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THE INFLUENCE OF SOCIAL MEDIA FILTER BUBBLES AND ECHO CHAMBERS ON IT IDENTITY CONSTRUCTION

Research in Progress

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Abstract

Social media sites are extending social structures from physical to virtual environments. The leading social media platforms use customized algorithms to improve their users experience online. The filter algorithms analyze restricted to individuals online habits. Thus, ignoring more subjective personality traits. Moreover, social media technological features allow individuals to receive constant feedback loops that influence their self-concept and reflects on their identity construction while online. The understanding of how a dynamic Information Technology (IT) artifact — created and continuously modified by interpersonal relationships — influence individuals identity, demands a multidisciplinary approach. Based on a broad bibliographic review, this research-in-progress paper proposes a conceptual model encompassing the cognitive and motivational processes involved during the use of social media to investigate the influence of filter bubbles and echo chambers on Information Technology (IT) Identity construction. In the next phase of research, we intend — throughout a mix-methods approach — investigate empirically the relations presented in the conceptual model. Given the interconnected and embedded nature of social media in today's world, we believe that findings from this research will be of interest to Information System(IS) researchers and practitioners engaged in the study of the relationship between social media and identity.

Keywords: IT Identity, Filter Bubbles, Echo Chambers, Social Media.

1 Introduction

The distinguished social psychologist Roy Baumeister remarks that “self begins when awareness turns around in a circle” (Baumeister, 2010, p. 680). Nowadays, technology has transformed how individuals, groups, and organizations perceive themselves and define their identity (Whitley, Gal and Kjaergaard, 2013). Therefore, Information Technology (IT) becomes more relevant in the context of identity theory research (Dunn, 2013). In recent years, Carter (2013) drew on structural symbolic interactionism - the epistemological basis of identity theories - to define the concept of information technology (IT) identity. According to Carter (2013) IT identity is the set of meanings that individuals attach to their self about IT as a product of personal histories of interacting with IT, as well as a force that shapes their thinking and guides their IT use behaviors.

Carter and Grover (2015) argue that IT Identity is initially a private construction, but this process is also a product of social and cultural contexts in which people insert themselves. As stated in the bases

of symbolic interactionism, experience has a prominent role in the process of individual self-construction. Therefore, the experience in the use of IT needs to be interpreted to generate a single action. In sequence, this action must be interpreted to generate a new belief. Then, new features are incorporated or modified into the old self (Cheng and Guo, 2015; Davis, 2014; Dunn, 2016; Robinson, 2016).

Social media, as a recent phenomenon has been changing the way people interact, perceive each other, and plays a significant role on their identity construction (Levinson, Cogburn and Vodanovich, 2018; Pan et al., 2017; Yu et al., 2018). In that regard, the emergence of social media raised questions about the differences of identity in virtual environments and the physical world (Hongladarom, 2011). Among the most used technologies in recent times, social media is increasingly ubiquitous in the daily life of individuals (Ahmed, Scheepers and Stockdale, 2014). Its influence can even be seen in recent election results like the presidential race in the USA (Oh and Kumar, 2017).

In recent years, there has been growing criticism from scholars, thinkers, and IT specialists regarding the appropriation of the internet by social media companies like Facebook and Twitter. For example, World Wide Web (WWW) architect, Tim Berners-Lee recently declared that the internet has been taken over by those companies that have transformed it into "walled gardens" where the user navigates within their domains and absorbs only the content determined by the algorithmic curation (Evangelho, 2018; Rader and Gray, 2015; Spohr, 2017).

Social media architects implement computer algorithms to analyze individuals habits and offer personalized content (Bobok, 2016; Dutton et al., 2017). As a result of the limited content variety, filter bubbles increase the intensity and speed at which people are gathered into social groups that share the same points of view. These groups start to act as echo chambers, where information and ideas are rapidly and dynamically transmitted among group members (Flaxman, Goel and Rao, 2016; Sunstein, 2018).

Outside these "walled gardens" – i.e., without the influence of filter bubbles – there is greater information transparency and, therefore, the individual acquires more autonomy to decide which content to access (Bobok, 2016; Bozdag and Timmermans, 2011; Dutton et al., 2017; Flaxman et al., 2016; Groshek and Koc-Michalska, 2017). Correspondingly, in both situations, individuals experience different levels of sense of belonging, relatedness and social connectedness (Davis, 2014; Ellison, Steinfield and Lampe, 2007; Goswami et al., 2010; Walther, 2016).

Given that explaining the intertwining between the extrinsic and intrinsic factors involved in social media usage and its influence on IT Identity is a challenging theoretical task, it is necessary to adopt a multidisciplinary perspective. In this research-in-progress paper, we aim to propose a conceptual model to investigate how filter bubbles and echo chambers influence IT Identity construction during the use of Social Media. Following the introduction, we present the relevant literature which serves as the theoretical foundation for this research in progress paper.

2 Literature Review

2.1 Filter Bubbles and Echo Chambers Influence on Social Media

Social media are classified as consumption artifacts, in the same category as smartphones, tablets and cloud services (Carter and Grover, 2015). However, when using social media, individuals become involved in more complex networks in comparison to static IT artifacts such as spreadsheets or text editors (Zhang et al., 2015). Therefore, to understand their role in the construction of IT identity, it is necessary to adopt multiple theoretical perspectives (Carter and Grover, 2015; Pan et al., 2017; Shi, Booth and Simon, 2017).

Currently, social media has— paradoxically — the ability to expand but also restrict the amount of information that individuals are exposed to during its use (Flaxman et al., 2016; Spohr, 2017). The ever-growing volume of data it generates challenges our capacity to fully enjoy the user experience

due to the limited capacity of human beings to process large amounts of information (Brooks, Longstreet and Califf, 2017; Cramer, Song and Drent, 2016). Regarding that, the speed and capacity to process information (Lengel and Daft, 1989) contribute to effective communication in digital environments (Walther, 2016). As a way of addressing this issue, algorithms - known as filter bubbles - are implemented to offer a personalized experience during social media usage (Pariser, 2011) and gave rise to social media echo chambers (Jacobson, Myung and Johnson, 2016; Nikolov et al., 2015; Quattrociochi, Scala and Sunstein, 2016).

Filter bubbles reduce the volume and variety of information presented to social media users (Bobok, 2016). If in one hand individuals benefits of the optimized content, on the other, it restricts the amount of information available when using these technologies. The algorithms used in social media firms such as Facebook and Twitter aims to reduce the information overload (Bozdag and Timmermans, 2011), costs with storage and data processing and provide a customized experience for users (Bobok, 2016). However, most social media users do not have the knowledge or ability to control algorithms activity. Moreover, the algorithms do not take into account the information context (Bozdag and Timmermans, 2011). Ultimately, it reflects in increasing difficulties to develop new ideas, and different points of views as the users lose the autonomy to decide what kind of information want to be exposed during their online interactions (Dutton et al., 2017).

When engaging in social relationships, individuals tend to establish cognitive symmetry with others. In this process, seek to confirm their beliefs to reinforce the perception that the world is predictable and controllable (Swann, 1990). This is the premise of echo chambers formation (Bobok, 2016; Dutton et al., 2017; Flaxman et al., 2016). During the communication process, they tend to focus on narratives that reinforce their opinions and beliefs. In that regard, social media enabled echo chambers becomes an environment where their messages can be forwarded quickly to other individuals who share the same point of views. Ultimately, the combined action of filter bubbles and echo chambers becomes responsible for groups polarization around important topics like politics and religion (Del Vicario et al., 2016; Quattrociochi et al., 2016). To understand the communication processes in social media, in the next section we present Defleur's mass media communication model.

2.2 Defleur's Mass Media Communication Model and Social Media

Social media allow constant feedback during the communication process (McQuail, 2010) combining the benefits of mass media such as a broader audience range, with the benefits of the interpersonal communication, such as the use of personalized messages (Chou et al., 2013). In that regard, DeFleur (1993) mass media communication model combines the earlier models of Shannon, Weaver and Burks (1951) and Westley and MacLean Jr (1957). Defleur's model expands the linear communication presented in the previous models to two-way feedback (circular communication) and also introduces the mass media device. These two additions imply that the feedback occurs in both directions and that the communication process completes when the feedback is received (Narula, 2006).

The perceived social benefits of social media usage and its addictive characteristics stimulate users to enter into a constant feedback loop (Rahman et al., 2018; Savci and Aysan, 2017; Stanciu, 2017). In this context, its usage intensity can influence a diverse range of behaviors in both the physical and virtual worlds. However, any effort to ensure the effectiveness of this influence must consider not only the effect of the message on the audience but also the propensity that the message and its elicited behavior will be disseminated throughout the network. Thus, it is essential to understand the interaction between the transmitter and receiver and how the feedback process occurs (Bond et al., 2012; Dunn, 2013). In the next section, we present the conceptual model and the propositions derived from the presented literature.

3 Conceptual Model Proposition

The self - a concept originated in the area of psychology that comprises the whole human psychic phenomena - is formed by a set of identities that manifests as roles when individuals interact with others in different social structures (Burke and Tully, 1977; Ellemers, Spears and Doosje, 2002). In the physical world, they alternate the roles when moving through social structures (Serpe and Stryker, 2011). Similarly, in the virtual environment, individuals may alternate their roles according to the influence of cognitive and motivational processes (Chan and Suarez, 2017; Miranda, Kim and Summers, 2015; Pan et al., 2017).

Identity construction is an internal process motivated by reflexive consciousness and also by extrinsic aspects (Baumeister, 2010). This relationship implies that the multiple identities that the individual claims must also have the recognition of people with whom he or she interacts (McCall and Simmons, 1978). In the social context, individuals acquire multiple selves which depend on the recognition on the part of individuals in their relationships networks (James, 2013). In this regard, social media are characterized as social structures in which the processes of identity construction (external and internal) develops continuously, allowing individuals to present distinct aspects of their identity, both in physical and virtual social structures (Hongladarom, 2011; Yu et al., 2018). Internally, the self-concept is built from three components. Self-image comprises physical and personal characteristics and how individuals perceive them. Self-esteem depends on how individuals evaluate their traits when compared with others. The last element, the ideal self, consists of how individuals would like their self-image to be perceived by others within their relationship networks. Ultimately, the distance between the self-image and the self-esteem can increase or shorten (Rogers, Smith and Coleman, 1978; Vinney, 2018), producing both positive and negative consequences for the self-concept and influencing the behavior of individuals (Koolivandi and Lotfizadeh, 2015).

Concerning the external aspects of identity construction, the sociology area provides the theoretical base to understand how it occurs in digital environments (Hogan, 2010). In the book "The Presentation of Self in Everyday Life" (1959), sociologist Erving Goffman presents a theatrical allegory to explain the roles individuals play in society (Goffman, 1959; Scheibe and Barrett, 2017). Goffman argues that, as in the theater, social life occurs in three instances, which are: (i) front stage, (ii) backstage and (iii) off stage. In recent times, Goffman's dramaturgical allegory has contributed to the theorization of identity construction during social media use. In social media, interactions occur in the three instances described by Goffman (Hogan, 2010) with different levels of relatedness, identification, and intimacy. Therefore, in each of these instances the individual's presentation is distinct (Levinson et al., 2018; Pan et al., 2017; Wang and Skovira, 2017).

The process of identity construction in social media extends throughout different physical and virtual social structures. This interrelationship occurs because characteristics attributed to the self in the physical world reflect on the online self and vice versa (Davis, 2014; Hogan, 2010; Hongladarom, 2016; Kashian et al., 2017; Tong et al., 2008; Walther, 2007). As a consequence, the so-called cyberself or "online self" results in the perpetuation of the self that individuals build in the physical world (Robinson, 2016).

Identity is the primary factor that influences human behavior, promoting positive attitudes consistently and integrating the social and individual context (Carter and Grover, 2015). Therefore, community groups and organizations also influence identity construction (Boudreau, Serrano and Larson, 2014). In the social media environment, individual identity undergoes the process of information customization due to the algorithms implemented in those platforms (Marabelli, Newell and Galliers, 2016; Rader and Gray, 2015). Consequently, a generic user identity is created as the individual's information is being filtered by algorithmic curation (Bozdog and Timmermans, 2011; Rader and Gray, 2015). The concepts, definitions, and implications of the essential cognitive and motivational processes involved in IT Identity construction during the use of social media are summarized in Table 1.

Cognitive and motivational processes	Conceptual Definition	Implications for the Identity construction	Author(s)/Year
Self – Concept	The set of meanings we attribute to ourselves by questioning who we are and how others act about us.	Identity affirmation. Increases self-esteem and confidence	Rogers et al. (1978); Stets and Burke (2003); Shavelson, Hubner and Stanton (1976); Harter (1999); Markus (1977); Marsh, Xu and Martin (2012)
Self-Disclosure	The act of revealing our thoughts and/or experiences to others.	Provides the ability to control what others know and to establish the desired level of intimacy.	Archer and Burleson (1980); Derlega and Berg (2013); Gibbs, Ellison and Heino (2006); Jiang, Bazarova and Hancock (2011)
Self –Monitoring	Self-observation and self-control oriented by situational cues in order to achieve social appropriateness	Provides the ability to adjust our behavior in different social situations.	He et al. (2014); Na (1991); Snyder (1974, 1987); Tyler, Kearns and McIntyre (2016)
Self–Presentation	The individual's control of the impressions that others about him/her during interpersonal interactions.	Provides the capacity to expand our attractiveness and credibility in the face of others.	Goffman (1959);Leary (1995); Ellison, Heino and Gibbs (2006); Swann (1990); Nadkarni and Hofmann (2012); Seidman (2013); Hogan (2010); Wan, Wu and Lu (2015);
Self-Awareness	The ability of the individual to be attentive and understand behaviors, emotions, and feelings.	Increase the ability to not being set into social stereotypes.	Duval and Wicklund (1973); Geller and Shaver (1976); Silvia and Duval (2001); Fenigstein, Scheier and Buss (1975); Wicklund (1975); Doas (2017)
Self-Enhancement	The effort that individuals make to maintain high levels of self-esteem.	Improves the ability to change a particular situation or achieving a goal.	Swann (1990); Paulhus (1998); Hoorens (2011); Cramer et al. (2016)
Self-Verification	The individual's need to be perceived by others according to their self-concept.	It leads to impairment in relationships, positive emotional connections, and guidance for the group	Swann and Read (1981);Swann (1990); Burke and Stets (1999); Kraus and Chen (2012); Seyle and Swann Jr (2007)
Sense of Belonging	The individual's need to feel inserted and accepted in a particular social group.	Influences cognitive processes and acts as a motivator of behaviors	Leary and Cox (2008); Baumeister and Leary (1995); Levett-Jones and Lathlean (2008); Dorum, Bartle and Pennington (2013); Nadkarni and Hofmann (2012)
Social Connectedness	The ability to construct rich relationships and perceive himself/herself as part of it.	Reinforces the sense of belonging and influences self-esteem	Crisp (2010); Lee and Robbins (1995); Lee and Robbins (1998); Savci and Aysan (2017)

Table 1. Summary of the cognitive and motivational processes involved in social media IT Identity construction.

Insofar internet communication grows, technology is being used as a way to achieve social connected-

ness; an ability to construct rich relationships and perceive ourselves as part of it. Amongst the cognitive factors, social connectedness is one of the main motivations that influence social media usage (Rahman et al., 2018; Savci and Aysan, 2017). Social connectedness occurs in short periods when individuals experience feelings of belongingness and relatedness as they participate in social networks and organizations (Crisp, 2010; van Bel et al., 2009). Nevertheless, the sense of belonging implies an emotional attachment and is reinforced by social connectedness. In this regard, communication experience during the use of social media benefits from the ability to safely and dynamically process large and diverse volumes of information (Agrawal et al., 2015; Lengel and Daft, 1989; Oh, Kwon and Rao, 2010; Pan et al., 2017). Regarding the arguments above, four propositions are presented. Formally stated,

P1: The capacity to handle large and diverse types of information in a fast manner will positively influence the experience during the use of a particular social media (improving social connectedness and sense of belonging).

P2: A solid sense of belonging and social connectedness influences positively the engagement on the processes of self-presentation, self-disclosure, and self-enhancement.

P3: The continuing engagement in the processes of self-presentation, self-disclosure, and self-enhancement will positively influence IT Identity (throughout the feelings of relatedness, emotional energy, and dependence).

P4: The continuing engagement in the processes of self-awareness, self-monitoring and self-verification influences positively the levels of self-presentation, self-disclosure, and self-enhancement.

Social media sites comprise a set of embedded IT artifacts (Carter, 2012, 2013; Carter and Grover, 2015) and its use involves the three instances described by Goffman (Hogan, 2010). The influence of a particular IT artifact in IT Identity reflects on feelings of (i) emotional energy, (ii) dependence, (iii) and relatedness (Carter, 2013; Carter and Grover, 2015) due to the history of IT usage. Considering that Carter and Grover (2015, p. 947) remarks that identity verification is a reciprocal process, the fifth proposition is presented. Formally stated,

P5: A positive social media user experience (throughout the improved social connectedness and sense of belonging) will influence positively the continuing engagement in the processes of self-awareness, self-monitoring, and self-verification that in the sequence, will reflect indirectly on IT Identity.

Figure 1 shows the Conceptual Mapping encompassing the cognitive and motivational processes involved in social media usage. Also, Filter Bubbles and Echo Chambers influence on IT Identity within the three communication instances (transmitter, receiver, and channel).

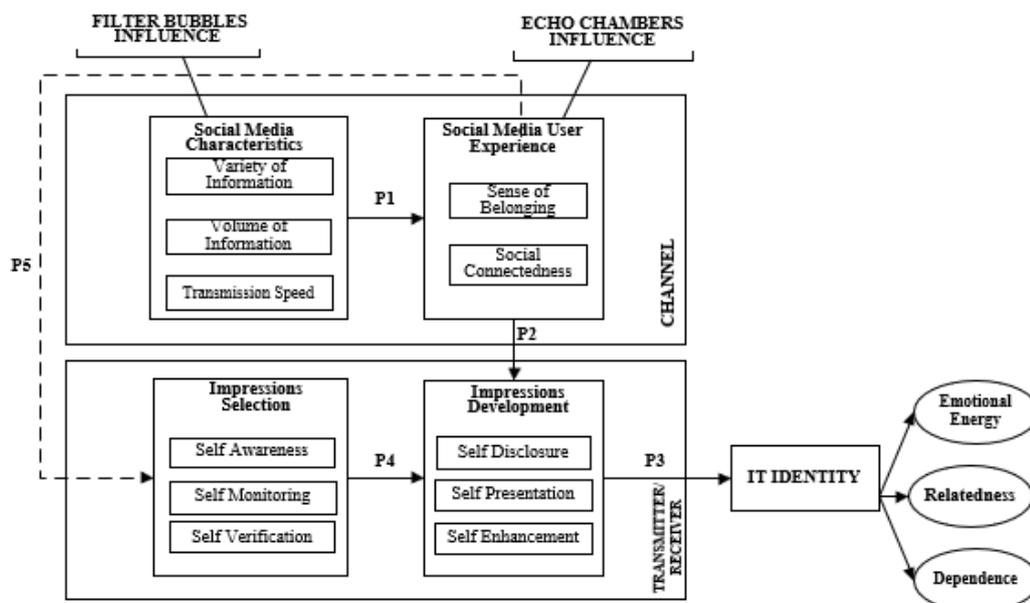


Figure 1. Conceptual Mapping of Social Media Filter Bubbles and Echo Chambers influence on IT Identity construction

The filter bubbles influence on social media characteristics — reducing diversity and information volume while boosting the creation of echo chambers — reflects in IT identity as the algorithms customization create a unique online identity derived of the user's history of interaction in social media sites (Bozdag and Timmermans, 2011). This combination increases the speed and intensity in which individuals experience (i) sense of belonging and (ii) social connectedness. In Table 2 are presented filter bubbles and echo chambers influence on the involved variables and propositions.

Propositions	Filter Bubbles Influence	Echo Chambers Influence	Author(s)/Years
P1	Decrease information transparency. Restrict the autonomy of the individuals to choose the information that would like to be exposed. Reduce the variety and volume of information.	Increase the sense of belonging, and social connectedness	Bobok (2016); (Bozdag and Timmermans, 2011); Flaxman et al. (2016); Goswami et al. (2010); Groshek and Koc-Michalska (2017); Pariser (2011); Rao, Davis and Ward (2000); Statache et al. (2014)
P2	-	Restrict the characteristics of the ideal self that will undergo the processes of self-disclosure, self-presentation, and self-enhancement	Dunn (2016); Mazur and Li (2016); Wang and Skovira (2017)
P3	Restricts the diversity of characteristics of the ideal self to be assigned to the user on the construction of IT Identity.	-	Carter (2012, 2013); Carter and Grover (2015); Pan et al. (2017); Stets and Carter (2011)
P4	Increases the distance between the self-image and the ideal self on the online environment	-	Abramova et al. (2017); Banks et al. (2016); Bazarova (2015); Kim and Kim (2017); Orsatti and Riemer (2015)

Propositions	Filter Bubbles Influence	Echo Chambers Influence	Author(s)/Years
P5	-	Restrict the characteristics of the ideal self that will undergo the processes of self-awareness, self-monitoring, and self-verification	Dorum et al. (2013); Leary and Cox (2008); Liu and Guo (2015); Rogers et al. (1978); Seidman (2013); van Bel et al. (2009)

Table 2. *The Influence of Echo Chambers and Filter Bubbles in the Variables and Propositions of the Conceptual Model*

Therefore, observing the proposed conceptual model, filter bubbles and echo chambers have a direct influence on the instance "social media characteristics" whereas echo chambers occur in the instance "social media user experience".

4 Discussion and Expected Contributions

From the premises presented in this study, we theorize that the process of identity construction during the use of social media extends outside the online environment. Moreover, potentially including social media incorporated capabilities (Carter and Grover, 2015), influencing individuals roles and behaviors in different physical and virtual socials structures. Finally, the identity on a broader perspective.

On the one hand, selective exposure of information by filter bubbles and echo chambers restrict the range of possible personal resources (or capabilities afforded by social media) (Carter and Grover, 2015; Marabelli et al., 2016; Nikolov et al., 2015; Rader and Gray, 2015) to be assigned on the ideal self. Ultimately, it reflects in a more impoverished depiction of IT Identity within the social media context (Spohr, 2017). On another hand, increases the pace in which individuals experience social connectedness and sense of belonging in this virtual environment. Ultimately, this combination intensifies the process of internalization of the characteristics habilitated by social media, carrying consequences to the self-image and the ideal self (Marabelli et al., 2016; Spohr, 2017).

In the organizational context, the history in the use of social media and this "new" identity has reflections in the way individuals relate with organizations and consequently influence their behavior during the fulfillment of work functions (Leftheriotis, Giannakos and Pappas, 2016; Oliveira and Watson-Manheim, 2013; Zhang et al., 2015). For instance, Bennett et al. (2010) pointed out that in the organizational context, social media has a positive impact on the workplace in areas like enhanced collective knowledge, improved knowledge, increased productivity, and improved morale.

In the next phase of research, throughout a mix-methods approach, we will investigate empirically the relations presented in the conceptual model following Venkatesh, Brown and Bala (2013), guidelines. In the first phase, we will apply in-depth interviews with a sample of 30 regular social media users. We will analyze the data throughout the thematic analysis method (Braun and Clarke, 2012). In the quantitative phase — based on the qualitative analysis results — we will develop and validate a survey questionnaire and submit to representative samples of social media users in order to test and analyze the relations in the conceptual model through structural modeling equations technique.

An improved understanding of the cognitive and motivational determinants of social media use influence on IT identity construction might help to design more effective communication strategies and to challenge the digital misinformation threat (Bessi, 2016; Del Vicario et al., 2016). The comprehension of how social media influence individual identity construction — and more specifically its algorithms enabled filter bubbles and echo chambers — may bring an essential contribution to the academy as extends IT Identity research to a complex and dynamic IT artifact. For practitioners, this research in progress can be valuable for managers wanting to improve social media strategy within the workplace.

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