat (2017) points out the fact that social media cannot be easily categorized as tools for inside communication strategies, because they are not suitable for the transmission of complex policy information. Short communication styles used in outside strategies are more likely to be aided by social media.

Other prior works (e.g., Martins, 2021; Krasni, 2020; Eyal, 2016; Chalmers, 2013; Edwards and Hoefer, 2010) express similar views that social media should be considered differently from inside media strategy tools, although they are growing in likeness to traditional news media. Eyal (2016) believes the increased "mediatization" of advocacy activity, and organizations taking steps to achieve an online presence, is the basis of social media use among IGOs. Other arguments suggest the growing pressure to employ the media in advocacy activities, which is part of the broader trend of the phenomenon of audience democracy, is the reason for the wide social media use in advocacy (Obar et al., 2012). Therefore, to make sure inside strategies like lobbying activities have ceased to be carved in black boxes and are now under the scrutiny of the media (Komendantova et al., 2021) organizations seek media coverage for transparency to enhance audience democracy.

This advances a part of the argument on why social media is an integral part of organizations' repertoire of public engagement tools today. The reasons for using social media need further exploration. Because, even within this view, some scholars imply social media technologies exist separate from the mainstream news media or operate parallel to them, suggesting they may not be useful for other aspects of audience inclusiveness, such as the news making aspects. Others show that social media, not only are they not suitable for news communication and lobbying activities but also inadequate for shaping the news (Lee, 2020).

From the foregoing discussions, we infer two uses of social media for IGOs. To shape the news and policy debates, and to control the organizational image. Since the 70 s, advocacy organizations have used traditional media to frame and spin policy (Baumgartner et al., 2009). Lobbying debates can achieve influence by knowing which parts of the debate should be projected. Thus, the public relations potentials of social media can be used to project arguments and spark discussions among publics.

Ziegele et al. (2014) believe that the same way organizations may use social media to influence user reactions and spark public reactions and debates, they can use these media to shape discussions and mold their image. Recent developments in the field shows a trend of professionalism in IGO lobbying activities (Castello et al., 2013). It is as if advocacy now requires more professionalism and ability on policy matters than group and

membership power (Schultz et al., 2013). In essence, the outcome of a public image is driven by an evidence-based approach to advocacy.

Many IGOs struggle to get enough user attention online (Vijaykumar et al., 2021). Even though social media has the potential to frame policy debates and set the agenda for discussion, not much evidence exists on their effectiveness for such organizational use (Joo and Cahil, 2019). Much remains to be understood on this issue, especially in the global advocacy domain (Kanol and Nat, 2021). Social media and organizational communication trends have been researched in the corporate brand and reputation building literature (Joo and Cahil, 2019), and apparent that effective reputation and brand building on social media is synonymous with the extent of intimacy between an organization and its audience (Pentina et al., 2018). Thus, understanding what drives effective engagement among audiences forms the crux of organizational communication online.

Influencing engagement behavior online. Online engagement illustrates user- initiated activities that drive value co-creation (Shi et al., 2022). Engagement actions occur in behavioral, cognitive, and affective forms and expressed through liking, commenting, or sharing content (Varda and Hahner, 2020). Although similar in action, there are different names on different social media sites for these actions. For instance, on twitter, retweeting depicts reposting or sharing content (Chung, 2017). Effective engagement is measured along the dissemination aspects just as other aspects cognitive and participatory reactions such as "likes", "dislikes", "comments", or "recreating posts" to suit specific needs (Pentina et al., 2018).

There are three core factors that influence user actions on social media (Jaakonmäki et al., 2017). Whether the content generates many comments, shares, or receives "likes" or "dislikes" it is driven by, (1) user account (e.g., gender of content creator, account age etc.), (2) context of post, (e.g., referenced location, time of day), and (3) content-specific features of the post (e.g., function of post, extent of personification, are human faces in the content visible, voices in the audio etc.) (Jaakonmäki et al., 2017). Few studies have looked at the role of functions of posts and how they influence engagement actions (Kanol and Nat, 2021; Ischen et al., 2020). There are several studies on the effects of linguistic features and other content characteristics other than the function of a post (Varda and Hahner, 2020; Ischen et al., 2020). Effective engagement is assessed by the extent of cognitive engagement with content. This current study considers a similar assessment of user engagement actions, because IGOs rely on the degree of reach to make a significant impact (Kanol and Nat, 2017).

Multimedia content for audience engagement. Online audience's interest in interactive elements in digital content has grown (YEC, 2019). There are several applications that enhance and incorporate multimedia features into online content. Multimedia inclusion as photos, videos, and even geographic elements improve user experience with communication (Xia et al., 2020). Hence, the importance of multimedia inclusion is emphasized. For instance, on social media sites as Instagram, multimedia is the main content shared and therefore has a decisive impact on the engagement of users (Quijada et al., 2021).

It is difficult to conclude on this matter due to platform differences. Many studies have tried to investigate this issue, only to offer mixed results. Ali et al. (2021) suggests five categories of multimedia elements that can influence engagement. Habibi and Salim (2021), argue that multimedia inclusion must blend with other characteristics of content to drive significant engagement (product, promotion, advertisement, social responsibility, special days, workplace/workers, and public relations). Lee et al. (2018a), identifies lower levels of engagement with informative content when prices or ranges are mentioned in multimedia content. When only textual content is shared with branded images they don't attract as much attention as they could (Quijada et al., 2021). Based on these varying observations on the analysis of multimedia inclusion in communications, extending the knowledge of this issue from a non-profit context offers new insights and understanding of this issue.

Research framework development

This study looked at the effect of communications content functions on the content dissemination aspects of user engagement in an IGO context. User engagement on social media shows the interactive actions of users (Schreiner et al., 2019). Ha et al. (2016), for instance, defined engagement as "a user-initiated action", and Hollebeek (2011) conceived engagement as a multidimensional construct that compasses behavioral (actions), affective (emotional) and cognitive responses. This study is in line with these other existing studies (Marzouki et al., 2021; Pillai and Ghosh, 2022; Newman and Rezaeiahari, 2018; Blankenship et al., 2018) view user engagement as the behavioral actions that are expressed in response to viewing social media content. Scholars highlight behavioral engagement with social media content as an important public relations element as it measures the degree of success of communication (Newman and Rezaeiahari, 2018; Brettel et al., 2015). When organizations effectively engage audiences on social media, they are better placed to build a good image for themselves, rather than using social media for one-way communication (Peacemaker et al., 2016).

This study suggests that communications content functions are implicit factors that will increase engagement actions among users. The function of the communication is determined by the purpose of the message. For example, content can be used to share relevant information, build, or deepen relationships, or garner support for a course. Some studies show the influence of communication contents on user engagement (Han et al., 2019; Schreiner et al., 2019). Schreiner et al. (2019), for instance, revealed that message content features such as emotional sentiments favor engagement. Han et al. (2019) also showed that there is a link between levels of engagement and shared content on social media.

Thus, understanding engagement as pursued in this study will extend these existing insights into factors driving user engagement on social media, Twitter (Table 1).

Methods

Topic analysis in text mining. Topic modeling techniques are statistical and mathematical models proven for latent topic extraction (Blei et al., 2003). They analyze latent semantic topics based on the singular-value decomposition and a vector space algorithm (Blei and Lafferty, 2007). Experts identify conventional topic models to be unsuitable for short text because of the problem of data sparsity. They treat documents as a mixture of topics and words. Thus, this study looks quite further from the traditional topic modeling techniques to limit the problem of sparsity with short text in topic models that is improved with the recent bi-term model, which learns co-occurrences of words in a corpus, while not relying on topic mixtures (Li et al., 2016). This approach has been used in the social media context to produce reliable estimations. The nature of tweets is that they are short, thus, the bi-term topic model is appropriate for analyzing such content.

Table 1 User engagement and communication content studies and context.

	Constructs	Context
Hollebeek et al. (2019)	Customer resource integration, customer knowledge sharing, customer learning	Profit sector, developed market
Gupta et al. (2018)	Satisfaction, emotion	Profit sector, developed and emerging market
Romero (2018)	Relationship quality, rewards, company identification, self enhancement, learning, social integration	Profit sector, developed market
Heinonen (2018)	Behavioral, emotional, cognitive factors	Profit sector, developed market
Eigenraam et al. (2018)	Fun practices, learning practices, customer feedback, work for a brand, talk about a brand	Profit sector, developed market
Carlson et al. (2018)	Environmental stimulus, virtual customer experience	Profit sector, developed market
Chiang et al. (2017)	Learning motivation, collaborative learning, satisfaction	Profit sector, developed market
Pansari and Kumar (2017)	Satisfaction, emotion	Profit sector, developed market
Sorenson et al. (2017)	Events, donations and fund-raising, social justice	Non-profit sector, developed market
Sim and Plewa (2017)	Engagement platforms	Non-profit sector, developed market
Harmeling et al. (2017)	Customer engagement marketing	Profit sector, developed market

Table 2 Model constructs.

Dimension	Variable	Description
Content Features	Message function features	Extracted sub-functions of messages
	Multimedia inclusion	The presence of a multimedia element in the tweet
User engagement	Retweets	The number of retweets generated by each post

Study context. In targeting a wider audience, IGOs have used social media to interact with the public. When posting communications on social media pages, IGOs can adjust their communications according to the content and its function to gain the attention of their target audience. These organizations offer the right context for this study to explore user engagement.

Sampling procedure. The transparency register on the European union website (europa.eu) contains a list of active non-governmental organizations. We used a random sampling procedure to pick 500 groups from 2897 non-governmental organizations. The official accounts of each group were verified using the Twitter search engine. The groups that shared communications in English were considered. The final sample included data from 121 official accounts.

Collecting data. The export tweets professional software was used to collect the Tweets on the sites. It drew the research data between September 2017 and August 2019. 1600 were selected for coding in the final sample of 12,766. This is enough for assessing inter-coder reliability according to Riffe et al. (2014).

Guo and Saxton (2014) classified non-profit organization's communication content functions into *information-community-action* themes. This scheme is adopted and further investigated to derive sub themes using the bi-term topic modeling technique. The study focused on retweets user engagement function as the outcome variable. Drawing on similar examinations of Twitter metrics (Marzouki et al., 2021; Pillai and Ghosh, 2022; Chen and Pirolli, 2012) retweets generated on the posts were recorded. The choice of retweets alone is to take a step in being able to accurately assess an organization's follower's engagement using the Twitter platform (Newman and Rezaeiahari, 2018). This focus is therefore a starting point by which an entity could gauge their followers' engagement specifically on Twitter, using a core engagement variable on Twitter. Other components of the shared posts, multimedia elements (photos, videos, audios) were also recorded. The analysis tested the relationship between the frequency of each of a communication function and the number of retweets, with and without multimedia inclusion. It employs a multilevel generalized linear regression model. Communication functions identified consist multiple categories; hence, a logic link was employed. That is, i representing a post, and j an interest group. As such, Y_{ij} represents retweets (dependent variable) and T_{ij} the type of function in the ith post of an IGO j. I_{ij}, and P_{ij} indicate the presence of image or photo (multimedia element) respectively

- Model: $\text{Log}\ (Y_{ij}) = \beta_{oj} + \beta_{1j}\ T_{ij} + \beta_{2j}\ I_{ij} + \beta_{3j}\ P_{ij}$

The number of followers for each group was used to control the effect of group size. The presence of a multimedia element in a post was recoded dichotomously, thus the presence of a multimedia element in a post was coded "1" and the absence "0" (Table 2).

Message coding. In line with Wang and Yang (2020), an inductive approach was used by the authors to design the codes while reviewing the group's Twitter pages and a constructed group structure of the tweets. There were nine communication sub-functions in the coding procedure. The extracted functions were coded as (1) *Event* (activities, updates, community work); (2) *Report* (research, group updates); (3) *Trade* (business, trade, news); (4) *Period* (date, time, season, occasions); (5) *Cancer* (health education, health tips and information); (6) *People* (appreciation and recognition); (7) *Unite* (call for action); (8) *Sign* (online activism, petition) and (9) *Glean* (garner for support) based on the results of the topic modeling analysis. The user engagement variable was assessed with the recording of the frequencies of each post.

Both authors and two other coders were trained to develop the coding protocols and a code sheet. Coders together worked on 400 posts using the code sheet. Afterwards, each member was assigned 300 posts to be coded independently using the coding protocols. Coding inconsistencies were discussed until absolute consensus was reached. Authors established inter-coder

Table 3 Coding scheme, frequencies, and coder reliabilities.

Message function	Frequency	Kappa's (*k*)
Event information	351 (19.9%)	0.98
Report, (research, activity reports)	60 (8.3%)	0.92
Appreciation, recognition, and Acknowledgement	148 (13%)	0.84
Sign petition	75 (9.3%)	0.89
Trade, news related	41 (6.8%)	0.87
Unite for action	134 (12.4%)	0.96
Time, period-related information	146 (12.9%)	0.92
Cancer, health awareness	52 (7.7%)	0.77
Glean	83 (9.7%)	0.72

Table 4 Top ranked terms.

R	Term	#	%	R	Term	#	%
1	group	4412	1.2	13	community	1632	0.4
2	report	3899	1.0	14	share	1629	0.4
3	event	3872	1.0	15	research	1534	0.4
4	join	3855	1.0	16	year	1512	0.4
5	member	3847	1.0	17	appreciate	1479	0.4
6	weekend	2824	0.7	18	growth	1456	0.4
7	activity	2787	0.7	19	educate	1444	0.4
8	women	2746	0.7	20	cancer	1442	0.4
9	day	2745	0.7	21	month	1421	0.4
10	animal	2743	0.7	22	climate	1387	0.4
11	time	2712	0.7	23	visit	1384	0.4
12	sign	1695	0.3	24	ticket	1381	0.4
				25	charity	1372	0.4

R-Rank, #-Frequency, %-proportion.

agreement before the entire dataset was coded. The Cohen's Kappa reliability estimate for the categories was computed and shown in Table 3. Thus, the resultant inter-coder agreement in the final dataset is presented in Table 3.

Results

Communications content functions in posts. The range of posts was between 7 and 1157 (mean = 64.34, and SD = 28.7). The Chi-square test of independence established an even distribution, with X^2 *being* 865.8 (122, $N = 12766$), $p = 0.002$. Descriptive statistics show that there were over 350,000 observed word terms and over 40,000 unique terms after the preprocessing process. The top 25 frequent word terms made up about 15% of the total word token (Table 4).

Observing the term frequencies, time, and activity updates were the most frequent terms observed. For example, "join 4th", "activity 7th", "weekend 6th", and "sign 12th". The terms "day 9th", "time 11th", and "weekend 6th" are the top ranked time-related terms. This shows that the organizations share activity and time relevant communications.

We use the data in the study to conduct a bi-term topic modeling analysis. The default setting from the implementation package of Variational Expectation Maximization (VEM) algorithm should be to initially set the value for *k* (number of desired topics). In this analysis, from 2 to 21 *K-number of models* was examined. The model run with *9 functions* had the highest perplexity value and model coherence. Table 5 shows the top 10 weight words and their frequencies for each topic. There were fewer duplicate words between the topics, therefore topic detection by the perplexity value is reliable. This result reveals the hidden thematic structure in the organizational communications of the IGOs and shows the potential meaning of the topics, thus aiding the understanding of the latent functions of the communications of the interest organizations.

The most used communication content functions were events, people, and periods. "*Event*" *(F2)* accounts for about 49% of the communication functions and illustrates posts or information on group activity and updates. The "*people*" (*F6*) function suggests appreciation and recognition related communication, and these accounted for 14.40% of the shared organizational communications on Twitter, and "*period (F4)*" communications function constituted 10.22% of the shared posts and illustrated time and date specifications of programs and activity. Other latent communications functions observed from the analysis include *report* (3.96%), *trade* (3.09%), *cancer/health* (2.80%), *sign* (6.74%), *unite* (1.59%) and *glean* (8.27%). In sum, the results summarized in Table 5 demonstrate that the IGOs' communications focus mostly on information provision function, particularly related to their events and other activity information and updates. In addition, the groups also share community function communication content, that facilitate relationship building and friendly interactions with audiences. Therefore, this study reveals that IGOs rely mostly on information function of communication to engage audiences among the three broad categorizations of communication functions determined by prior studies, that is, information community and action functions. Further, this conclusion differs slightly from previous assertions like that of Guo and Saxton (2014), who found non-profit organizations mostly leveraged on friendly or the community communication function to engage audiences.

Effect of message functions on user engagement. A multilevel generalized linear regression is performed to assess the association between the communication functions and user engagement. Preliminary analysis of the data and model validity was performed using the omnibus test, Hosmer and Lemeshow insignificance tests, and the Cox & Snell and Nagelkerke R square estimation of model fit (Table 6).

There was a significant Chi-square at X^2 of 1066.15 in the Omnibus test. $p < 0.000$. Further, the model summary provides −2 LL estimates of (11129.84) suggesting the model is a better fit than the null model.

The assessment looked at the relationship between the communication content functions and user engagement. There were two levels of analysis, the first without multimedia inclusion and the second with multimedia inclusion. Table 7 shows the results of both assessments. For the "without" multimedia inclusion assessment, three communication functions, "*report*", "*work*", and "*period*" exert significant negative effects on user engagement, while the "*people*", "*unite*", "*sign*", "*glean*" functions showed significant positive effects on user engagement.

Secondly, the assessment of the effects with multimedia inclusion, (thus images, videos, or photos in posts), showed that *report* (F2) and *work* (F1) communication functions, which initially (without multimedia inclusion) showed a negative association with user engagement, upon the introduction of the multimedia inclusion component show a positive association with user engagement. Likewise, the observed effects for "*unite*" *F7*, "*sign*" *F8*, and "*glean*" *F9* communication functions, which were positive, are observed to have a negative effect with the inclusion of the multimedia element.

Discussion

Observing the top three term frequencies, they revealed that the IGO communications on Twitter included words such as "*group*", "*report*", and "*event*". This observation projects the notion that IGOs communicated about group events and reports, thus it

Table 5 Message functions, message frequencies, and keyword probabilities.

Code	Description	Keywords and relative probability	Frequency %
F1	Report (activity updates, outcome information	report (0.014), finding (0.014), live (0.011), update (0.011), read (0.010), take (0.008), research (0.008), country (0.008), outcome (0.008), right (0.007).	346, (3.96%)
F2	Event (group, program, activity community information)	program (0.014), event (0.010), today (0.009), activity (0.008), volunteer (0.007), join (0.007), global (0.007), community (0.006), local (0.006), meet (0.006)	4272, (48.93%)
F3	Trade (sales, Illicit animal trade, news)	trade (0.015), animal (0.013), slavery (0.010), part (0.010), sales (0.010), indigenous (0.010), remote (0.009), market (0.009), agent (0.008), ivory (0.007)	270, (3.09%)
F4	Period (date, time, and occasions)	weekend (0.023), day (0.015), place (0.015), date (0.014), month (0.011), season (0.011), location (0.010), summer (0.009), time (0.009), center (0.008)	892, (10.22%)
F5	Cancer (health information, solicitation, health awareness)	cancer (0.023), challenge (0.013), amazing (0.011), food (0.009), help (0.009), even (0.009), share (0.008), event (0.008), raise (0.007), waste (0.007).	245, (2.80%)
F6	People (appreciation and recognition	people (0.012), member (0.011), happy (0.009), support (0.009), appreciate (0.008), work (0.008), volunteer (0.006), admire (0.006), country (0.006), show (0.006)	1257, (14.40%)
F7	Unite (call for action)	united (0.021), link (0.019), action (0.017), permanent (0.015), representative (0.014), pollution (0.013), come (0.013), live (0.011), money (0.011), invite (0.010)	139, (1.59%)
F8	Sign (online activism)	sign (0.043), petition (0.040), share (0.037), action (0.028), change (0.025), follow (0.018), friend (0.014), join (0.014), sign (0.014), address (0.014)	588, (6.74%)
F9	Glean (call for support)	glean (0.022), help (0.017), seek (0.013), join (0.012), people (0.012), society (0.012), gather (0.011), share (0.010), commune (0.010), friend (0.010)	722, (8.27%)

Perplexity score: −8.24346.

Table 6 Model fit assessment.

Omnibus test		Chi-square (X^2)	df	Sig.
Step 1	Step	566.7	8	0.000
	Block	566.7	8	0.000
	Model	566.7	8	0.000
−2 Log likelihood	11129.838[a]			
Cox & Snell R Square	0.219			
Nagelkerke R Square	0.0.259			
Hosmer and Lemeshow	$X^2 = 6.744$, df = 8, Sig. 0.601			

Table 7 Effects of communication functions on user engagement (with and without multimedia inclusion), normalized by logarithm and number of followers.

	Without multimedia incl.			With multimedia incl.		
Message functions	*B*	Sig	EXP *(B)*	*B*	Sig	EXP *(B)*
Constant	2.67	0.003	14.447	−2.508	0.005	0.081
Report (F1)	−1.753	0.000	0.173	1.805	0.000	6.078
Event (F2)	−1.899	0.000	0.15	1.648	0.000	5.195
Trade (F3)	0.132	0.637	1.142	−0.18	0.524	0.835
Period (F4)	−0.32	0.000	0.726	0.327	0.000	1.387
Cancer (F5)	0.051	0.406	1.053	−0.059	0.340	0.943
People (F6)	0.579	0.005	1.785	0.565	0.006	0.568
Unite (F7)	1.104	0.000	3.016	−1.105	0.000	0.331
Sign (F8)	1.158	0.000	3.183	−1.035	0.000	0.355
Glean (F9)	0.733	0.000	2.082	−0.721	0.000	0.486
Multi_media incl.	-	-	-	0.291	0.000	1.338

confirms previous assertions that social event information and reportage dominate the focus for using social media for communication by groups (Shiri and Rathi, 2013). Further, Joo and Cahil (2019) also observed similar words like "*program*", "*event*", "*join*", "*come*" to be prevalent among the top 100 ranked terms of non-profit organizations on Facebook. We found that non-profit organizations share similar communication. Time-related communications like "day", "month", "weekend", and "spring" were some of the related terms. The prevalence of regular communications of event times and date information reinforces the notion that this communication content is a core aspect of IGOs engagements. Kanol and Nat (2017) found that non-profit organizations on Facebook focused on building relational ties compared with information creation. Whereas this study finds that these organizations mainly sought to create awareness, which is information related. This conclusion supports previous assertions of Chung (2017), who found 50% of the posts shared on breast cancer awareness day 2017 focused on awareness creation for fund-raising and events.

Cancer/health, report, event, period, trade, people, unit, glean, and *sign* were subjectively labeled as the nine latent functions identified from the bi-term topic modeling analysis. The *event* and *people*-related communications were very prevalent among the communications content functions. Shared posts that functioned to propagate the organizations' events or activities consisted of 48.93% of entire communications shared. While posts for recognition to members constituted 14.40%. The least prevalent communications were posts for call for action (1.59%). This consistent with the assertion of professionalism taking over advocacy communications from brute force and popular activism known from earlier days.

The event function of IGOs communication describes the nature of events undertaken by the groups. In addition, the finding that event function was most the prevalent and increases user engagement, makes it crucial that communication with such function must be carefully created to arouse more engagement. As a strategy, this communication function can be used to discuss and promote a variety of activities to draw the groups closer to the public and facilitate greater support.

Further, this also means social media like Twitter is useful for organizational communication, just like traditional media, to drive engagement with complex communications as reports and policy updates. This conclusion, although opposed by some prior studies like Martins, 2021, Krasni, (2020), Eyal, (2016), Chalmers, (2013), Edwards and Hoefer, (2010) shows that social media like

Twitter can be suitable for inside strategy of lobbying and influencing policy.

The different effects of the communications content functions on user engagement show the diversity in the roles played by communication functions. Users react to shared content in different ways based on what function they intend the post to perform. For instance, VanScoy et al. (2018), observed that frequently shared messages were those messages intended to share personal relevance to a user (*people function*). This study reveals that frequently shared communications are meant to create awareness and inform audiences.

Therefore, the results that communication functions such as *event*, *report*, and *people* increase the likelihood of user engagement with multimedia show the diverse ways to employ communications content functions to drive engagement. Communicators, by this assertion, can view Twitter as an inside strategy and lobbying tool to be used to transmit communication that is intended for shaping the news and lobbying publics This supports Abramson's (2016) assertion that advocacy now requires a shift in focus from outside strategies of activism to a more professionalized inside strategies of fact sharing and expert opinions. So, as a strategy, IGOs can steer discussions and lobby for change through sharing "bite size chunks" of reports and policy information through frequent updates on Twitter.

Notably, communications content consistent with call for action (*sign*) and call for support (*glean*) functions are more likely to attract retransmission actions when created without multimedia inclusion. There were messages such as "URGENT! *Please sign and share…"* and *"help put an end to the terrible animal trade*". Prior campaigns have suggested the use of multimedia forms to gain public appeal for such posts. This study reports otherwise. We that, the key point of these opposing finding is that, understanding what function and form a post will have among users is the first strategy to engage users. Thus, the way a communication is created must be shaped by an understanding of this situation. This study recommends that IGOs must use less textual content for *report, event, people*, and *period-related* communication content functions, and create such posts with much multimedia themes. For instance, it is possible to share highlights of reports, policy briefs and research findings using infographics. *Sign, glean*, and *unite* communications functions are mostly kept in text form.

Rudat and Buder (2015), found that communication content that seeks to appreciate and recognize people increased commenting and sharing actions because they attract people who will congratulate or celebrate the recognized people. Users are likely to retransmit such *people* communication function of posts with other users in their networks to celebrate their contacts because of the personal relevance associated with the post. Hence, the effect of people communication on user engagement is positive. For example, posts like *"Congratulations to Ange, a 94-year-old volunteer at our camp"* and "*Meet Mary, she turns 103!!! Today. Let's celebrate this milestone with Mary at the Home this weekend"* without multimedia element less likely to attract retransmission outcomes from users.

This conclusion points to the fact that an incompatibility between communication content functions and multimedia inclusion can weaken the effect of an organizational communication and drive effective engagement. In the context of non-profit organization use of social media, this analysis expands the scope of use. It adds to the evidence on the effectiveness social media for communication.

Implications for theory and practice. There are some implications for theory and practice in this this study for general social media for organizational communication field. The literature of non-profit organizations has barely understood the effects of communications content functions on user engagement. Understanding the communication experience from this view is important for organizations. There are a number of contributions made to the non-profit service literature by this research.

First, although studies on the antecedents of user engagement (including satisfaction, participation, and involvement) exist, specific features of communications content for social media that drive greater engagement remain unclear (Joo et al., 2020; Wu et al., 2019). Engagement from an involvement viewpoint and the relationship between communication content functions on user engagement are the focus of this examination. It adds to extant literature on user engagement in the non-profit service domain and extends the understanding of social interactions in the interest group and advocacy context. Consequently, the audiences' perspective in the co-creation and design of interaction experiences on Twitter is seen in this study to be critical for a richer user engagement experience.

Increased user engagement is associated with interaction experiences on social media. Compared with prior studies that have examined communication in an online context, most have mainly considered the business and corporate organizations context, whereas this current analysis sheds light on new insights into specific engagement behavior that can associate with different communication content functions in a formal non-profit organizational context. By this examination, thus assessing the effect of communication content functions on user engagement on Twitter, this study extends the scope of research on non-profit organizations to the general design and co-creation of online communication experiences of non-profit organizations' audiences.

Further, the findings indicate that non-profit organizations like IGOs that seek to develop superior communication strategy can assume a friendly posture but focus on frequent information-related communications to allow them to increase their chances of disseminating information on social media, especially Twitter. In addition, if they seek to gain greater popularity and effectively garner for support online that will induce audiences to exhibit greater involvement and participation, they must share frequent posts about their actions and courses in an informational manner to eliminate any social distance between themselves (organization) and their audiences. Communication functions and how multimedia elements are integrated must be considered by non-profit organizations like IGOs. If IGOs desire to increase engagement through content retransmission from audiences on Twitter, frequently sharing event and activity information content and community building or friendly messages than outrightly promoting their course or garnering for support. Community building messages and information communication contents can be shared with various multimedia elements. In instances where interest group organizations must promote an action or garner support, they can ensure that such communication content is friendly in tone with limited or no multimedia inclusion.

Conclusion

The study looked at the communications functions of IGO posts. Nine content functions were formed around the content of shared posts. There are different effects exerted on user engagement with and without multimedia inclusion. This suggests that for organizational communications, a balance between incorporating or excluding multimedia elements with different communications functions is key to driving significant engagement with audiences. To drive effective engagement, message creators must blend content functions that favor multimedia inclusion and those that

do not. These findings emphasize the relevance of communications content functions and how they relate with or without multimedia features. The findings show that social media is equally useful for engaging audiences for both inside and outside lobbying.

Limitations and future research. IGOs operate on multiple social media platforms to reach a diverse audience, whereas this study only includes posts from Twitter. The findings from this current study give a generic view of the role of message functions. It will be interesting for future studies to look at this issue from multiple social media sites. In addition, because social media platforms possess several behavioral engagement features such as shares, likes, commenting, emoticons, etc., expanding the evaluation to cover these other engagements actions will offer more understanding of the phenomenon for increased engagement with audiences online. Future studies can expand the levels of engagement to include likes, dislikes, comment, and even sentiments.

Data availability

The dataset analyzed during the current study are available in the Dataverse repository: https://doi.org/10.7910/DVN/NRNZFS.

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Competing interests

The authors declare no competing interests.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Informed consent

Consent was not deemed necessary for this study, as the study sought data that is publicly available to all users. Further, Twitter allows for open scraping of public posts for research and other analysis. Hence, the authors did not need to acquire the consent of the owners of the public pages to collect their data for analysis.

Additional information

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