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Empirical Investigation on Computer Self-Efficacy Influencing the Intention to Use Facebook

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Abstract

Environments of social networking sites (SNS) allow individuals to build an online public profile within a bounded system that aims for relationships with other users (called "friends"). Even though the growth of access to SNS has been lower than the average growth of access to the Internet, SNS are increasingly incorporated into the routine of Brazilian people. In order to emphasize the user's point of view, this study is based on the intention to use Facebook from an individual perception. So the objective of this study is to examine how computer self-efficacy (CSE) may influence the intention to use Facebook. We conducted this study in three phases: (1) exploratory procedures, which were developed from a review of the literature in order to refine the specification of the constructs of our research model; (2) definition of the instrument and data collection, which were then used to analyze the variables of each construct; and (3) an empirical investigation, which was performed with 161 Brazilian users of Facebook to assume an effective treatment of our research model. Our findings highlighted that there is a statistically positive relationship of influence between general and specific CSE and intention to use Facebook. Finally, we may contribute by suggesting that predictions of CSE are strongly influenced by the user's experience.

Keywords

Computer Self-Efficacy, Intention to Use, Social Networking Sites and Facebook.

1. Introduction

Environments of social networking sites (SNS) allow individuals to build an online public profile within a bounded system that aims for relationships with other users (called "friends") with whom they share information such as photos and videos (Boyd & Ellison, 2007). These environments, mediated by Web 2.0, represent the diffusion of new features on the Internet as a platform, enabling the socialization of content (Cheung & Lee, 2010).

Even though the growth of access to SNS has been lower than the average growth of access to the Internet, the SNS are increasingly incorporated into the routine of Brazilian people. According to statistics in 2011, over 70% of Internet users had the daily habit of "surfing" on these sites, representing quantitatively 44.9 million people (IBOPE, 2011). Moreover, in 2012, those numbers rose to a total of 48.3 million users, an increase of 8% (IBOPE, 2012).

Facebook, an SNS launched in 2004, which by early 2009 had become the largest social networking site in the world, has attracted attention in the fields of scientific and academic research on information and communication technology (ICT) and social sciences. Facebook

has become a phenomenon in the Brazilian online context, where symbolically the second largest number of Facebook users (51 million) is located, according to the statistics site socialbakers.com. Based on this scenario of Facebook as a social phenomenon, the present study presents a timely and representative research proposal, using perceptions of Brazilians as a sample of potential users of Facebook.

Exploratory findings from this study indicate that, even in the face of a significant amount of recent publications about the intention to use Facebook, there is a clear gap in recent literature. Ergo this study provides an opportunity to make a contribution towards broaching the following research question: *how may the intention to use Facebook be influenced by users' perceptions of general and specific computer self-efficacy?* In order to answer that, this study develops a model consisting of a set of hypotheses and presents the results of an empirical research conducted among Brazilian users of Facebook.

2. Theoretical Background

2.1 Intention to Use Social Networking Sites

The intention to use a new technology depends on individual reasons and perceived social pressure (Cheung & Lee, 2010). Decision-makers are more likely to develop their own intended use, motivated by their personal attitudes, while subjective norms encourage them to take a decision accordingly (Davis et al., 1992). Knowing that SNS are virtual spaces for social interaction and a variety of communicators (Jones, 1997), Hsieh and Keil (2008) highlight that the provision of access and the conditions of using SNS are the first steps, to be complemented thereafter by aspects that shape the individual's motivations in seeking continuous use.

Prolonged and effective participation of individuals in communities of practice facilitates the occurrence of interactions, encouraging engagement in activities (Wenger & Snyder, 2000) that contribute to the intention to use (Iriberri & Leroy, 2009) and seeking resources to enable individuals to develop skills, thereby resulting in users' continuance (Cheung & Lee, 2010).
In order to emphasize the user's point of view, this study is based on the intention to use Facebook from an individual perception (exclusively). An environment of prolonged involvement in relation to a specific common goal usually provides high levels of involvement with the network, transforming visitors into members, members into collaborators, and collaborators into "evangelists" who act to promote the network (Kim, 2000).

2.2 Computer Self-Efficacy (CSE)

Self-efficacy is a belief in one's capabilities to organize and to execute the course of action required to attain a goal (Bandura, 1997). Among the individual factors examined in past research, self-efficacy may be identified as a key factor for the association between learning performance and the ability to make effective and continuous use (Hasan, 2003). According to Barling and Beattie (1983), self-efficacy plays a crucial role in the individual's motivation, influencing decisions for which persistence and effort are required.

With the intention of developing a scale for self-efficacy focused on the use of computers, Compeau and Higgins (1995) introduced a computational definition of self-efficacy (called "computer self-efficacy"). The term computer self-efficacy (CSE), when related to the broad

domain of computer use, is called general computer self-efficacy (GCSE) – defined as the individual's belief in his ability to use the computer and its related technologies – and, when related to a specific use of any computer-mediated technology, it is called specific computer self-efficacy (SCSE) – defined as a context-specific belief (Compeau & Higgins, 1995).

Following the idea of Compeau and Higgins (1995), other studies have established a certain distinction between GCSE and SCSE (Agarwal et al., 2000; Marakas et al., 1998). However, although most studies of CSE concentrate on each of these dimensions (Wang et al., 2008), there are some other studies, in the minority, which investigate the relationship between the antecedents and consequences of each dimension (Agarwal et al., 2000). The possibility of this relationship is explored in our research model (see next section).

3. Hypothesis Development
The complete research model (see Figure 1) explores the role of reflective constructs. The description of the model and its variables, beyond the due justifications for the research hypotheses, will be addressed in the subsequent sections.
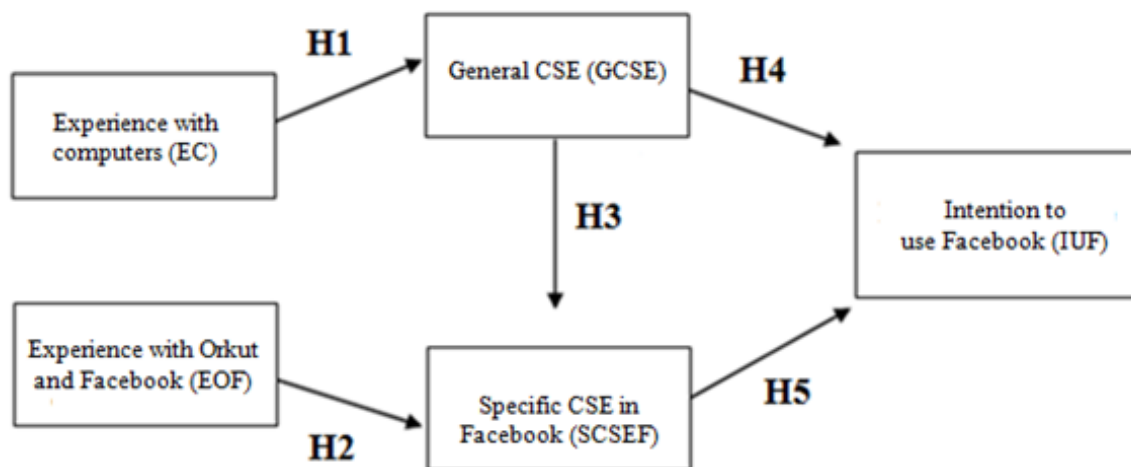

Figure 1: The Research Model

3.1 Antecedents of Computer Self-Efficacy
Based on a literature review, we highlight that there is a set of three antecedents that describe the sources of influence on CSE, which are: (1) social influence, corresponding to social persuasions, (2) the psychological state of the individual (for example, anxiety), and (3) experience with computers and related technologies (Bandura, 1997; Henry & Stone, 1994; Igbaria & Iivari, 1995). Accordingly, this study focuses on the third factor because experience is considered to be the most critical source of information about an individual's ability to perform tasks (Bandura, 1997), affected by attempts that are either successes or failures.

So we decided to investigate the influence of user experience on CSE. Next, we distinguished "Experience with Computers (EC)" from "Experience with Orkut and Facebook (EOF)". There are two reasons for this. Firstly, as an antecedent of general CSE (GCSE), the construct EC refers to access and effective actions to use computers reflecting the varying levels of CSE (Compeau & Higgins, 1995). Successful EC might point to the emergence of high levels of GCSE, whereas failed experiments might result otherwise (Wang et al., 2008).

Secondly, early in 2004 and 2005, while Facebook only aimed to connect students from a university in the United States to their colleagues from different institutions (Larue, 2012), Orkut's statistics indicated Brazil to be the country with the highest proportion of users on its system (63.1%) (Manssour & Bellini, 2005). And, in 2008, the amount of Orkut users was around 60% of the entire Brazilian population, who were accessing the Internet sporadically (Felitti, 2008). Furthermore, because Facebook has only become popular in Brazil in 2011, we decided to highlight that the specific computer self-efficacy in Facebook (SCSEF) is preceded by variations depending on the influence of past experiences with Orkut, which was developed by Orkut Buyukkokten in 2004.Orkut enables people to build personal connections online and represent them pictorially, as well as to forge or join communities driven by topics of interest. Moreover, from analysis of the last few years, Orkut may arguably prove to be representative of the Brazilian intention to use SNS and current experiences with Facebook, which is the latest phenomenon in Brazil. Both facts resulted in the formulation of the construct EOF ("Experience with Orkut and Facebook"). Therefore, the following hypotheses are proposed:

H1: Experience with computers is positively related to general CSE.
H2: Experience with Orkut and Facebook is positively related to specific CSE in Facebook.

3.2 General CSE and Specific CSE in Facebook

As presented in section 2.2, the term computer self-efficacy (CSE), when related to the domain of computer use, is called general CSE, and when related to a specific use of any computer-mediated technology is called specific CSE (Compeau & Higgins, 1995). It is noteworthy that the literature has been developed to support the search for a better understanding of the relationship between these two dimensions of CSE (Wang et al., 2008). Marakas et al. (1998) treated general CSE as a collection of all specific CSE accumulated over time. Consequently, the establishment of the specific CSE and its levels of experience may contribute to the formation of another specific CSE (Wang et al., 2008).

Thus, the concept of specific computer self-efficacy in Facebook (SCSEF) refers to individuals' perception and belief that they may operate effectively on Facebook, including demonstrating a high level of familiarity with this technology. Based on this assumption, consistent contributions from previous studies affirm that most people with a high level of general CSE (GCSE) also have a high level of specific CSE in Facebook.
We propose the following hypothesis:

H3: General CSE is positively related to specific CSE in Facebook.

3.3 GCSE and SCSEF as Antecedents of Intention to Use Facebook

After clarifying the perceptions of GCSE and SCSEF, it is important to understand how people differentiate their assessments of CSE and how these differences may influence their intention to use Facebook, making them motivated to continue using the Facebook technology and so to facilitate their ability to use it effectively.

According to Tzeng (2009), usability is enhanced by the individual's confidence, which reflects his or her ability to perform the intended behavior that is necessary to effectively use a technology. As a result, we believe that there is a positive relationship between the individual's CSE and the intention to use SNS (Torkzadeh & Van Dyke, 2001).

Thus, this study emphasizes that individuals with a higher level of computer self-efficacy

tend to have a positive intention to use SNS (Hasan, 2003). Based on Hasan's evidence, we believe that, regardless of the type of action performed, the increase of CSE becomes evident from the moment that the individual has the intention to use Facebook (IUF) in relation to his or her interests and desire to access and use this kind of SNS.

Therefore, the following hypotheses are proposed:

H4: General CSE is positively related to intention to use Facebook.
H5: Specific CSE in Facebook is positively related to intention to use Facebook.

4. Research Methodology

This study was conducted in three phases: (1) exploratory procedures, (2) definition of the instrument and data collection, (3) and empirical investigation. The exploratory procedures were developed from a review of the available literature in scientific databases in order to refine the specification of the concepts of intention to use Facebook and computer self-efficacy (CSE), which allowed us to view how those themes are presented in current academic research. The results of this phase enabled the conceptualization and contextualization of the constructs and their relationships in the research model (Figure 1).

The generation of items for the purpose of this study resulted in 18 items distributed in the constructs of analysis previously outlined in the research model. Besides following the suitability of the semantic dimensions (content validity) as a key criterion for selection of these items, we sought to initially provide content validity (also known as logical validity), in which we analyzed the degree of relevance and representativeness of each item. Then we asked other researchers (faculty members and graduate students) to examine the face validity by means of the evaluation of the preliminary set of items – including explanations of the purpose and concepts of each item. By considering other studies developed with similar purposes to those of our study, we decided to initially use a 5-point Likert scale – point #1 indicating total disagreement and point #5 indicating total agreement.

After validating our instrument based on procedures prescribed in Churchill (1979), we performed a pre-test with a sample of 13 respondents who represented a preliminary set of Brazilian users of Facebook. After the necessary adjustments were made, the instrument was consolidated to its application in the field, resulting in the following setting:

- Universe data: the approximate size of this universe is 51 million Brazilian Facebook users (Socialbakers, 2012);
- Selection of the sample: a non-probability sample of 185 Brazilian users of Facebook was selected for reasons of convenience and accessibility, and 161 of them were validated. Our sample consisted only of Brazilian Facebook users because Facebook is being increasingly incorporated into the routine of the Brazilian people, as may be seen from the dense documentation on Brazilian Facebook use in daily newspapers, weekly magazines, and web sites with up-to-date statistics;
- Data collection method: data collection was run by the online software LimeSurvey. The survey was conducted in June and July 2012. To increase the chances of success of the data collection method (quality of answers), we used direct communication with prospective respondents within a strategy of "participant observation" to provide and maintain good relations with the sample.

After consolidating the data collected, we proceeded to the initial analysis of missing values and outliers. Then, the variables of the constructs were subjected to four sets of analysis: (1) exploratory analysis, (2) confirmatory analysis, (3) analysis of convergent validity of the research model and (3) final analysis of the research model by a partial least squares regression (PLS regression). We used SPSS and SmartPLS to support those analyses.

5. Data Analysis

5.1 Sample description
We analyzed the profile of the 161 respondents, of which 90 subjects were male (56%) and 71 female (44%). In terms of age, and given the fact that 35% of the total Brazilian users of Facebook are aged between 18 and 25 years (Nielsen, 2012), we registered the predominance of this age group, totalling 65% of respondents, thus confirming the actual conditions of the universe studied. When it comes to the frequency of monthly access, we highlight that 90% of respondents claim to access Facebook more than 20 times per month. And when we asked about how long the respondent had been a member of Facebook, 56.5% of the respondents answered that they had been accessing Facebook for about a year, the same period during which Facebook grew by approximately 300% in Brazil (Nickburcher, 2012). Note that all respondents (100%) were also Orkut users.

5.2 Exploratory analysis
In order to assess the appropriateness of factor analysis, we used the Kaiser–Mayer–Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity (BTS). Firstly, for the KMO test, the literature requires values greater than 0.5 for a satisfactory factor analysis and a KMO near to 1.0 indicates that the factor analysis is perfectly suited for the treatment of data (Hair et al., 1998). Secondly, for the BTS test, a p-value <0.00 was expected to indicate that the data do not produce an identity matrix (correlation) that is acceptable for factor analysis.

After the KMO and BTS tests proved that the database was appropriate for factor analysis, an assessment was conducted to confirm whether the eigenvalue was greater than or equal to 1 (one) - the number of factors to be extracted is decided according to the eigenvalue criterion. Furthermore, each construct needs to be over 50% in statistical power of the total variance (Hair et al., 1998). While checking the factorial scores associated with each variable that is conceptually consistent with the statistically extracted factor, the variables needs to present communalities (h²) greater than 0.20, resulting in the following:

- *EC*: no removal of items, so the same three initial items were confirmed. The KMO was 0.745, and the BTS test yielded a p-value <0.001. The minimum factorial score was 0.723 and the maximum was 0.812. The three factors together accounted for 62% of the total variance. The minimum correlation was 0.555 and the communalities greater than 0.20.
- *EOF:* no removal of items, so the same three initial items were confirmed. The KMO was 0.705, and the BTS test yielded a p-value <0.001. The minimum factorial score was 0.520 and the maximum was 0.873. The three factors together accounted for 51% of the total variance. The minimum correlation was 0.290 and the communalities greater than 0.20.
- *GCSE:* an item was removed, and the three other items remained to the end. The KMO

was 0.710, and the BTS test yielded a p-value <0.001. The minimum factorial score was 0.589 and the maximum was 0.708. The three factors together accounted for 50% of the total variance. The minimum correlation was 0.250 and the communalities greater than 0.20.

- *SCSEF:* no removal of items, so the same four initial items were confirmed. The KMO was 0.774, and the BTS test yielded a p-value <0.001. The minimum factorial score was 0.739 and the maximum was 0.794. The four factors together accounted for 58% of the total variance. The minimum correlation was 0.424 and the communalities greater than 0.20.

- *IUF:* no removal of items, so the same four initial items were confirmed. The KMO was 0.751, and the BTS test yielded a p-value <0.001. The minimum factorial score was 0.681 and the maximum was 0.763. The four factors together accounted for 55% of the total variance. The minimum correlation was 0.340 and the communalities greater than 0.20.

5.3 Confirmatory analysis

Even after the exploratory factor analysis had helped to reduce the dimensionality of variables, providing a strong analytical foundation as well as an empirically and conceptually consistent grouping of the variables which compose each construct, we continued this study to measure the structure of our research model because the exploratory factor analysis did not extract the base model for testing the hypotheses.

Therefore, evaluating the final adjusted research model, we found that the values of the t-value, derived from bootstrapping procedures, confirm the linking of each variable to its respective constructs - Hair et al. (1998) require a t-value of bootstrapping greater than 1.96. Regarding the factorial score (defined margin above 0.50) of each variable, we observed that the variable GCSE4 ("Normally I am curious to use new tools on the computer") exhibited a low score, which confirms the results of exploratory factor analysis. The exploratory factor analysis placed the variable GCSE4 as inadequate for the construct in question, exposing the necessity of removing it from the model.

In general, the results reaffirmed the improvement of the research model as well the model derived from the exploratory factor analysis. The other variables indicated compliance with their respective constructs, proving to be adequate for the purpose of our study (see Table 1).

Const.	Item	Score	t-value of bootstrapping
EOF1	Familiarity with Orkut facilitates the use of Facebook.	0.87	4.32
EOF2	When I am using Facebook, I remember my experiences with Orkut.	0.65	2.11
EOF3	I consider myself as knowledgeable about Facebook as I was about Orkut.	0.52	1.81
EC1	I consider myself an expert computer user.	0.81	8.22
EC2	I think I have enough experience to use a computer.	0.72	7.14
EC3	I feel more prepared to use a computer compared to years ago.	0.75	8.19
GCSE1	I am able to use the computer and its related technologies.	0.59	1.90
GCSE2	I feel safe using computer tools.	0.71	4.27
GCSE3	I consider myself motivated to use technology day after day.	0.65	3.83
SCSEF1	I think my skills for using Facebook are good enough.	0.79	8.03
SCSEF2	I am familiar with Facebook.	0.74	7.50
SCSEF3	I believe I can perform my actions in Facebook well.	0.74	7.27
SCSEF4	I am able to understand any new change in Facebook.	0.76	7.92

IUF1	I consider the use of Facebook a pleasant experience.	0.68	6.01
IUF2	I am excited about being part of Facebook.	0.76	7.24
IUF3	I recognize the importance of accessing Facebook for my life.	0.75	7.23
IUF4	I have a deep interest in accessing Facebook frequently.	0.75	7.10

Table 1: Confirmatory factor analysis

5.5 Convergent validity

Besides developing content validity and face validity, we were concerned to validate the model by taking a convergent validity. First, convergent validity occurred by analyzing the value of composite reliability (CR) and average variance extracted (AVE) of the variables which compose each construct (Hair et al., 1998), which had already been set by the confirmatory factor analysis procedure. As shown in Table 2, CR values range from 0.72 to 0.87, which are higher than the recommended value of 0.7 (Chin, 1998). AVE values range from 0.55 to 0.68, which are above the acceptable value of 0.5 (Fornell & Larcker, 1981).

In addition, we analyzed the internal consistency of each of the constructs measured by Cronbach's alpha coefficient. The generally agreed upon value of Cronbach's alpha is 0.70 (Hair et al., 1998). As shown in Table 2, the alpha values range from 0.68 to 0.75. Consequently, we have support for the construct reliability.

Construct	AVE	Cronbach's alpha	CR
EOF	0.55	0.68	0.72
EC	0.68	0.75	0.87
GCSE	0.59	0.70	0.80
SCSEF	0.67	0.75	0.86
IUF	0.62	0.72	0.83

Table 2: AVE, Cronbach's alpha and Composite Reliability

Through the procedures of convergent validity of the model, we emphasize that the values of the construct EO did not comply with the requirement of Cronbach's alpha. However, we opted to retain it in the final model because both the CR and AVE values were significant and beyond the fact of the relevance of its content to the purpose of the study.

5.6 Final analysis

Based on the partial least squares regression, the summary of the hypothesis tests of the research model is shown in Table 3. We can see that all hypotheses were accepted, with p-values varying below the significance level of 1% and 5% (Chin, 1998). As theoretically estimated, critical results were obtained for hypotheses H1 and H2, which added necessary evidence to the argument that experience with computers reflects variations in GCSE and that experience with Orkut and Facebook reflects variations in SCESF.

Furthermore, the prediction that GCSE reflects variation in SCSEF (hypothesis H3) is largely confirmed. In addition, regarding the acceptance of hypothesis H5 $p < 0.01$ (t-value = 4.3) and hypothesis H4 $p < 0.05$ (t-value = 1.51), we highlight these results as the necessary evidence to affirm that the SCSEF reflects more powerful variations in IUF compared with GCSE, which ends up reflecting variations in IUF on a significance level of 5%.

Hypothesis	Path Estimate	Standard Error	t-value	Significance	Supported
H1: EC → GCSE	0.32	0,057	5,62	<0,01	Yes
H2: EOF → SCSEF	0.15	0,051	2,00	<0,05	Yes
H3: GCSE → SCSEF	0.25	0,047	3,19	<0,01	Yes
H4: GCSE → IUF	0.10	0,067	1,52	<0,05	Yes
H5: SCSEF → IUF	0.31	0,072	4,30	<0,01	Yes

Table 3: Summary of Hypotheses Testing

6. Discussion and conclusions

The main objective of this study is to explore *how both general and specific computer self-efficacy influence the intention to use Facebook*, taking as a specific case the reality of Brazilian users of Facebook, and drawing on empirical evidence to assume an effective treatment of the research model. Our findings highlight that there is a statistically positive relationship of influence between general and specific CSE and intention to use Facebook.

As a result, we may contribute to the CSE literature by suggesting that predictions of CSE show the strong influence of experience in the use of Facebook and Orkut. Additionally, this study also contributes to research methodology by formulating and validating measures for the construct specific CSE in Orkut and Facebook – according to Marakas et al. (2007), insufficient evidence has yet appeared in literature to establish how to measure this construct. As to the contributions to business practice (assuming that SNS may have commercial appeal - Hagel & Armstrong, 1997), we understood that the provision of collaborative platforms could be performed with a reasonable probability of return on investment and level of success in terms of management and user satisfaction. With this purpose in focus, it is necessary to develop a deeper knowledge about whether consumers believe that they have the ability to use the new functions.

Although the empirical results are perfect for the conceptual model of research (as only one of the 18 items proved to be irrelevant or was not grouped into the theoretically defined constructs), we should beware. First, the formulation of each item showed a small conceptual and terminological variation within each construct, which naturally favors the grouping of phenomena by the respondents. Second, we must not ignore that fact that some items did not show high correlations with other items of their respective construct, although this may be due to the probable failure of the survey to cover all the possibilities of variance of each construct. Finally, caution should be taken when generalizing the results for application to other contexts, as is the case of the United States, to recognize the limitations of applicability. Opportunities for future research should also be explored. Our first suggestion is to apply the method of social network analysis (Wasserman & Faust, 1994) to estimate the presence and involvement of "social influence" as sources of influence of general and specific CSE. Moreover, it is also necessary to understand the events that influence the non- intention to use Facebook.

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