The Election Day of Pope Francis: between sentiment and emotions online

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***Abstract*—: The mediatization of emotions emerges as an affordance of social media, the study of which involves paying attention to digital practices and the formation of the sense of public affection, of connected audiences expressing their participation through expressions of sentiment. This happens both for the great events and for the daily demonstrations of support or of its negation. Here we choose to analyze the tweets in which the users express their opinions, sentiments, emotions on Pope Francis's Election. To reconstruct the hashtag semantics, we use multimodal content analysis.**

Keywords—hashtags, multimodal content analysis, emotions, sentiments, social media.

I. INTRODUCTION

The introduction of the word and the concept of mediatization is connected to the process of change of the social and cultural institutions as a consequence of the growing influence of media, taking however the circumstances into account, that is how culture and society are changing. We are refering to the constant communicative contact with others, which occurs in completely unknown ways [1] [2] [3], transforming life conditions into a new social horizon and determining a metamorphosis of social relationships. The reference is to practices or a habitus performed according to specific needs which contains in itself an entire world of capabilities, restrictions and powers [4].

Within this framework we can insert the phenomenon of the mediatization of emotions. The objective is to understand if the cloud of feelings they have created on the Web is to be attributed to a true globally mediatized emotional exchange, or just an expression of emotions on the social media, which have become emotional media[5], where the emotions are gathered under hashtags[6] [7].

It is therefore starting from this frame of mediation of the emotions online that we analyze the tweets connected to the election of Pope Francis and the emotional reactions of the connected public around the event with the aim of:

• apply a merge method which is based on computational content analysis and which we call multimodal content analysis (RQ1),

• trace the expressive modalities of emotions (RQ2).Although this method is more qualitative than quantitative, it allows us to look inside the hashtags. In line with the debate between quantity and quality we lose the quantity (linked to a large number of tweets), but we gain in terms of investigation, since we know everything about a single day.

The day chosen is 13 March 2013, the day of the election of Pope Francis. On this day we download all the hashtags connected to the event: #PapaBenedettoXVI, #BXVI, #papabenedetto, #benedettoxvi, #conclave, #electionpope, #papafrancesco, #nuovopapa, #bergoglio, #papabergoglio and tweeted in Italy. The total number of tweets is: 20,871.

II. HASHTAGS AND EMOTIONS

Hashtags and their use in social media represent a quite unique thematic index that designs a new perspective of connectivity[8], especially if one considers retweet or quoting operations[9]. Social media like Twitter since they have appeared, have been object of numerous studies and of various thematic in depth analyses, such as politics[10], cultural conversation[11] and cultural performance[12]. Another line of studies has conceptualized the dimension of connections between users, thanks to this tool, moving from the idea of a connected presence[13], of being together but alone[14], to the analysis of tweets as a tool to provoke reactions in the audience[15], to reach the idea that on Twitter the users imagine their potential audience[16] and the Twitter networks can be both real and imagined[17]. More recently Rathnayake and Suthers[9] have focused on hashtags as temporary connection affordances.

Affordance is a concept belonging to the ecologic theory of perception[18], subsequently adopted in other fields. It refers to the properties of the environment that activate or offer potential action by an agent. As many studies have shown[19], affordances are not just properties of the environment: They exist only as a relationship between an agent and his/her environment. A study of the uses of the concept of affordances was carried out by Bucher and Helmond[20], who show how this concept has been examined from different perspectives: high-level and low-level affordances[21], imagined affordances[22] and vernacular affordances[23]. Furthermore, Bucher and Helmond[20] in their analysis of social platforms show how they can allow various types of users (among whom the final users and the developers) to perform different actions, or changes to the platforms. According to Rathnayake and Suthers, Twitter hashtags can be seen as affordances for two reasons: 1) the platform allows the creation of hashtags and 2) through hashtags different types of action emerge. To their analysis of

hashtag affordances, we add a third reason: 3) the possibility of hashtags to change their original meaning thanks to retweets and quotings.

Rathnayake's and Suthers's study is based on the analysis of the independent interaction of media, 'so [it] is not subject to the constraints that offline metaphors carry over to the analysis of online transactions, and therefore provides a foundation for a natively digital conception of phenomenological elements of online expressions' (p. 2). They use a concept adopted from Suthers[24], that of uptake, defined as 'acts in which one participant takes up another's contribution and does something further with it', to place momentary connectedness in the right context. They define momentary connectedness as 'a novel conception of online publicness, as an extended computer-mediated sociality that includes transactive as well as non-transactive online activity'[9]. They then introduce a further correlated concept, that of 'projected uptake'. Indeed, if uptake is the 'most fundamental element of interaction'[25], projected uptake is based on the affordances of acts for future uptake. The objective with which they introduce these two concepts is to examine transactive as well as non-transactive elements in Twitter hashtags. For them hashtags are affordances of the platform that organize instances of momentary connectedness into networks.

In line with our idea that hashtags change through human interaction, thus changing the emotions that are contained in them.

So the goal is not to know the topics or trends models analysis, the goal becomes to understand how, from tweets in tweets, users - through their actions - engage new feelings, emotions and meanings at the same hashtags.

III. The Usage of Multimodal Content Analysis to Rebuild the Sense and Meaning of Hashtags

The multimodal content analysis (MCA)[26] is presented as a merge method[27] that allows a decomposition and recomposition of polysemic communication. It is based on two analysis techniques, which are merged into one: Content analysis and Multimodal discourse analysis. It necessarily becomes a merge method focused on various elements: content analysis for the attention placed on the content of communication, text decomposition, the creation of categories, and the reconstruction of frames; multimodal discourse analysis since it extends the study of speech itself to the study of speech in combination with other resources, such as images, symbols, and videos. This way we can admit that speech and other resources work together to create a meaning that is either multimodal or multi-semiotic[26].

We need to consider emoticons, emoji, comments, references, photos, links, videos and all the tools that allow us to replace the text according to the expository intentions of who created or shared it. It is discourse analysis to deal with these phenomena with greater interest, but we cannot ignore them if the objective is the analysis of new and social media digital contents. Indeed, how it is it possible to restrict our observation only to the written text and not extend it to its extra elements, if our goal is to understand the sense of what is said about a certain topic or phenomenon on the Web? Only this way content analysis can open up to the possibility of considering the language used as a technologized meta-resource. So considered, content analysis seems closer to ethnographic discourse[28][29] than to an analysis of occurrences because it is not simple to reconstruct the path and the emotions of an online topic. This is due to the grammar structure and the syntax of the messages, to the linguistic admixture, to the necessity to recodify the emoticons and to evaluate the text according to them.

We need to develop a multimodal content analysis approach, indicating with this term how also in this field it is necessary to carry out what occurred in the study of discourse[30] [31], where attention is placed on how language interacts with other semiotic systems, replacing the "language" with the construction of content, that inevitably interacts also with other semiotic systems.

In this case, it is clear that an approach in which the researcher manually performs all the operations or recodifies the expressions bringing them back to shared categories of sense, becomes the most appropriate solution.

But, we cannot forget that - although our approach is more qualitative than quantitative - we are always working with big data. In this case it is useful for us to proceed as follows:

- analyze our corpus with textual data analysis software, so we already have a list of words in the text that we can use to create categories;
- in a second step, apply the content analyis,
- develop the approach of multimodal content analysis,
- synthesize the results through computational content analysis.

The reconstruction of meaning here performed by multimodal content analysis can be defined as retrospective sensemaking. We are borrowing this concept from Weick[32], who defines it as a process of continuous coevolution between sense and meaning. If we consider the hashtag – as we have done here – equal to a speech act, it becomes necessary to investigate its semantic content in denotative and connotative components.

A. The Reconstructing of the Semantics of Hashtags

Everything that is anchored to a single hashtag contributes to redefine its meaning. This new meaning – or perhaps better – this affordance is created by the users through their actions, that is through an agency.

A multimodal content analysis is chosen to extrapolate sense and meaning from each tweet, considering the latter not only as text but also in its accessory elements.

The posts published by single users to support or denigrate the election day, are substantiated or perhaps better foraged in an emotional and personal way.

The range of feelings associated to these messages is wide and variegated and it reflects human nature. The objective is to reconstruct and problematize the different ways of looking at the election of Pope Francis, which comes after the resignation of Pope Ratzinger.

To these tweets we apply the categories, whether they are *a priori* and *ex post*. We have two types of categories:

- *a priori* ones, which are created by the researcher moving from the definition of the concept of hashtag,
- and *ex post* ones, which emerge as the researcher works on the hashtag contents.

Moving from concepts to categories, or from the content of multimodal resources to categories, the process of *ex post* creation of the categories is crucial to relocate the hashtag in the intentions of the users. In fact, a hashtag is linked to a set of feelings that can conform to the label but also be in contrast with it[33].

The application of the *a priori* and *ex post* categories refers to two distinct processes: deduction and induction. The creation of the categories (deduction process) is linked to the literal and figurative meaning of our hashtag. A literal meaning of a hashtag is the first road map to start creating containers/labels (categories) of derivable meanings. The figurative meaning involves the use of "several expressive modes" that refer to the literal meaning, but use this literal meaning in a symbolic and translated way (inductive process). This way, under the # umbrella, different meanings are gathered and they contribute to redesigning the global meaning of #. Therefore, it is at this stage that the researcher, while analyzing the hashtags, must create new labels.

By using this procedure, the content analysis integrates the discourse analysis[34], proposing an approach that can be inserted among the mixed methods[35], but at the same time goes beyond them, making use also of a spatial analysis[36] obtained through a computational content analysis. The use of the software Hamlet permits us to have multidimensional scaling. The meanings emerge from multimodal resources: texts, emoticons, comments, and mentions.

Our goal is to work with all these resources to rebuild the meanings attributed to #. This operation is a retrospective reconstruction of sensemaking[32]. To do this we use content analysis procedures, but keeping in mind that communication is multimodal. We therefore need to create a data collection form, organized in categories. The data form collects the texts (messages, sentences, paragraph), descriptions of emoticons. This description is made by the researcher working on two levels: the one of denotative and the one of connotative meaning.

B. *The Sentiment and Emotions Expressed Through Hashtags*

The first step to make to identify the range of emotions expressed by the hashtags selected as polysemic collectors is the categorization of the texts, considered also in their multimodal component. The categorization is a series of procedures through which information is codified in homogeneous sets containing portions of meaning[33]; the categories created have to present two main characteristics: mutual exclusiveness, that is each analysis unit can be codified in only one way; in other words, each unit belongs to one and only one of the categories created; and completeness, meaning that all the data corpus must be codified.

The *a priori* categories identified for the election day represent a literal decomposition of the hashtag. In fact, they are categories about the event (i.e. election, conclave, smoked black, white smoked, waiting), the Pope (i.e. Francis, Bergoglio, Argentine), personal characteristics of Bergoglio (i.e. humble, good, likeable) and positive emotions (i.e. joy, happiness, thankfulness).

From the analysis of the multimodal content emerge *ex post* categories such as hate speech (i.e. church scandals, pedophilia, luxury, religious emptiness, anxiety, prejudice) and ironic specch (i.e. Italian political panorama, Berlusconi, five-star movement), the mission of Pope Francis (i.e. the religious crisis, the resignation of Ratzinger, popes) and forecasts (i.e. cardinal, bishop, tomorrow, today).

Specific terms have been associated to the categories identified. They come from the texts already included in the hashtags, but also from the textual descriptions of the emoticons prepared by the researcher.

This way we can create a dictionary of the categories, which is then introduced inside the software to extrapolate the keywords in context.

For example, comparing the results of applying Sokal's coefficient (1)

- $cij = (fij + t - (fi + fj – fij))/t$ (1)

where fij are the joint frequencies and fi, fj the individual frequencies of words i and j of words i and j in a given vocabulary list, expressed in units of context in each case, and $t = (fi + fj – fij)$, with those of the Jaccard coefficient (2)

- $sij = (fij)/(fi + fj - fij)$ (2)

which excludes consideration of occasions when neither word is present. These are just two of numerous possible coefficients, for general treatments of measures of similarity (between dichotomous variables) [37].

The following set of categories, each defined by a number of words related to the theme indicated, was developed on the basis of the word distributions of the hashtag contributions to the debate on the election day of Pope Francis to produce co-occurrence matrices for each hashtags' group.

In a quantitative representation they provide information on the presence in the text of the words inserted in a specific category.

The computational part of the content analysis begins as soon as the codification of the texts has been completed. The reduction of the data, their synthesis in an easily readable format, therefore in a graphic representation, makes it possible to summarize information coming from a large database. We have here chosen to use Mini-SSa Scaling, which is a form of multidimensional scaling per ordinal data, defined by Coxon[38] together with the attempts made by Hayashy[39] in Japan with quantification scaling and in France by Benzécri[40] with "l'analyse des correspondences". The MDS summarizes the data by calculating the geometric distance between the dots, trying to leave unaltered the positions taken by the categories one towards the other[41].

In our case we apply standard non-metric multidimensional scaling, treating the standardised co-occurrence values as similarities, with the convenience that the results can be visualised in three dimensions, preserving the rank order of the original similarities. In this tridimensional MDS there is space for the categories elaborated to analyze the communicative and emotional frame gathered under the hashtag used for the election day.

The dots summarize the texts, emotions used by the users and they give a complete picture of the semantic variability of the hashtag and of how they are close to one another.

IV. FINDINGS

The abductive reconstruction of the phenomenon investigated represents the connection between the initial

description of the texts and what instead emerges from the data. It seems that the abduction of which Krippendorff writes with reference to the communicative frame obtained through MDS, is the same as Pierce's (1935-1966). In front of some facts that do not belong to the habitual explicative scheme for such kind of phenomenon, it is necessary to invent hypotheses which prove them right.

RQ1 - Linked with our first research question we can see that: the data collected shows how moving from the deductive operationalization of the hashtag it is later possible to widen the semantic content through the induction process. With reference to election day – the MDS performed on a similarity matrix, using the coefficient of Jaccard – shows us how some of the topics described with hashtags are close to one another. Examples are mission of Pope Francis, personal characteristics of Bergoglio, Pope and event. On the other side but near the previous group, we find hate speech that is closer mission of Pope Francis; connected to each other forecast, positive emotions and ironic speech.

Under this perspective hashtags seem to be able to gather the multiplicity of the aspects one can trace of a single event, attaching the feelings of those who look at the election Pope. The hashtags and their polysemy re-propose cognitive components such as hopes, fears, emotions, and purposes built around a person or an event.

Furthermore, the Multimodal Content Analysis provides important information about how the mediatization of emotions emerges as an affordance of the social media whose study implies placing attention on digital practices and the formation of the sense of public affection, of the connected publics[21] that express their participation through expressions of feelings[7].

The hahstags are without doubt stories of connection and expression, where hashtags are used as empty meanings waiting for an ideological identification with a wide polysemic orientation[42].

RQ2 - In fact, what Rathnayake and Suthers had already described happens. The hashtag 'projected uptake' takes place and while this uptake by hashtag users occurs, the meaning of the hashtag also change. At this point is possible to support – with evidence in hand that – if uptake is the 'most fundamental element of interaction'. Projected uptake is based on the affordances of acts for future uptake; so hashtags are affordances of the platform that organize instances of momentary connectedness into networks. Using MCA we can see that: the best way to observe affordances is to evaluate the efficaciousness of human actions, that is to address the agency, understanding how technologies show their affordances while actors are engaged in performing an action within the social system using them. The agency derives from the actor's knowledge of the frameworks and from his/her ability to apply them to new contexts, operating little tranformative actions and working in a creative way. This transformation of the hashtag associated with social media fetures requires users to express their emotions within a hashtag. This momentary connection to users – in which the hashtags act as a bridge – becomes a tool to express emotions.

The MCA allows to reconstruct the emotions and to synthesize them within categories.

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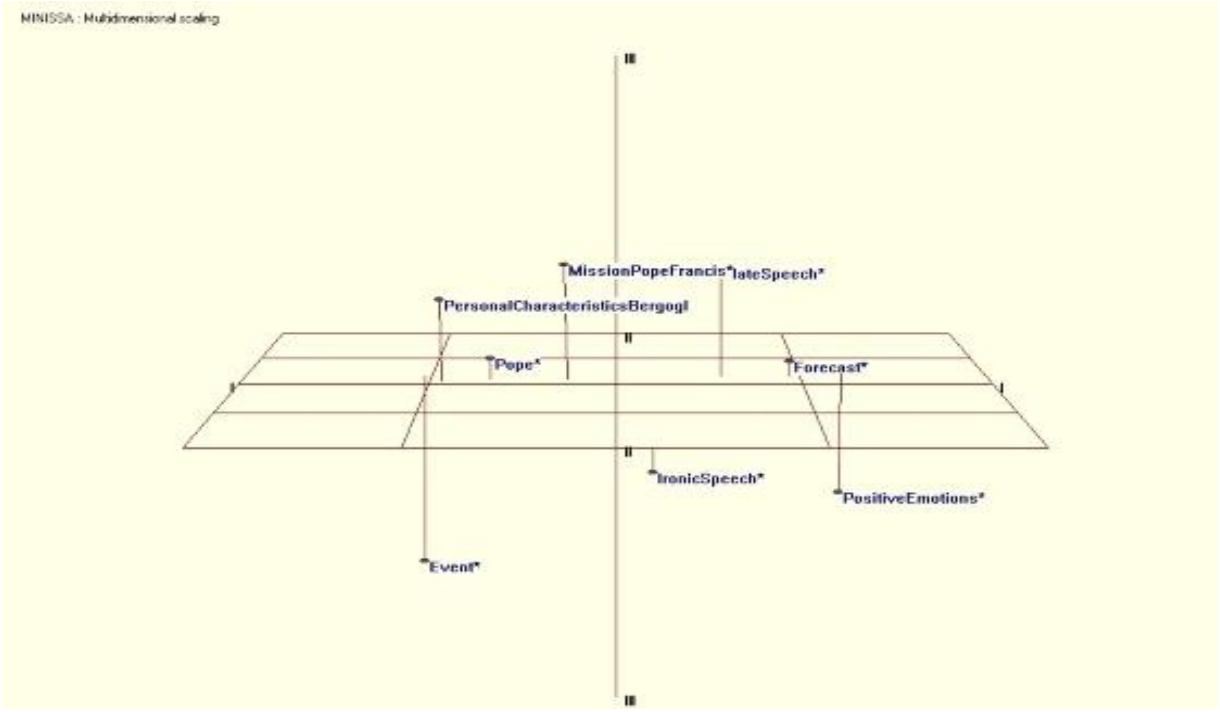

Fig. 1. Mutidimensional Scaling