Engagement in a Social Media: An Analysis in Higher Education Institutions

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Resumo
Online social media are channels of communication and relationship with the market. This research aimed to evaluate the determinants of consumer engagement in brand messages published on Facebook in higher education institutions. Data were collected through direct, non-participant and structured observation of 1,981 Facebook publications of 16 higher education institutions. The results indicate that active postings have a positive influence on the amount of like, and negative on the number of comments and shares. On the other hand, that posts with remuneration content have a negative influence on like, and positive on comments; that posts with information content have a positive influence on comments and sharing and negative influence on like; while posts with entertainment content have a positive influence on comments and sharing. The study contributed to the proposition and test of a predictive model of consumer engagement on Facebook.

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Abstract: Online social media are channels of communication and relationship with the market. This research aimed to evaluate the determinants of consumer engagement in brand messages published on Facebook in higher education institutions. Data were collected through direct, non-participant and structured observation of 1,981 Facebook publications of 16 higher education institutions. The results indicate that active postings have a positive influence on the amount of like, and negative on the number of comments and shares. On the other hand, that posts with remuneration content have a negative influence on like, and positive on comments; that posts with information content have a positive influence on comments and sharing and negative influence on like; while posts with entertainment content have a positive influence on comments and sharing. The study contributed to the proposition and test of a predictive model of consumer engagement on Facebook.

Keywords: Marketing in social media; consumer engagement; Facebook; higher education.

1. Introduction

This article analyzes the factors influencing consumer engagement in Facebook on the context of higher education institutions. Gümüş (2017) defines social media marketing as a process of communication and interaction with stakeholders through online social media, seeking to influence consumers and obtain business. In recent years there has been an increase in companies' investments in social media marketing (Rydén, Ringberg & Wilke, 2015), with Facebook being the most used social media (Kemp, 2018). This advance indicates the relevance of online social media, as a marketing communication channel, brand building, business generation, and relationship development.

Marketing literature shows that organizations are creating fan pages and cultivating relationships with consumers and other stakeholders through social media (Harris & Rae, 2009; Chua & Banerjee, 2015; Rydén et al., 2015). Porter and Donthu (2008), for example, investigated how consumer confidence in virtual communities creates value for the company and highlighted the relevance of online social media in business relationships. While Smith, Fischer, and Yongjian (2012) have analyzed differences in user-generated content on Twitter, Facebook, and YouTube, and reveal that the characteristics of publications tend to vary by media type. In the same line, Kumar et al. (2016) analyzed the effect of postings on customer buying behavior. In a recent study, Bocconcelli et al. (2018) analyzed the impact of social media on the communication practices of companies with different stakeholders. In general, this profusion of studies indicates that social media is increasingly used in corporate communication and relationship practices.

However, in the literature, there is not much empirical evidence about marketing practice in social media organizations, notably about types of publications, consumer reactions, and the effects of postings (Cvijik & Michahelles, 2013). Similarly, little is known about the effects of different postings on consumer attitudes and behavior (De Vries, Gensler & Leeflang, 2017). Recently, VanMeter et al. (2018) confirmed the need to broaden the understanding of the subject, in particular, the strategic use of social media and its influence on consumer engagement.

Few studies deal with the evaluation of marketing performance in social media in the context of higher education institutions (HEIs). For Assimakopoulos, Antoniadis, Kayas & Dvizac (2017) although social media is a trend within these institutions, the number of studies in this context is still limited and little is known about the effectiveness of marketing practices in the different social media platforms. Added to these issues is the fact that institutions fail to publicize their fan pages, or frequently update their social media, or lack a defined social media

strategy (Biczysko; Jabłońska, 2016). Specifically, in Brazil, a significant part of university students makes use of social media for interaction and sharing of content (Statista, 2019).

Thus, this study aims to analyze the factors that influence consumer engagement in brand messages published on Facebook, in the context of higher education institutions. Specifically, we seek to: (a) examine the influence of factors related to the type of media (interactivity and liveliness) on the amount of like, comments and shares; (b) examine the influence of content-related factors (remuneration, emotional, entertainment, and informational) on the amount of like, comments and shares; and (c) to examine the influence of factors related to posting (day of the week and time of day) on the amount of like, comments and shares.

2. Literature Review

2.1 Social Media Marketing

Advances in Information Technology and the Internet have enabled changes and improvements in the organizations regarding the processes of relationship with markets. New business models, new marketing practices and increased use of digital media (Gensler, Völckner, Liu-Thompkins, & Wiertz, 2013, Bolton et al., 2013, Felix, Rauschnabel & Hinsch, 2017) to the new field of study of digital marketing. Such advancements in social media applications and tools have also intensified marketing practices in social media, which provide the company with direct contact with the consumer and their insertion into emerging contact networks, as well as relationships with other organizations in the market (Rydén et al., 2015).

In this context, service organizations seek through social media to develop communication and interaction with customers, and to conquer new businesses (Rydén et al., 2015); they also invest in refining customer segmentation and developing campaigns targeted at specific, previously mapped audiences (Killian & McManus, 2015); work on brand promotion in terms of awareness, image and market positioning (De Vries et al., 2017). As postulated by Sabate et al. (2014), social media marketing helps the company to understand its consumer better and to deepen its relationships with diverse stakeholders.

Baird and Parasnis (2011) developed a study of online consumer behavior in the context of the United States, Canada, the United Kingdom, France, Germany, India, China, Australia and Brazil and concluded that most consumers are inclined to interact in the media with brands they already know and that have affinity; and that users interacting with social media mainly seek information about brands and products (promotions, discounts and evaluations of other consumers) and make purchases. In the context of education services, social media is increasingly present, especially in IES marketing practices. Previous studies have shown that universities use social media (mainly Facebook) to promote interactivity with students (Brech et al., 2017), develop marketing campaigns with new students (Assimakopoulos et al., 2017) and promote collaborative co-creation with students and employees (Fujita, Harrigan & Soutar, 2017).

There is also evidence that most postings of higher education institutions have informational content - that is, news about services, events and institutional marketing activities (Bélanger, Bali & Longden, 2014), and that the frequency of influences on consumer engagement (Brech et al., 2017). It is also known that marketing communication actions by social media can contribute to improving the perceived quality of the relationship with students. For example, the study by Clark, Fine & Scheuer (2017) points to a positive association between students who follow universities through social media and the perceived quality of the relationship; according to these authors, the higher the variety of social media users, the higher the perceived quality of the relationship.

The IES uses various social media marketing practices, such as the use of hashtags to create relevant content and provide students and employees with opportunities to present suggestions and opinions and build collective meanings for the brand (Fujita et al., 2017). There

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is also the practice of continually interacting, stimulating user participation, and fan page creation (Clark, Fine & Scheuer, 2017). Another practice used is to emphasize the use of specific characteristics of the post, such as vivacity, interactivity, emotional content, informational, remuneration and/or entertainment (Cvijikj & Michahelles, 2013). It is also worth mentioning the use of reports from the website or social media to monitor the performance of the pages of the institution.

Although social media are increasingly present in HEIs, there are few empirical studies on the subject in this context, especially on mechanisms underlying the management process (Brech et al., 2017) and on the effectiveness of certain media practices such as Facebook (Fujita et al., 2017). This present study seeks to contribute to deepening the understanding of the theme in the context of HEIs.

2.2 Research hypotheses and study framework
2.2.1 Factors related to the type of media

On Facebook, brand posts vary in media type (formatting characteristics) and may have different levels of liveliness and interactivity. The interactivity of the media is related to the degree to which it enables synchronized and interactive communication between users (Liu & Shrum, 2002). The work of Sabate et al. (2014) suggests that the interactivity of the media influences the consumer reaction, by arousing more considerable attention and interest in communication. The study by Luarn et al. (2015) shows that interactivity on Facebook influences user engagement in terms of like, comments, and sharing. However, the empirical findings of Chua and Banerjee (2015) suggest that postings with interactivity at a moderate level generate more like, comments and sharing by users, compared to interactivity at a high level. Thus, as Chua and Banerjee (2015) postulate, the empirical findings on the subject are still inconclusive and need new studies. Because it believes that the interactivity of the media influences the user's engagement in Facebook in the context of HEIs, both in like, comments, and shares, it was decided to formulate the first hypothesis of study:

H1a: Facebook posts with a high level of interactivity influence the number of like users
H1b: Facebook posts with a high level of interactivity influence user feedback
H1c: Facebook posts with a high level of interactivity influence the number of sharing by users

The second factor of influence related to the type of media is the liveliness of the media. It is related to the way the message awakens the different human senses (Chua & Banerjee, 2015). A video message tends to have more vividness than a message with only text or illustration. For example, a message that contains only one image will tend to stimulate only the user's vision; already a video message will stimulate different human senses. It is known that on Facebook many brand posts have some level of liveliness (De Vries et al., 2012; Chua & Banerjee, 2015). The study by De Vries et al. (2012), for example, has shown that more vivid posts cause users to be more positive about the message, which tends to favor consumer engagement. On the other hand, the research by Chua and Banerjee (2015) on Facebook points out that posts with nil liveliness have generated few like users.

The effect of vividness on Facebook posts on user engagement is not yet sufficiently clarified. Differently, from previous studies mentioned, the findings of Luarn et al. (2015) suggest that Facebook users are more likely to enjoy, comment and share posts with a moderate level of liveliness. On the other hand, the work of Chua and Banerjee (2015) indicates that on Facebook the vivacity is positively related to the amount of comments and shares, but not to the number of like users. In Cvijikj and Michahelles (2013) posts with more vivacity obtained more amount of like and shares, but a little amount of comments. On Facebook, some images

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may have more profound effects than videos, and more significant influence on consumer engagement (Sabate et al., 2014). In the light of these evidence, it is concluded that this subject still lacks scientific proof and the second hypothesis was formulated:

H2a: Facebook posts with a high level of alertness influence the number of likeusers
H2b: Facebook posts with a high level of vividness influence user feedback
H2c: Facebook posts with a high level of vividness influence the amount of sharing by users

2.2.2 Factors related to content type

On Facebook, branded posts can also vary, as for the content type. Such postings may predominantly contain content of an informational, entertaining and rewarding nature - which is the case when it offers a promotion, some discount or a reduction in value (Luarn et al., 2015). Malhotra et al. (2013) have also identified emotional content postings when they evoke emotions in users, seeking to create or strengthen an emotional tie with the brand.

On the remuneration content, the study by Baird and Parasnis (2011), which addresses consumer behavior in online interaction with brands, points out that one of the main determinants of social media interaction is the possibility of obtaining information about promotions and offers. The research of Luarn et al. (2015) pointed out, however, that remunerated posts have more influence on the number of like users than informative and entertaining content and less influence on the amount of feedback and sharing. In Cvijikj and Michahelles (2013) the posts with remuneration content had a negative effect on the number of like users. Unlike previous studies, the research by Chua and Banerjee (2015) has shown that posting with pay generates less like and has no significant relationship with the amount of comments and shares. Faced with these divergences, the third hypothesis of the study was formulated:

H3a: Facebook posts of content influence the number of like users
H3b: Facebook postings of content compensation influence the number of comments by users
H3c: Facebook posts of content influence the number of shares by users

Regarding emotional content, the literature shows that, in social media, messages of brands with human characteristics (called minimalist ones) tend to build a greater emotional connection with users (Malhotra et al., 2013), and that on Facebook the Emotional appeals tend to influence purchase intent more (Sheth & Kim, 2017). The study by Dobele et al. (2007) shows that social media users in situations of positive emotions (happiness, satisfaction) tend to share more messages received, and have higher intention to buy. This may mean that posts with emotional content tend to promote greater consumer engagement on Facebook.

The study by Mangold and Faulds (2009) points out that social media users tend to share postings of subjects with which they are emotionally connected, and that organizations tend to create emotional connections when supported by social causes such as environmental sustainability and education child. Corroborating this view, the findings of Swani et al. (2017) point out that social media users are more likely to be interested in postings of brands with emotional appeals since these give greater motivation to the action on the part of the reader. Additional empirical evidence indicates that postings with emotional content drive message sharing (Malhotra et al., 2013) and users' purchase intent (Sheth & Kim, 2017). However, the study by Chapleo et al. (2011) revealed that universities in the UK prefer to communicate traditional or functional values (such as research and teaching) in their posts rather than emotional attributes. In this same line, as pointed out by Swani et al. (2017), there is little

empirical evidence in the literature about the effects of posting with emotional content. Thus, the fourth hypothesis of the study was formulated:

H4a: Facebook posts with emotional content influence the number of like users
H4b: Facebook posts with emotional content influence user feedback
H4c: Facebook posts with emotional content influence the number of sharing by users

In Facebook, it is considered that the posting with information content is the one that mainly presents data, information or orientations to the users (De Vries et al., 2012; Luarn et al., 2015). In general, such postings are intended to provide information about the organization's brands, products, and marketing activities. Consumers search for social media for brand and product information. The study by Baird and Parasnis (2011) points out that they seek information about product characteristics, prices, launches, promotions, offers and opinions of other customers. In Brazil, the Internet is the second most used means of communication by the consumer to obtain news/information (BRAZIL, 2017).

In the literature, there is empirical evidence that postings of brands that offer information tend to arouse more interest and stimulate user engagement (De Vries et al., 2012; Malhotra et al., 2013). In the context of Facebook, the work of Malhotra et al. (2013), for example, points out that posts that provide information about brands and products tend to get more like. In the same vein, after analyzing posts from 10 brands on Facebook, Luarn et al. (2015) concluded that posts of an informational nature provide more engagement than posts with other types of content. In Cvijikj and Michahelles (2013), posts with informational content obtained a more considerable number of like and comments, but to a lesser extent than posts with entertainment content. Other studies, however, presented different results. For example, the work of De Vries et al. (2012) on Facebook points out that there is no significant relationship between posts with informational content and the number of like or comments. Because it is understood that the subject still needs clarification, it was decided to formulate the fifth research hypothesis:

H5a: Facebook posts with informational content influence the number of like users
H5b: Facebook posts with information content influence the number of comments by users
H5c: Facebook posts with informational content influence the number of sharing by users

In online social media, it is common to use posts with entertainment content, the one dedicated to entertaining (distracting) users (Tafesse, 2015; Luarn et al., 2015). In the literature, there is evidence that entertainment messages appeal to users, and can help bring them closer to the brand or product (Sheth & Kim, 2017). This kind of posting can make it easier to create and maintain relationships with users. Some studies suggest that posts with entertainment content tend to influence users' attitudes positively as well as evoke a positive perception about the brand (Cvijikj & Michahelles, 2013, Lukh et al., 2015, Sheth & Kim, 2017). In Luarn et al. (2015) this posting led to a higher amount of comments and sharing of users.

On the other hand, in De Vries et al. (2012), posts with entertainment content had little influence on the amount of feedback and had a negative effect on the amount of like. There are also indications that such postings can be interpreted negatively by the user. The study by Vanden Bergh, Lee, Quilliam & Hove (2011) points to the existence of risks related to misunderstanding (irony or sarcasm) and perceived user embarrassment. Because it believes that this subject still needs a deepening in its training mechanisms, and believing that on Facebook the posts with entertainment content tend to influence consumer engagement positively, the sixth hypothesis of the research was formulated:

H6a: Facebook posts with entertainment content influence the number of like users

H6b: Facebook posts with entertainment content influence the number of comments by users

H6c: Facebook posts with entertainment content influence the number of sharing by users

2.2.3 Factors related to the moment of posting

Sabate et al. (2014) state that posting is an element of social media marketing strategy. Brookes (2010) and Chauhan & Pillai (2013) suggest that on Facebook the moment of posting can influence consumer reaction and engagement; they believe that some users are more likely to enjoy, comment or share messages on certain days or times.

Regarding the day of the week, messages can be posted on weekdays, weekends or holidays. In Brazil, about 44% of users usually access the Internet more during working days; and 17% of them access more at the weekend (Brazil, 2017). The study by Tafesse (2015) points out that 85% of trademark postings were published in working days, which corroborates with the findings of Sprinklr (2015), which concluded that at the weekend there is lower participation of users. When analyzing on Facebook the effect of posting on consumer engagement, the Brooks (2010) study found that posts made on Friday were the most influential on user engagement, and that weekend posts little influence. In Cvijikj and Michahelles (2013), messages posted on weekdays had a positive influence on the number of comments, and negative influence on the amount of like; in Wagner, Baccarella and Voigt (2017), business day postings had a positive influence on the amount of comments. The researches of Chauhan and Pillai (2013) and Sabate et al. (2014) indicate that there is no significant difference in the number of likes and comments depending on the day of the week of the posting. Due to these divergences in the presented researches, it was decided to elaborate on the penultimate hypothesis of the study:

H7a: Facebook posts posted on weekdays influence the number of like users

H7b: Facebook posts posted on weekdays influence the number of comments by users

H7c: Facebook posts posted on weekdays influence the number of sharing by users

When it is a time of day, Facebook posts may occur during business hours, or outside of business hours. Sabate et al. (2014) state that the performance of Facebook posts is influenced by the time the message is published according to the user profile. Cvijikj and Michahelles (2013) state that when the message is published at the time the user is active, the probability of visualization is greater; consequently, the potential of user engagement. In general, in Brazil, it is considered that business hours include the morning daytime (from 06:00 a.m. to 12:00 p.m.) and afternoon (from 1:00 p.m. to 6:00 p.m.). The prime Internet time in Brazil is from 10 am to 8:59 pm (Brazil, 2016).

For Sabate et al. (2014) messages posted on Facebook between Monday and Thursday, from 8:00 am to 5:59 p.m., and on Friday from 8:00 p.m. to 2:59 p.m., influenced the amount of comments from users positively, but not the amount of like. Cvijikj and Michahelles (2013) concluded that messages published between 4:00 pm and 4:00 am negatively influenced like numbers and sharing but did not have a significant influence on the number of comments. Thus, the evidence on the subject is also inconclusive, and the last hypothesis of the study was formulated:

H8a: Facebook postings posted at peak times of the internet (10 am to 8:59 pm) influence the number of like users

H8b: Facebook posts posted during peak internet times influence user feedback

H8c: Facebook posts posted during peak internet time influence the number of sharing by users

3. Method

The research, quantitative and descriptive has as reference frame the 16 institutions of higher education located in the State of Santa Catarina (Brazil), belonging to the Association of Santa Catarina Educational Foundations (ASCEF). Of these, 11 are universities, and 5 are university centers. All the HEIs associated with ASCEF, the leading association of HEIs in Santa Catarina, participated in the study. The unit of analysis is the messages posted on the institutional page of HEIs, from August to October / 2017.

Data collection took place through direct, non-participant and structured observation, based on the verification and recording of data and evidence regarding the characteristics of IES postings on Facebook. A structured collection instrument organized in two blocks: data about the HEI and its page, and data about the posts. In the first, block, the data: IES name, Facebook page link, page creation time and a number of followers. In the second block, the data are: moment characteristics of the post, the type of media the type of content and the engagement of the users. Table 1 details the dimensions and variables measured.

Table 1:
Dimensions, analyzed variables and respective references

Dimensions	Variable	Levels	Description	References
Post time	Day of the week (IV)	0 = weekday 1 = weekend day	Message posting day	Brooks (2010); Sabate *et al.* (2014)
	Time of day (IV)	0 = 10:00 a.m. and 8:59 a.m. 1 = between 9:00 p.m. and 9:59 p.m.	Message Post Time	Brooks (2010); Sabate *et al.* (2014)
Type of media	Vivacity (IV)	0 = null 1 = low 2 = average 3 = high	Message containing text only Message with image only Message with events, text, images and links Message with gifs and videos	De Vries *et al.* (2012); Luarn et al. (2015)
	Interactivity (IV)	0 = null 1 = low 2 = average 3 = high	Contains only status and image Contains links directed to another website, blog or page Contains request to visit another page, comment and participate in contest / lottery Contains questioning / quiz	De Vries *et al.* (2012); Luarn et al. (2015
Type of content	Remuneration (IV)	0 = no remuneration 1 = with remuneration	Message contains discount, award or other financial incentive	Chua and Banerjee (2015); Luarn *et al.* (2015)
	Emotional (IV)	0 = no emotional appeal 1 = with emotional appeal	Message contains appeal or emotional stimulation	Malhotra et al. (2013); Swani *et al.* (2017)
	Entertainment (IV)	0 = no entertainment 1 = with entertainment	Message has humorous entertainment / video features	De Vries *et al.* (2012); Cvijikj and Michahelles (2013)
	Informational (IV)	0 = no informational focus 1 = with informational focus	Message aims to pass data / information on brands, products and activities of HEIs	De Vries *et al.* (2012); Cvijikj and Michahelles (2013)
Engagement metric	Comment (DV)	Amount	Number of message comments	Cvijikj and Michahelles (2013); Chua and Banerjee (2015)
	Sharing (DV)	Amount	Amount of message sharing	
	Like (DV)	Amount	Number of likes in the message	

In the assessment of the characteristics of the postings, the procedures of investigative triangulation (Flick, 2018) and intra- and inter-rater reliability were adopted (Haneline, & Young, 2009; Denzin, & Lincoln, 2011). As part of the research triangulation, different researchers (two professionals with experience in research and social media) performed the observation of each post separately. To obtain intra-examiner reliability, each investigator performed, two weeks after the first observation, another evaluation of the postings. The intra-examiner reliability was established by the agreement between the data collected in the two

moments of evaluation. The inter-rater reliability was established when the agreement between the data collected by the two researchers occurred. In case of doubts, a third (equally experienced) researcher was called to support the evaluation of the postings.

Data were analyzed using descriptive statistics techniques and OLS regression, in line with the recommendations of De Vries et al. (2012), Sabate et al. (2014) and Tafesse (2015). Due to the number of dummy variables, the data of the independent variables were transformed utilizing a logarithmic function. In the user engagement measurement formula, y1 = amount of like, y2 = number of comments and y3 = number of shares. As Cvijikj and Michahelles (2013) suggest, the variable number of comments, like and shares are non-absolute measures and were measured considering how many followers of the IES page at the time of publication. Thus, the values of these variables were weighted by the number of fans, as follows:

$$y_1 = \frac{N_{LikePost}}{N_{Seg}}; y_2 = \frac{N_{ComentPost}}{N_{Seg}}; y_3 = \frac{N_{SharePost}}{N_{Seg}},$$

The statistical model used in the multiple linear regression (OLS) of the influence of the factors measured on the user engagement was expressed as follows:

$$y_{ij} = \alpha + \exp\left(\sum_{f=1}^{3} \beta_f viva_{fj} + \sum_{g=1}^{3} \beta_g inte_{gj} + \beta_i info_j + \beta_e entr_j + \beta_d emo_j + \beta_r remu_j \right.$$
$$\left. + \beta_d day_j + \beta_h hour_j\right) + \varepsilon_{ij}$$

At where:

y1j, y2j or y3j - quantity of like from the IES post j, number of comments from the IES post j or number of shares from the IES post j;

vivia_fj - dummy variable that indicates if the characteristic vivacity f is present in the post of HEI j (base category = null vivacity);

inte_fj - dummy variable that indicates if the characteristic interactivity g is present in the post of the HEI j (base category = null interactivity);

info_j - dummy variable that measures whether the post of the HEI is informative (base category - without informational focus);

entr_j - dummy variable that measures whether the IES post already has entertainment characteristics (base category = no entertainment);

emo_j - dummy variable that indicates if the post of the HEI already has emotional appeal (category of base = without emotional appeal);

remu_j - dummy variable that indicates if the post of the IES already has some offer of remuneration (base category = without remuneration);

dia_j - dummy variable that indicates the day of the week that the posting of the IES j was carried out, whether business day or weekend;

hora_j - a dummy variable that indicates the time of day that the IES posting was carried out, whether peak time or between 9:00 pm and 9:59 p.m.;

ε_ij - variation of the error of the dependent variable y1j, y2j and y3j, respectively, which is not explained by the statistical model generated.

4 Analysis of results
4.1 Results of Hypotheses Tests
4.1.1 Results of influence factors on the amount of like

Table 2 presents the results of the multiple regression analysis between the independent variables and the number of like users. The results of the analysis of variance (ANOVA) indicate that the statistical model obtained presents satisfactory quality. The value of F is 14.871, and its significance is 0.00, allowing to reject the null hypothesis that the endogenous variable (amount of like) is independent of the exogenous variables (independent variables) analyzed.

In this regression model, there are six variables whose estimator (coefficient B) has a significant contribution: interactivity (Sig = 0.001), vivacity (Sig = 0.000), remuneration (Sig = 0.000), informational (Sig = 0.000), day of the week Sig = 0.042) and posting time (Sig = 0.000). The variable with the highest explanatory value is informational content, whose standardized coefficient is higher, followed by remunerated content and lively media. The variables interactivity, remuneration, informational, day of the week and time of postage present negative estimator, indicating the existence of an inverse relation with the amount of like; for the variable vivacity, the estimator is positive (0.092), meaning a direct association between posture with vivacity and amount of like.

Table 2:
Results of regression between independent and like variable

Model	Non-standardized coefficients			t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	IFV
Constant	-6,376	0,233		-27,377	0,000		
Day of the week	-0,232	0,114	-0,045	-2,033	0,042	0,971	1,029
Time of Day	-0,318	0,088	-0,08	-3,590	0,000	0,964	1,037
Vivacity	0,251	0,064	0,092	3,899	0,000	0,862	1,160
Interactivity	-0,174	0,054	-0,076	-3,207	0,001	0,857	1,167
Remuneration	-0,652	0,141	-0,11	-4,618	0,000	0,845	1,183
Entertainment	0,007	0,122	0,002	0,061	0,951	0,795	1,257
Informational	-0,603	0,082	-0,187	-7,336	0,000	0,744	1,344
Model Statistics	R^2 = .050 F = 14.871 Sig = .000						

4.1.2 Results of influence factors on the number of comments

Table 3 presents the results of the multiple regression between the independent variables and the number of comments. The ANOVA results indicate that the generated model also has satisfactory quality. The value of F is 17.057, and the p-value is <0.05 (Sigma 0.000). For the second regression model, there are five variables whose estimators have a significant contribution: interactivity (Sig = 0.000), vivacity (Sig = 0.000), remuneration (Sig = 0.001), informational (Sig = 0.000). The variable with the highest explanatory value is informational content, with the highest standardized B; followed by interactivity and liveliness. The variables vivacity and interactivity present a negative estimator, indicating an inverse relation with the number of comments; while the results of the remuneration, informational and entertainment

variables, which present a positive estimator, indicate the existence of a direct association with the number of comments.

Table 3:
Regression between independent variables and comments

Model	Non-standardized coefficients			t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	IFV
Constant	-2,634	0,679		-3,880	0,000		
Day of the week	0,4	0,333	0,027	1,201	0,230	0,971	1,029
Time of Day	0,296	0,258	0,026	1,148	0,251	0,964	1,037
Vivacity	-0,794	0,188	-0,099	-4,222	0,000	0,862	1,160
Interactivity	-0,875	0,158	-0,131	-5,537	0,000	0,857	1,167
Remuneration	1,318	0,412	0,076	3,200	0,001	0,845	1,183
Entertainment	0,718	0,356	0,049	2,017	0,044	0,795	1,257
Informational	1,684	0,24	0,178	7,032	0,000	0,744	1,344
Model Statistics	R^2 = .057 F = 17.057 Sig = .000						

4.1.3 Results of influence factors on the numbers of shares

Table 4 presents the results of the multiple regression between the independent variables and the number of shares. The ANOVA results indicate that the statistical model generated has satisfactory quality. The value of F is 4.875, and the significance is 0.000, allowing to reject the null hypothesis that the dependent variables are unrelated to the independent variables. For this model, there are four variables whose estimator has a significant contribution: vivacity (Sig = 0.019), informational (Sig = 0.000), entertainment (Sig = 0.000) and time of postage (Sig = 0.030). The variable with the highest explanatory value is entertainment content, followed by the informational variable and liveliness. The variables vivacity and time of day present a negative estimator, indicating an inverse relation with number of sharing. On the other hand, the informational content and entertainment variables present a positive estimator, indicating that there is a direct association with the amount of sharing.

Table 4:
Regression results between independent variables and shares

Model	Non-standardized coefficients			t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	IFV
Constant	-4,901	0,637		-7,694	0,000		
Day of the week	0,287	0,313	0,021	0,917	0,359	0,971	1,029
Time of Day	-0,526	0,242	-0,049	-2,172	0,030	0,964	1,037
Vivacity	-0,415	0,176	-0,057	-2,352	0,019	0,862	1,160
Interactivity	-0,199	0,148	-0,032	-1,345	0,179	0,857	1,167
Remuneration	-0,264	0,386	-0,017	-0,684	0,494	0,845	1,183
Entertainment	1,221	0,334	0,092	3,657	0,000	0,795	1,257
Informational	0,722	0,225	0,083	3,215	0,001	0,744	1,344
Model Statistics	R^2 = .017 F = 4.857 Sig = .000						

Table 5 summarizes the results of the hypothesis tests performed. In all, six hypotheses could not be confirmed, fifteen were accepted (some with positive relation and others negative) and three were excluded from the study (H4 - variable emotional content), in line with the recommendation of Hair et at. (2010) who postulated that variables with multicollinearity (FV greater than 10) are withdrawn because of the high correlation of this variable with other independent variables analyzed. Multicollinearity distorts the regression results and impairs the construction of the predictive model.

Table 5:
Synthesis of hypothesis test results

Hypothesis	Independent Variable	Dependent Variable		
		Like	**Comments**	**Share**
H_1	Media with interactivity	Accepted (-)	Accepted (-)	Not confirmed
H_2	Lively Media	Accepted (+)	Accepted (-)	Accepted (-)
H_3	Content remuneration	Accepted (-)	Accepted (+)	Not confirmed
H_4	Emotional content	Excluded	Excluded	Excluded
H_5	Informational content	Accepted (-)	Accepted (+)	Accepted (+)
H_6	Entertainment Content	Not confirmed	Accepted (+)	Accepted (+)
H_7	Weekday post week	Accepted (-)	Not confirmed	Not confirmed
H_8	Posting in peak hours	Accepted (-)	Not confirmed	Accepted (-)

4.2 Discussion of Results

This study analyzed a set of factors that influence the engagement of users on Facebook, in the context of higher education institutions in Brazil. Regarding posting factors, the results presented suggest that the postings on working days have a negative influence on the number of like, and no significant influence on the amount of comments or shares. In the study by Sabate et al. (2014), weekday postings had no significant influence on the number of like or comments. In Brookes (2010), weekend posts were less engaging than postings on business days. Thus, although these differences in results may be related to the cultural differences between the countries studied, it is believed that new studies in Brazil are necessary to confirm the findings of the present study.

An important social media marketing strategy is posting at the time most conducive to consumer engagement (Brookes, 2010, Chauhan, & Pillai, 2013). The results of the present study suggest that postings from 10:00 a.m. to 8:59 p.m. (peak of the internet in Brazil) have a negative influence on the amount of like and shared. In other words, postings at these times produce less engagement. These results corroborate the findings of Brookes (2010) on the subject, where postings between 00:00 and 12:00 (different time of the Internet peak in Brazil) obtained greater engagement, as well as the findings of Cvijikj and Michahelles (2013) , which analyzed the postings of dozens of brands from different countries, and concluded that posts outside the peak hours of the internet resulted in a greater amount of like and shares. Of course, this online consumer behavior may vary depending on the context studied and over time.

This study also examined the influence of media type factors on HEI postings. The results suggest that the vivacity has a positive influence on the amount of like, but a negative influence on the number of comments and shares. Postings with videos favor user engagement in the field of like, but not in comments and shares. The literature proposes that posts with lower levels of liveliness tend to have faster visualization and require less effort in user clicks and attention (De Vries et al., 2012; Cvijikj and Michahelles, 2013), which could explain this result favorable only in the quantity of like. This result corroborates the findings of Brookes (2010) and Sabate et al. (2014) on the subject. In Brookes (2010), image-only posts received more engagement than video postings. In Sabate et al. (2014), the posts with liveliness at low level had a positive influence on the amount of like; However, this result diverges from what was pointed out by Chua and Banerjee (2015), who presented a positive relationship between the level of alertness and the number of comments and sharing. Thus, it is considered that this subject still needs to be further empirically investigated in order to confirm the results - including because such differences may be a reflection of the number of posts observed, or of the category of products analyzed. It is also possible that this divergence can be explained by the difference in the duration of the videos analyzed.

As for the interactivity of the media, the results of this study indicate that posts with high interactivity have a negative influence on the number of like and comments, and no significant influence on the number of shares. With this, it can be interpreted that posts with strong

incentive to user interaction (e.g., with questions, games or contests) may cause discouragement to users' engagement in like and comments. However, these results diverge from propositions in the marketing literature (De Vries et al., 2012, Chua & Banerjee, 2015, Luarn et al., 2015). De Vries et al. (2012), for example, have stated that posts with low interactivity have a negative effect on engagement. Chua and Banerjee (2015) point out that posts with greater interactivity tend to get more engagement. Already, Luarn et al. (2015) affirm that posts with high interactivity generate greater engagement, both in like and comments and shares. Thus, although it is logical to think that too much incentive can have a negative effect on the willingness to interact, this topic also needs more empirical research.

On the influence of factors related to content type, the results presented in this study indicate that posts with remuneration content have a negative influence on the number of like and positive on the amount of comments, and no significant influence on the number of shares. This suggests that posts with a draw, promotion or discount favor the amount of comments, confirming the findings of Cvijikj and Michahelles (2013) and Chua and Banerjee (2015) on the subject. In Chua and Banerjee (2015), postings with pay attracted less like; and in Cvijikj and Michahelles (2013) the results show that posts with remuneration have a positive influence on the number of comments.

On the information content, the results of this study indicate that messages with information content negatively influence the amount of like, but positively the amount of comments and shares. One of the reasons consumers access social media is to get information, including postings and promotions (De Vries et al., 2012). Luarn et al. (2015) analyzed posts from 10 brands on Facebook and concluded that users expressed greater engagement in informational posts than in other types of content. In Cvijikj and Michahelles (2013), the informational posting had a positive influence on the number of comments. However, in De Vries et al. (2012) these posts did not have a significant influence on the amount of like or comments. One possible explanation is that Brazilian Internet users are more likely to seek news from online social media (Brazil, 2017) or, as Leeflang et al. (2014), that the students of the HEIs researched to have the habit of accessing social media to obtain information and interact with the institution.

About entertainment content, the results presented indicate that posts with entertainment content have a positive influence on the number of comments and sharing. This finding corroborates with Cvijikj and Michahelles (2013), whose study revealed the positive influence of posts with entertainment on user engagement, both in terms of comments and shares. It also corroborates the findings of Luarn et al. (2015) who postulate that posts with entertainment content lead to a greater number of shares. Thus, such evidence indicates that posts with entertainment content tend to influence user engagement in terms of comments and sharing positively. This may occur because such postings tend to be perceived as attractive and supportive (Muntinga, Moorman, & Smit, 2011).

5. Final Remarks

The study contributed to increasing the knowledge about the topic, as it presents new empirical evidence on the characteristics of Facebook postings of higher education institutions in Brazil, a context with a lack of empirical studies (Assimakopoulos et al., 2017). At the international level, the only study on the subject in the context of higher education institutions is that of Chauhan and Pillai (2013) in India. The present study presents the most present characteristics in the postings of the HEIs analyzed, with emphasis on the liveliness and interactivity of the media, and the information content of the posts. The study stands out by examining a set of factors that influence Facebook engagement, and by confirming that factors related to post features influence user engagement, including aspects of the type of media, content type, and moment of posting. The findings presented here contribute to confirm the

results of studies and theoretical propositions of authors such as De Vries et al. (2012), Cvijikj and Michahelles (2013), Sabate et al. (2014), Chua and Banerjee (2015) and Luarn et al. (2015) on the subject.

Another critical point is the proposition and test of a theoretical predictive model for the evaluation of user engagement on Facebook, based on different engagement metrics. A model containing a set of eight influence factors was presented, expanding the previous theoretical models (De Vries et al., 2012, Cvijikj, Michahelles, 2013, Luarn et al., 2015). By considering both soft (based on semantics and message interpretation) and hard (quantifiable and objective) variables in the model tested, in line with the recommendations of Sabate et al. (2014), the results presented here contribute to the advancement of theoretical knowledge and can contribute to improve the practice of HEI analyzed.

It is proposed that future studies be performed in the Brazilian and international context, but a more representative sampling process is recommended - that is, it involves a more significant number of observations, a more extended period of data collection and a random selection of the analyzed posts. It is also recommended to extend the study to HEIs from different states of the country, both public and private. It is also suggested to improve the theoretical model tested here, including other non-considered search variables such as message size and the practice of sponsored (paid) posts.

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