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The information technology and the university: use of educational applications by students

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ABSTRACT

This research aimed to identify what are the factors that lead university students to the intention of using applications offered by educational institutions, through a study of students who already have the educational application installed. The applications offer facilities such as the search of collections, reservations and loans in the library, access to class schedule, among other options. A survey was performed with 133 students who used the educational application studied and the analysis was developed by structural equation models. The results show that the aid in the daily academic activities, the provided hedonic motivations and the habit positively influence the intention of use. The technical part involved in this procedure (download, installation and search for information) and the influence of other people did not influence use. The study broadens the understanding of the aspects related to educational applications, thus enabling the use of its results to make decisions on the provision and development of apps for this purpose.

KEYWORDS: Applications. University Students. Technological Adoption. Structural Equations.

INTRODUCTION

Social and business relations have undergone profound changes because of the use of information and communication technologies (ICT), transforming the notion of time and space (COLOMBO; CORTEZIA, 2014). The possibility of connectivity in any location and time changes the form of communication between enterprises and their stakeholders. Issues involving mobility permeate business actions, which seek to take advantage of technological trends, searching for new results in their business.

Wireless networks and access to data and information through mobile devices are presented as an alternative for common interactivity between enterprises (SACCOL; REINHARD, 2007). Since the invention of smartphones, mobile phone technology has changed quickly (PATERSON; LOW, 2011).

The demand for smartphones and tablets is greatly increasing, and this is due to their different functions and popularity. With these devices it is possible to perform instant messaging over the Internet, download mobile applications (PARK; CHEN, 2007).

Because of the growing connectivity via wireless devices, it is necessary to adapt the technologies to various situations (CENZI et al., 2008), by applications (apps), which are developed as a tool for the interaction of enterprises with customers, working as software, performing various tasks and increasing the interactivity of mobile devices.

In education, ICT has provided new opportunities for the teaching of individuals, allowing for more information and therefore more knowledge, contributing to the advancement of teaching (COSTA; SANTOS; BARBOSA, 2015).

With the proliferation of mobile applications used in smartphones, educational institutions are aiming to make applications, offering content of value and quality for students. The applications offer facilities to students, such as, for example: the search of collections, reservations and loans in a library, access to class schedule, access to course material provided by professors and university news, among others.

In this context, this research aims to understand the factors that lead students to the intention of downloading and using university applications.

The overall objective of the study may be translated by the research question: What are the factors that lead university students that have already the application to the intention of using an application for smartphone provided by the educational institution?

The justification for conducting the research is its practical and theoretical contributions.

From a practical point of view, the results can help professors and educational institutions to understand the benefits of the use of ICTs at the university, thus facilitating the dissemination of information and expanding scientific and technological knowledge.

From an academic point of view, this study aims to adapt and test models recognized in the international literature for a particular contexto, and not yet explored, adding new constructs and increasing the understanding on new

technologies. The new model featured contributes to studies in administration, technology and education, with perceptions on the behavior of the individual in the face of new technologies.

THEORETICAL REFERENCE

MOBILE INFORMATION TECHNOLOGIES AND APPLICATIONS

Mobile and wireless information technologies (MWIT) discuss topics such as mobile phones, smartphones, tablets, wireless networks, among other technologies (SACCOL; MANICA; CALDERWOOD, 2011).

Welin-Berger (2004) states that the introduction of MWIT enables improvement in processes, provides better speed in the access to information, reduces errors and contributes to a better planning, from a business point of view.

From the perspective of the consumer, Saccol, Manica and Calderwood (2011) present gains from the availability of a mobile communication channel to meet the demands of the mobile environment and also as a tool for information searches, generating reduced administrative and logistics tasks and efficiency in the field work.

The functionality of an information device depends on its communication interface (software), composed by operating instruction sets used to control the processing of technologies (LAUDON; LAUDON, 2004).

The term mobile application is used to classify the software used on mobile devices (CENZI et al., 2008).

The last decades have been marked by an accelerated dissemination of MWIT (SACCOL; MANICA; CALDERWOOD, 2011). Usability and adherence of citizens to applications can be verified in the daily routine of a user of mobile applications, who uses smartphones to, for example, listen to music, chat via Skype and watch movies (ANDERSON; WOLFF, 2010).

According to a research conducted by Gartner (2013), the number of downloads of applications in 2013 was estimated at 102 billion, generating revenues of $ 26 billion, compared to $ 18 billion in 2012. The forecast is that by 2017, 268 billion apps will be downloaded, with revenue of $ 77 billion.

These numbers highlight the importance and growth of this market.

This article used as an information tool the study on smartphones and tablets, along with the use of applications as software, within the university context.

RESEARCH STUDIES ON TECHNOLOGY ADOPTION

According to Benbasat and Barki (2007), information systems research has as one of the most mature streams the understanding of the use of information technology and individual acceptance. There are several theoretical models employed to explain technology acceptance and use (NEUFELD; DONG; HIGGINS,

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2007, CHANG et al., 2007, GUPTA; DASGUPTA; GUPTA, 2008, SUN; BHATTACHERJEE; MA, 2009).

One of the main reference in the studies of technology adoption is the Unified Theory of Acceptance and Use of Technology (UTAUT) (NEUFELD et al., 2007). The theory has served as a baseline model and has been applied to the study of a variety of technologies in both non-organizational and organizational settings (NEUFELD et al., 2007).

Venkatesh et al. (2003) developed the UTAUT model through a unification of eight previous models, containing four constructs considered as direct determinants of the technology use behavior. The constructs presented in the UTAUT are: Performance Expectancy, Effort Expectancy, Social influence and Facilitating Conditions.

Nearly a decade after the UTAUT, Venkatesh, Thong and Xu (2012) presented UTAUT 2, which would be an improvement over the previous model. The first version was developed for the organizational context, while the second version was developed for the consumer context. In addition to the constructs part of the UTAUT, the new theory introduces three new constructs: Hedonic Motivation, Price Value and Habit.

In the model, the Performance Expectancy assess to what extent the individuals believe that the use of the system will contribute to the performance in their work, and the Effort Expectancy is the perspective of easiness of individuals in relation to the use of the system.

Social influence is defined as the intensity to which individuals understand the influence important persons in their social circle exercise on them to use a technology. Facilitating Conditions are understood as the perception of the individual about the existence of a technical and organizational infrastructure for the use of the system, and the Hedonic Motivation is defined as the fun or pleasure in using a technology.

The Price Value is the comparison by the consumer of the perceived benefit with the use of technology, including advantages in relation to monetary cost. The last factor, Habit is defined as the extent to which individuals tend to run automatic behaviors because of their learning. (Venkatesh et al., 2012).

The authors highlight as moderators in the model Age, Gender and Experience.

The hypotheses of this study are based and adapted from the studies of Venkatesh et al. (2003) and Venkatesh et al. (2012)

The first hypothesis of this study is related to the construct Performance Expectancy of the UTAUT. The hypothesis formulated is that the student believes that the use of educational applications can assist in daily academic activities, speed up the study activities and be useful to accompany the lessons.

Hypothesis 1: Performance expectancy positively influences the Intention to Use educational applications.

Effort Expectancy and Social Influences are constructs used in most studies of technological adoption and are present in UTAUT and UTAUT 2 with high explanatory value. Therefore, they were considered in the model of this study to be tested.

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Thus, it is understood that the student that can easily acquire, install and search information on apps would have greater intention to use the applications.

Hypothesis 2: Effort expectancy positively influences the Intention to Use educational applications.

In relation to Social Influences, the hypothesis presented is that if persons who influence the behavior of the student would recommend it, there would be greater intention to use the apps.

Hypothesis 3: Social influence positively influences the Intention to Use educational applications.

Hedonic Motivation can be defined as the fun or pleasure in using technology (VENKATESH; THONG; XU, 2012). Some researchers of consumer behavior and information systems have used constructs related to hedonic motivation in their studies, and the results of the variable are relevant both in the consumption and in the use of IT (BROWN; VENKATESH, 2005; HOLBROOK; HIRSCHMAN, 1982; NYSVEEN; PEDERSEN; THORBJORNSEN, 2005; VAN DER HEIJDEN, 2004). Thus, Hypothesis 4 of the study is related to Hedonic Motivation, which understands that students that find the use of apps fun and pleasurable will be influenced to use them.

Hypothesis 4: Hedonic motivations positively influence the Intention to Use educational applications.

Habit has been used in studies of the technology area with positive results, as in the studies of Malhotra, Sung and Agarwal (2004), Limayem, Hirt and Cheung (2007) and Moraes et al. (2014). Venkatesh et al. (2012) also considered the construct in UTAUT 2 and the result obtained was high. For the context of this study, Habit was considered important, constituting Hypothesis 5. Thus, the hypothesis is that the student who has the habit of using apps to study, watch videos and get the content of courses will be more influenced to use educational applications.

Hypothesis 5: Habit positively influences the Intention to Use educational applications.

In the version developed for the present research, the construct Facilitating Conditions was not used, since the respondents were students who have already used the application. Another construct not added to the model was Value Price because the application was free, not involving financial issues in that case.

METODOLOGY

A quantitative methodology was used for the development of the research. For analysis and verification of the hypotheses and proposed model, a survey was carried out with 133 students who had already used educational applications. The students were from the Business Administration course of a private university, who had the application available for use. The average age was 23 years, fifty percent male and fifty percent female, all residents of the city of São Paulo.

The preliminary questionnaire was validated by a group composed of fours experts in the area of information technology who had used models of technological adoption. The scales were adapted from previous studies.

The questions were statements that users responded in a Likert scale based on five levels, ranging from the extremes Strongly Disagree to Strongly Agree.

Data analysis was performed by means of a multivariate analysis technique using structural equation modeling, which is suitable for situations of simultaneous multiple relationships (CHIN; MARCOLIN; NEWSTED, 2003; HAIR; ANDERSON; TATHAM; BLACK, 2005).

CONCEPTUAL MODEL OF RESEARCH AND HYPOTHESES OF STUDY

Graph 1 presents the theoretical model for validation of the constructs and tests of the hypotheses raised.

Graph 1. Conceptual model of the research.
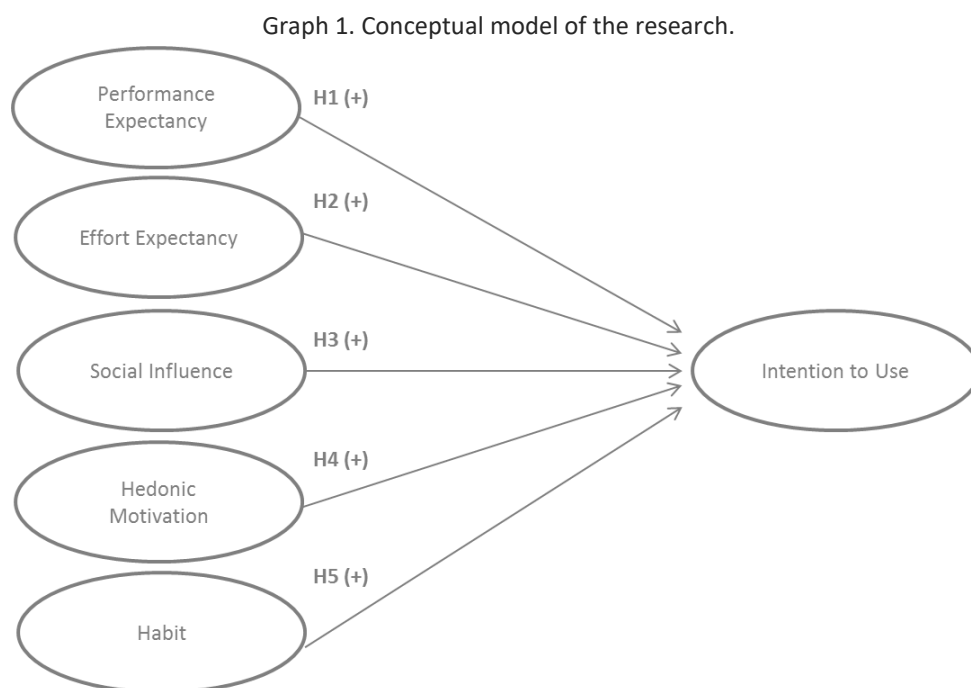
Font: Adapted from Venkatesh, Thong and Xu (2012).

Chart 1 presents the description and the theoretical basis of each of the hypotheses of the study.

Chart 1. Hypotheses of the study.

Hypotheses	Description	Theoretical Basis
H1	Performance expectancy positively influences the Intention to Use educational applications.	Venkatesh et al. (2003); Venkatesh et al. (2012)
H2	Effort expectancy positively influences the Intention to Use educational applications.	
H3	Social Influences positively influence the Intention to Use educational applications.	
H4	Hedonic motivations positively influence the Intention to Use educational applications.	
H5	Habit positively influences the Intention to Use educational applications.	

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DESCRIPTION AND ANALYSIS OF THE RESULTS

The criteria for the assessment of reflective measurement models presented by Hair et al. (2013) were used:

- Internal consistency (composite reliability);

- Reliability of the indicator;

- Convergent validity (average variance extracted);

- Discriminant validity.

The Confirmatory Factor Analysis was used to examine the convergent and discriminant validity of the constructs used in the structural model (HAIR et al., 2005).

All constructs presented indicators with high loads for their latent variables (Table 1), superior to 0.70, and low loads for the other latent variables, indicating reasonable convergent and discriminant validity (CHIN, 1998). The only indicators that did not show values above 0.70 were IU1 and IU4, for which loads were 0.684 and 0.655, respectively, values that are very close to acceptable.

Table 1. Confirmatory Factor Analysis

Construct	Variable	Performance Expectancy	Hedonic Motivation	Habit	Intention to Use
Performance Expectancy	PE1	0,815	0,482	0,353	0,379
Performance Expectancy	PE2	0,782	0,439	0,276	0,322
Performance Expectancy	PE3	0,898	0,638	0,410	0,476
Hedonic Motivation	HM1	0,460	0,821	0,449	0,432
Hedonic Motivation	HM2	0,578	0,868	0,498	0,477
Hedonic Motivation	HM3	0,570	0,844	0,416	0,416
Habit	HAB1	0,399	0,504	0,900	0,376
Habit	HAB2	0,334	0,473	0,924	0,430
Habit	HAB3	0,429	0,509	0,924	0,460
Intention to Use	IU1	0,433	0,389	0,236	0,684
Intention to Use	IU2	0,445	0,418	0,387	0,814
Intention to Use	IU3	0,258	0,463	0,446	0,766
Intention to Use	IU4	0,244	0,214	0,253	0,655

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Another indicator used for the convergent validation of the model was the value of the average variance extracted (AVE) that, as a criterion for validation, should have a value greater than 0.5, according to Hair, Ringle and Sarstedt (2011).

To assess the measurement model, a key measure used, besides the assessment of the loads for each indicator, was the composite reliability of each construct (HAIR et al., 2005; HAIR et al., 2013). Composite reliability describes the extent to which indicators represent the latent construct in common. A commonly used reference value for acceptable reliability is 0.70.

Internal consistency ckecking was also performed, in order to analyze the convergent validity. A high value of internal consistency in the construct indicates that all variables represent the same latent construct. Internal consistency is assessed through Cronbach's Alpha higher values, close to 1, indicate a higher level of consistency. For exploratory studies, values between 0.60 and 0.70 are considered as acceptable; while for studies at more advanced stages, values between 0.70 and 0.90 are considered as satisfactory (NUNALLY; BERSTEIN, 1994; HAIR et al., 2013).

Another indicator of discriminant validity between the constructs is the calculation of the square root of the average variance extracted from the constructs, which must be greater than the correlation between the latent variables (FORNELL; LARCKER, 1981).

All the mentioned indicators are presented in Table 2 and are above those treshholds established by the above mentioned authors.

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Table 2. Summary of the assessment of measurement models

Construct	Performance Expectancy	Hedonic Motivation	Habit	Intention to Use
Performance Expectancy	0,833			
Hedonic Motivation	0,635	0,844		
Habit	0,423	0,540	0,916	
Intention to Use	0,479	0,525	0,463	0,732
AVE	0,694	0,713	0,839	0,537
Composite Reliability	0,872	0,882	0,940	0,821
Cronbach's Alpha	0,781	0,799	0,905	0,714

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To analyze the significance of the indicators, the bootstrap method was used, according to the suggestion of Efron and Tibshirani (1998). The use of the bootstrap method to analyze the significance of the loads obtained for the observable variables is not based only on model estimation, but it calculates estimates of parameters and their confidence intervals based on multiple estimates (HAIR et al., 2005; HAIR et al., 2013).

According to the recommendations of Hair et al. (2013), a resampling of 5,000 samples was performed, with replacement of 133 cases.

The Student's t-test examines the hypothesis that the correlation coefficients are equal to zero. If the results of this test indicate values greater than 1.96, the hypothesis is rejected and the correlation is significant (EFRON; TIBSHIRANI, 1998; HAIR et al., 2013).

Table 3 presents the values of the coefficients between the constructs and their Student's t-test. The values were estimated by the bootstrap method. The values of the relationships of Habit and Hedonic Motivations regarding the Intention to Use showed Student's t-test values greater than 1.96 (significance level = 5%). The t-test value for Effort Expectancy and Social Influence were far below 1.96. These values mean that the constructs do not positively influence the Intention to Use the educational app, thus not confirming Hypotheses 2 and 3.

Table 3. Coefficients of the structural model – between constructs

	Average	Standart Deviation	T-test	P-Value (two tailed)
Performance Expectancy -> Intention to Use	0,220	0,121	1,856	0,054
Effort Expectancy -> Intention to Use	0,024	0,100	0,088	0,930
Social Influence -> Intention to Use	-0,031	0,084	0,490	0,624
Habit -> Intention to Use	0,241	0,095	2,516	0,012
Hedonic Motivation -> Intention to Use	0,274	0,115	2,349	0,019

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As the coefficients of the constructs Effort Expectancy and Social Influence associated with the construct Intention to Use did not show significant values, they were eliminated from the analyses and subsequent validations. Considerations on these absences of significance will be made on the topic Conclusions.

Table 4 presents the coefficients of the structural model without the constructs removed. In the first analysis, the construct Performance Expectancy showed a value that was very close to the desired one and in the analysis presented in Table 4 the value is already appropriate.

Table 4. Coefficients of the structural model – between constructs

	Average	Standart Deviation	T-test	P-Value (two tailed)
Performance Expectancy -> Intention to Use	0,224	0,097	2,201	0,028
Habit -> Intention to Use	0,229	0,093	2,462	0,014
Hedonic Motivation -> Intention to Use	0,270	0,117	2,260	0,024

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The analysis of the coefficient of determination (R^2) was based on studies of Cohen (1977). According to the author, the stage of development of a large part of the Behavior science is such that not much of the variance is predictable in the dependent variable. In this sense, the author proposes a scale for the classification of the coefficient of determination, being an R^2 equal to 10% considered low, an R^2 equal to 30% considered moderate and an R^2 equal to 50% considered high.

Graph 2 presents the resulting model with the summary of the validation of the hypotheses.

Graph 2. Resulting model of the research with the summary of the validation of the hypotheses
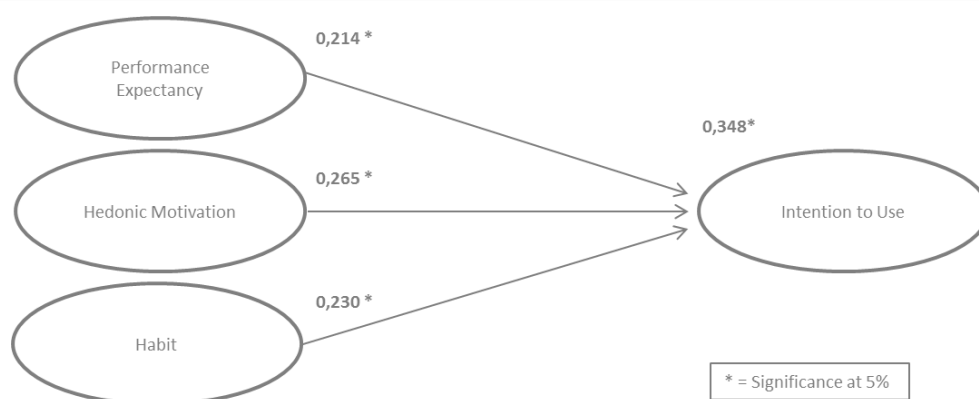
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Moderating variables such as age and gender were tested, and no significant effects were found.

Finally, Chart 2 present a summary of the hypothesis testing of the study.

Chart 2. Summary of the hypothesis testing of the study

Hypotheses	Description	Result
H1	Performance expectancy positively influences the Intention to Use educational applications.	CONFIRMED
H2	Effort expectancy positively influences the Intention to Use educational applications.	NOT CONFIRMED
H3	Social Influences positively influence the Intention to Use educational applications.	NOT CONFIRMED
H4	Hedonic motivations positively influence the Intention to Use educational applications.	CONFIRMED
H5	Habit positively influences the Intention to Use educational applications.	CONFIRMED

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CONCLUSIONS

The high explanatory value of the construct Hedonic Motivations shows that students consider the use of educational applications pleasurable and fun, in this way being the main influencer of the intention to use them.

However, we can note that the Effort Expectancy showed no statistical significance of influence on the intention to use the applications. The probable explanation for this result is that students, in their majority, are already accustomed to the technical aspects of applications such as, for example, acquiring, installing and searching for information about apps in virtual stores.

According to the results of the study, it was also not proved that users are influenced by the opinion of persons who they trust in order to use applications. As it is a technological application exclusively used for the context of the educational institution in which the student is enrolled, we understand that this result is plausible. When they receive information that the educational institution has provided an application, students do not need the opinion of other students to be interested in the app.

Performance expectancy also presented positive values, thus highlighting its influence on the use of apps. Thus, this shows that students consider that applications can assist in the everyday activities of school life, speeding up activities in the library, checking notes and days missed, among other possibilities. In this way, the functionality provided by the application provided by the institution is fundamental to the intention of use, because the more students realize that the application will assist in their academic demands, the more they will have the intention to use it

In addition to these aspects influencing the use of technology, the study revealed that habit is the second factor that motivates the intention to use apps, given its significant positive influence on the use of this application.

The value of the coefficient of determination of the construct Intention to Use apps equal to 34.8% expresses a reasonable explanation for the selection of the constructs analyzed. However, we suggest the continuity of this study with the inclusion of other possible constructs, to achieve a greater explanatory factor.

For educational institutions, the study broadens the understanding of the aspects related to educational applications and their use by students, thus enabling the use of the results to make decisions on the provision and development of applications for this purpose.

By understanding that students would use applications to assist in everyday educational activities, to have fun and because of the habit of using apps, administrators can recognize this channel as a possibility of effective and positive interaction with students.

As recommendations, new studies could: explore the model in different educational institutions and courses; add new constructs to increase the explanatory value of the model; insert moderators in the model to analyze differences between profiles (age, gender, income, etc.); perform qualitative research studies with a smaller number of students, to further the results.

A Tecnologia da Informação e a Universidade: utilização de aplicativos educacionais por estudantes

RESUMO

Esta pesquisa teve como objetivo identificar quais são os fatores que levam o estudante universitário à intenção de utilizar aplicativos educacionais, por meio de um estudo com estudantes que já têm um aplicativo educacional instalado. Os aplicativos oferecem facilidades como consulta a acervos, reservas e empréstimos na biblioteca, acesso à grade horária, acesso ao material didático, entre outros. Foi realizada uma pesquisa com 133 estudantes que utilizaram o app estudado e a análise foi desenvolvida por meio de modelos de equações estruturais. Os resultados evidenciam que o auxílio nas atividades acadêmicas cotidianas, as motivações hedônicas proporcionadas e o hábito influenciam positivamente na intenção de uso. Já a parte técnica envolvida nesse procedimento (baixar, instalar e buscar informações) e a influência de outras pessoas, não são influenciadores. O estudo amplia o entendimento dos aspectos relacionados aos apps, possibilitando utilizar-se dos resultados para tomar decisões sobre a disponibilização e desenvolvimento de apps para essa finalidade.

PALAVRAS-CHAVE: Tecnologia educacional. Aplicativos. Adoção tecnológica. Modelos de equações estruturais.

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REFERÊNCIAS

ANDERSON, C.; WOLFF, M. The web is dead: long live the internet. **Revista Wired**, [S.l.: S.n.], 17 ago, 2010.

BENBASAT, I.; BARKI, H. Quo vadis TAM? **Journal of the Association for Information Systems**, v.8, i.4, article 16, 2007.

BROWN, S. A.; VENKATESH, V. Model of Adoption of Technology in the Household: A Baseline Model Test and Extension Incorporating Household Life Cycle. **MIS Quarterly**, (29:4), pp. 399-426, 2005.

CENZI, D.; TEIXEIRA, I.; COSTA, J. G.; DOBGENSKI, J. Tecnologia de aplicações para dispositivos móveis integrada a banco de dados remoto utilizando software livre. **Anuário da Produção Científica dos Cursos de Pós-Graduação**, v. 3, n. 3, p. 53-101, 2008.

CHANG, I. C.; HWANG, H. G.; HUNG, W. F.; LI, Y. C. 2007. Physicians' Acceptance of Pharmacokinetics-Based Clinical Decision Support Systems. **Expert Systems with Applications**, v.33, n.2, pp. 296-303, 2007.

CHIN, W. W. The Partial Least Squares Approach to Structural Equation Modeling. In G. A. Marcoulides (Ed.), **Modern Methods for Business Research** (pp. 295-358). Mahwah, NJ: Lawrence Erlbaum, 1998.

CHIN, W. W.; MARCOLIN, B. L.; NEWSTED, P. R. A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study. [Article]. **Information Systems Research**, 14(2), 189-217, 2003.

COHEN, J. Statistical Power Analysis for the Behavioral Sciences, ed. 2. New York: Academic Press, **The Concept of Power Analysis**, 1977.

COLOMBO, M. C.; CORTEZIA, L, S. D. Adoção de Aplicativos Para Dispositivos Móveis: Uma Análise Sob a Perspectiva da Utilidade dos Aplicativos em Empresas do Setor Imobiliário. **XXXVIII Encontro da ANPAD – Enanpad**. Rio de Janeiro, 2014.

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R. Tecnol. Soc., Curitiba, v. 13, n. 28, p. 55-71, mai./ago. 2017.

COSTA, M. E. O.; SANTOS, M. S.; BARBOSA, A. L. R. Educação a distância e as bibliotecas universitárias: uma interação necessária. **Perspectivas em Ciência da Informação**, v. 20, n.2, p. 38-57, abr./jun. 2015.

EFRON, B.; TIBSHIRANI, R. J. **An introduction to the bootstrap**. Chapman & Hall / CRC Press, 1998.

FORNELL, C.; LARCKER, D. F. Evaluating structural equation models with unobservable variables and measurement error. **Journal of Marketing Research**, v.18, pp.39-50, 1981.

GARTNER GROUP. **Gartner says mobile app stores will see annual downloads reach 102 billion in 2013**. 19 Set. 2013. Available from: <http://www.gartner.com/newsroom/id/2592315>. Accessed: October 01, 2015.

GUPTA, B.; DASGUPTA, S.; GUPTA, A. Adoption of ICT in a Government Organization in a Developing Country: An Empirical Study. **Journal of Strategic Information Systems**, v.17, n.2, pp. 140-154, 2008.

HAIR, JR. J. F.; ANDERSON, R. E.; TATHAM, R. L.; BLACK, W. C. **Análise multivariada de dados**. 5. ed. Porto Alegre: Bookman, 2005.

HAIR, J. F.; HULT, G. T. M.; RINGLE, C. M.; SARSTEDT, M. **A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)**. Thousand Oaks: SAGE Publications, 2013.

HAIR, J. F.; RINGLE, C. M.; SARSTEDT, M. PLS-SEM: Indeed a Silver Bullet. **Journal of Marketing Theory and Practice**, v. 19, pp. 139-151, 2011.

HOLBROOK, M. B.; HIRSCHMAN, E. C. The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun. **Journal of Consumer Research**, (9:2), pp. 132-140, 1982.

LAUDON, J. P.; LAUDON, K. C. **Sistemas de informação gerenciais**: administrando a empresa na era digital. 5. ed. São Paulo: Pearson, 2004.

LIMAYEM, M.; HIRT, S. G.; CHEUNG, C. M. K. How Habit Limits the Predictive Power of Intentions: The Case of IS Continuance. **MIS Quarterly** (31:4), pp.705-737, 2007.

LUO, J.; BA, S.; ZHANG, H. The Effectiveness of Online Shopping Characteristics and Well-Designed Websites on Satisfaction. **MIS Quarterly** (36:4): pp.1131-1144, 2012.

MALHOTRA, N. K.; SUNG, S. K.; AGARWAL, J. Internet Users' Information Privacy Concerns (IUIPC): The Construct, the Scale, and a Causal Model. [Article]. **Information Systems Research**, 15(4), 336-355, 2004.

MORAES, G. H. S. M.; CAPPELLOZZA, A.; FLORES, E. S.; ARRAIS, E. F. Curtir mais, pagar menos – Adoção às compras coletivas pelo consumidor final. **Revista Gestão & Tecnologia**, v. 14, n. 2., p. 77-98, mai./ago. 2014.

NEUFELD, D. J.; DONG, L.; HIGGINS, C. 2007. **Charismatic Leadership and User Acceptance of Information Technology, European Journal of Information Systems**, v.16, n.4, pp. 494-510.

NUNALLY, J. C.; BERNSTEIN, I. **Psychometric theory**. New York: McGraw-Hill, 1994.

NYSVEEN, H.; PEDERSEN, P. E.; THORBJORNSEN, H. Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons. **Journal of the Academy of Marketing Science**, (33:3), pp. 330-346, 2005.

PARK, Y.; CHEN, J. V. Acceptance and adoption of the innovative use of smartphone. **Industrial Management & Data Systems**, vol. 107, n.9, pp. 1349-1365, 2007.

PATERSON, L.; LOW, B. Student attitudes towards mobile library services for smartphones. **Library Hi Tech**, Vol. 29 Iss: 3, pp.412 – 423, 2011.

SACCOL, A. Z.; MANICA, A.; CALDERWOOD, S. E. Innovation and adoption of mobile technology in public organizations: the IBGE case. **Revista de Administração de empresas - RAE**, São Paulo, v. 51, n. 1, p.72-83, jan./fev., 2011.

SACCOL, A. Z.; REINHARD, N. Tecnologias de informação móveis, sem fio e ubíquas: definições, estado da arte e oportunidades de Pesquisa. **Revista de Administração Contemporânea**, v. 11, n. 4, p. 175-198, out./dez., 2007.

SUN Y.; BHATTACHERJEE, A.; MA, Q. Extending Technology Usage to Work Settings: The Role of Perceived Work Compatibility in ERP Implementation. **Information & Management**, v.46, n.4, pp. 351-356, 2009.

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R. Tecnol. Soc., Curitiba, v. 13, n. 28, p. 55-71, mai./ago. 2017.

VAN DER HEIJDEN, H. User Acceptance of Hedonic Information Systems. [Article]. **MIS Quarterly**, 28(4), 695-704, 2004.

VENKATESH, V.; MORRIS, M. G.; DAVIS, G. B.; DAVIS, F. D. User Acceptance of Information Technology: Toward a Unified View. [Article]. **MIS Quarterly**, 27(3), 425-478, 2003.

VENKATESH, V.; THONG, J. Y. L.; XU, X. Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. **MIS Quarterly**, 36(1), 157-178, 2012.

WELIN-BERGER, M. W. M-Commerce. In: KORNAK, A; TEUTLOFF, J; WELIN-BERGER, M. **Enterprise guide to gaining business value from mobile technologies**. Hoboken: Wiley, 2004.