

Adoption of Technology for Reading Purposes: A Study of E-Books Acceptance

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ABSTRACT

This study aims to verify the acceptance of e-books by identifying the effects of the variables Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Habit, Price Value, and Hedonic Motivation, moderated by Age, Gender and Experience on the intention of use and actual use of this technology. To verify the effects of the relations between these variables, we applied the Unified Theory of Acceptance and Use of Technology 2 model (VENKATESH; THONG; XU, 2012). Out of a universe of 118,456 Brazilian citizens directly involved with education, 1,013 completed an online survey. We analyzed the data via structural equations modeling; we obtained generalized least squares and standard errors via resampling (Jackknife). The study concludes that Habit, Effort Expectancy and Facilitating Conditions are important for the adoption of e-books, and that Age, Gender and Experience are crucial moderators of these relations.

Keywords: Technology Acceptance; Adoption of Digital Media; Technology Diffusion; E-Books; UTAUT.

1. INTRODUCTION

The digital book or e-book is the modern version of the book, a technological reading tool created in antiquity. According to Verazsto et al. (2008), technology is a set of know-how inherent in the development and design of the instruments (artifacts, systems, processes and environments) created by man through history, to satisfy their personal and collective needs and requirements.

The e-book has the same attributes of storing and disseminating information as a printed book, its difference being in the format. For Borchers (1999), the digital book is composed of reading software (program) and hardware (physical part), being able to display large amounts of information and allowing navigation in a fast and practical way.

E-books fall into the world of digital media because the term refers to any medium that uses a computer or digital equipment in order to create, explore, finalize or continue projects supported by the Internet, communication, graphic productions, audiovisual contents and various

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other purposes, which can be applied to various areas including education, as a teaching and learning facilitator.

This technology is increasingly present in daily life and, according to Vassiliou and Rowley (2008), enhances the access to and dissemination of information, making it pertinent to evaluate the factors that may affect the acceptance and use of digital books by their users.

For Sanford (2013) the acceptance of digital books in an academic context has been gaining strength. The exchange of p-books (paper books) for e-books (electronic books) may lead to the discontinuation of the use of the p-book and adoption of its e-book substitute.

Maduku (2015) reports the advantages that digital books have over printed books, focusing on accessibility as a key point, so that digital books are available through remote access, at any time, providing a search facility, and creating the possibility of replicating, downloading and sharing these books. The ease of quickly finding a digital book in a database is also an advantage, as is the possibility of reading on different devices such as cell phones, tablets and computers. According to Muhsin and Nurkhin (2016), digital books, within the academic environment, are an important tool not only for students but also for lecturers, who have access to downloading articles in electronic format, facilitating the dissemination of knowledge.

The study of the digital book tool is relevant because it brings benefits to the market and the economy that revolves around the demand and transfer of this information, since understanding the behavior of the users of this technology and the factors that lead to its adoption is fundamental for the development of strategies for future technological improvements and for the growth of this market. Hsu et al. (2017), in a study that investigates determinants of acceptance and adoption of e-books, showed that the study of this technology helps to develop methods of promoting digital books to attract consumers and increase their adoption.

In addition to economic factors, the change in social behavior is an important phenomenon to be studied. The way some sectors of society organize themselves, and the mode of information archive and transfer, is changing. With this, some tasks and systems may cease to exist as digital books gain more space and usefulness in our daily lives.

Despite the importance and benefits of digital books and the rise of use and demand for this technology, there are not many studies on the factors that lead the user to adopt them. This creates a gap in the literature, which motivates the development of research in the area.

With this in mind, this research investigates the technology of e-books to answer the following question: What is the effect of the variables that influence the acceptance of e-books?

In order to study the level of acceptance of e-books among users, whether for academic or recreational use, this research verified the effect of independent variables: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Habit, Price Value and Hedonic Motivation on the dependent variables Behavioral Intention and Use Behavior of e-books, these relations being moderated by the moderating variables: Age, Gender and Experience of the user. As for the theoretical approach, we decided to use the technology acceptance model (UTAUT2), proposed by Venkatesh, Thong and Xu (2012).

The specific objectives of the research were: a) To verify the effect of the variable Performance Expectancy on Behavioral Intention and Use Behavior of e-books, considering the moderation of the factors of Gender and Age; b) To verify the effect of the variable Effort Expectancy on Behavioral Intention and Use Behavior of e-books, considering the moderation of the factors of Gender, Age and Experience; c) To verify the effect of the variable Social Influence on Behavioral Intention and Use Behavior of e-books, considering the moderation of the factors of Gender, Age and Experience; d) To verify the effect of the variable Facilitating Conditions on the Behavioral Intention and Use Behavior of e-books,

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considering the moderation of the factors of Gender, Age, Experience; e) To verify the effect of the variable Habit on Behavioral Intention and Use Behavior of e-books, considering the moderation of the factors of Gender, Age and Experience; f) To verify the effect of the Price Value variable on Behavioral Intention and Use Behavior of e-books, considering the moderation of the factors of Gender and Age; g) To verify the effect of the variable Hedonic Motivation on Behavioral Intention and Use Behavior of e-books, considering the moderation of the factors of Gender, Age and Experience.

When we achieved the research objectives, the general results found in the study showed that the independent variables studied had a relevant effect in relation to the dependent variables: Behavioral Intention and Use Behavior of e-book technology, when these relationships are moderated by Gender, Age and Experience.

By understanding more clearly the variables that influence the adoption of digital books and the significance of the effects of the relationships between these variables, we allow the future planning and development of strategies for the growth of this technology and its market to be focused on the study of the behavior of its users.

2. THEORETICAL APPROACHES TO THE ACCEPTANCE OF TECHNOLOGIES

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh et al. (2003) based on the theoretical revision of eight different models or theories about technology acceptance and/or human behavior, through a discussion of concepts and applications in studies of the psychology of human behavior, motivation, acceptance and diffusion of technologies. The Theory of Reasoned Action (TRA) (FISHBEIN; AJZEN, 1975) influences, to date, studies on social behavior. The main constructs of TRA that influenced the formulation of UTAUT were: the intention to perform an action, attitude, behavior, and subjective norms.

The Technology Acceptance Model (TAM), proposed by Davis (1989) to analyze information technology (IT) acceptance in the workplace was the second model analyzed by Venkatesh et al. (2003) for the proposition of UTAUT, having as main constructs: perceived utility and perceived ease of use.

The third model discussed by Venkatesh et al. (2003) is the Motivational Model (MM). Davis (1989) proposed a differentiation of motivational factors between external (e.g. salary paid to an individual) and internal (e.g. self-actualization).

The fourth theory that contributed to UTAUT was the Theory of Planned Behavior (TPB) (AJZEN, 1985), which explains intention and use behavior through attitudes, subjective norms, and control perceived by individuals.

The fifth theory was the Combined TAM and TPB (C-TAM-TPB). In it, Taylor and Todd (1995) merge TPB and TAM, creating a hybrid model. The main constructs of C-TAM-TPB are attitudes, subjective norms, perceived control, and the perception of utility.

The sixth model that influenced the creation of UTAUT was the Model of PC Utilization (MPCU), which is derived from the Theory of Human Behavior by Triandis (1977) and proposes a perspective (VENKATESH et al., 2003, p.6) competing with the TPB and TRA models. Thompson, Higgins and Howell (1991) adapted this model to studies in information systems contexts, in order to predict the use of personal computers.

The Innovation Diffusion Theory (IDT) presented by Rogers (1995) is the seventh theory that influenced UTAUT and is based on sociology, and has been used since the 1960s. Venkatesh et al. (2003) draw from Moore and Benbasat (1991), who present some constructs similar to or adapted from IDT. The variables studied by Moore and Benbasat (1991) are: Compatibility; Complexity; Observability; Testability; Relative Advantage; Visibility and Demonstrability of Results. The last theory that influenced the creation of the UTAUT theory was the Social Cognitive Theory (SCT) proposed by Miller and Dollard (1941 apud

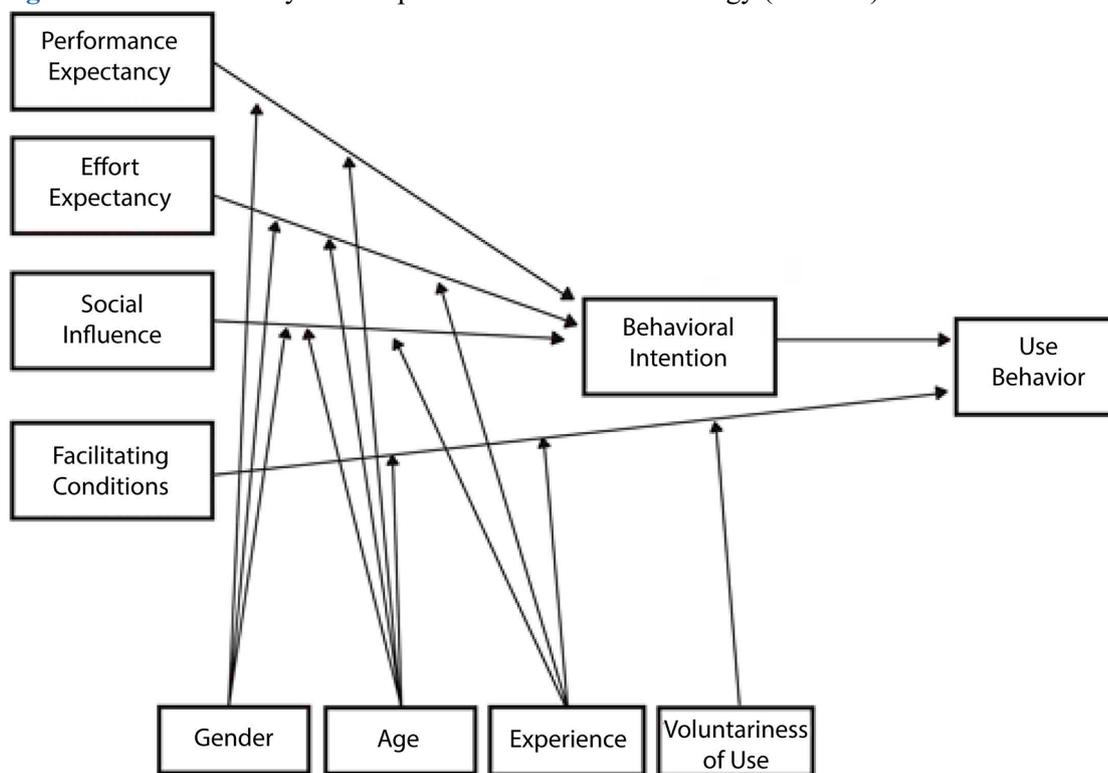
VENKATESH et al., 2003) and is one of the most important for the area of behavior. Its constructs are: performance outcome, personal results, self-efficacy, affinity and anxiety.

2.1. THE UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT)

The first UTAUT theory presented by Venkatesh, et al. (2003) proposed the study of the influence of the moderating variables: Gender, Age, Experience and Voluntariness of use on the independent variables of the model: Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. These relationships between independent variables and moderating variables, in turn, influence the dependent variable Behavioral Intention. Behavioral Intention and Facilitating Conditions are directly related to the final variable: Use Behavior of the studied technology. These relationships can be viewed in Figure 1.

The Variable Performance Expectancy refers to the degree to which individuals believe that technology will assist them in their tasks and is an influencer of Behavioral Intention, and the relationship is moderated by the variables of Gender and Age. The Variable Effort Expectancy refers to the difficulty associated with the use of the system and is an influencer of Behavioral Intention, this relationship being moderated by the variables of Gender, Age and Experience. The variable Social Influence refers to the level at which the user thinks that the technology is important for other people who are in their familiar circle and is influential on Behavioral Intention and use of technology, this relationship being moderated by the variables Gender, Age, Experience and Voluntariness of use. The Facilitating Conditions variable refers to the degree to which the individual believes that the technology development organization supports the problems related to its use. This variable influences

Figure 1. Unified Theory of Acceptance and Use of Technology (UTAUT)



Source: Venkatesh et al. (2003)

Behavioral Intention and Use Behavior of technology, these relations being moderated by the variables of Gender, Age, and Experience.

The variable Behavioral Intention can be defined as being the will that the individual has to try and use a certain technology. In their study, Venkatesh, et al. (2003) state that the set of reactions of each individual in relation to these technologies, influences both their intention to use certain technology and their Use Behavior (Actual Use), both before and after the first contact with technology. This relationship can be observed in Figure 2, below:

According to Williams et al. (2011), UTAUT is cited worldwide and used as a reference in several ICT studies. These authors developed a systematic review of the UTAUT citations made by other authors and their constructs that are a reference for different researches, concluding that the main motivation for the use of UTAUT is the reasoning of arguments and discussions on several subjects related to the area of technology, in addition to having its constructs partially or totally used in the development of new applications of the model.

2.2. THE EVOLUTION OF THE UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT) FOR UTAUT2

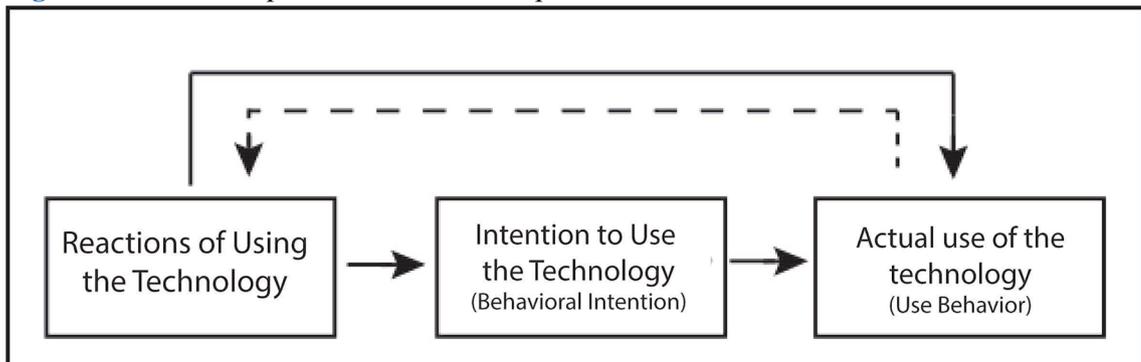
After applying the UTAUT model (VENKATESH et al., 2003) in an organizational context in which the adoption of a system by the employees was mandatory, UTAUT evolved in 2012 to UTAUT2. It should be emphasized that Venkatesh et al. (2003) used the longitudinal perspective to study a technology of mandatory adoption, in which employees of organizations periodically evaluated - from 3 temporal stages of adoption - their degree of training and use of the technology adopted.

In the 2012 proposal, Venkatesh, Thong and Xu studied mobile Internet technology. Its adoption was voluntary, that is, the users looked for and used the technology because they were motivated to do so. As in the mandatory adoption study, the authors chose to conduct a longitudinal study, which presented the interviewees with two steps. After answering the first step - a questionnaire regarding the intention to use mobile Internet, the users were contacted again four months later in the second step, for a new information collection.

As with Venkatesh, Thong and Xu (2012), this study deals with a voluntary adoption of technology (e-book), in which people are not trained for the use of technologies, but rather they seek it of their own volition. Although the 2012 study uses data collection at different times, in this research the collection was performed at a single moment due to the amount of data collected and treated, which made it impossible to follow the evolution of the relationship between the interviewees and the technology studied.

In 2012, Venkatesh, Thong and Xu proposed the inclusion of new variables in the model, indicating new relations and also the exclusion of the moderator variable Voluntariness of Use, since the technological context that makes possible the employment of UTAUT2 will

Figure 2. Basic concepts related to user acceptance models.



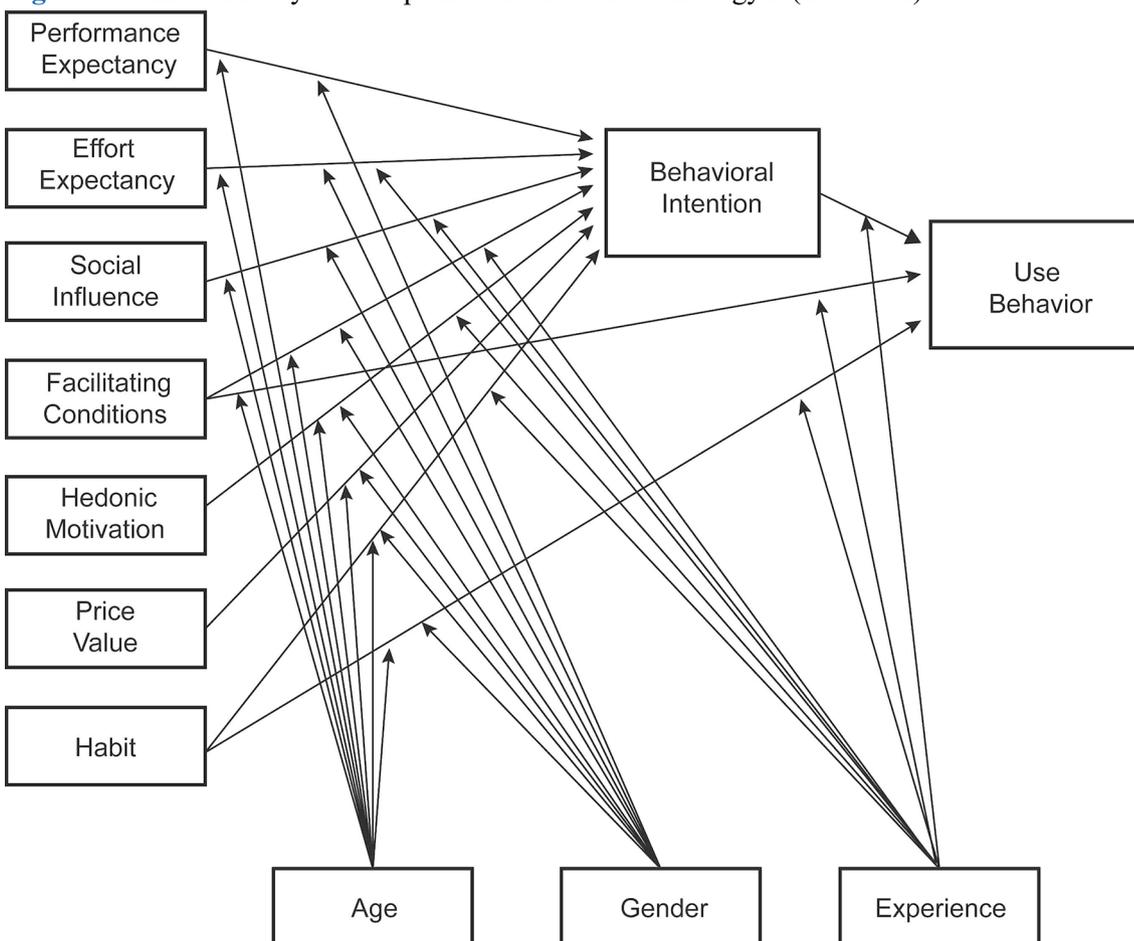
Source: Adapted from Venkatesh et al. (2003)

always be an optional adoption of a technology by the user. The 2012 study was conducted in Hong Kong, and applied to the study of the acceptance of mobile Internet technology. The extension of UTAUT to UTAUT2 suggested the inclusion of independent variables that are direct influencers of the Behavioral Intention and Use Behavior of the technology. The variables included were: 1) Habit, with which the individual tends to perform automatic behaviors when dealing with technology. Kim and Malhotra (2005) defined it as automation. Thus, Habit would influence Behavioral Intention and the Use Behavior of technology and the relation would be moderated by the variables Gender, Age and Experience; 2) the Price Value variable was also added, whose perceived value from technology adoption compensates the expense due to the positive factors provided. This variable would influence Behavioral Intention and Use Behavior of technology and the relationship would be moderated by the variables Gender and Age; 3) the variable Hedonic Motivation, also added to the model, corresponds to the pleasure or delight that the technology could provide to the individual, influencing Behavioral Intention to use technology and being moderated by the variables Gender, Age and Experience. Thus, UTAUT2 (2012) extended the initial UTAUT (2003) and is shown in Figure 3, below.

The UTAUT (2003) and UTAUT2 (2012) models, since they are a proposal of unification, cover the collection of theories and studies on issues of acceptance, diffusion and use of technologies, which makes these models important tools for studies in this area.

The use of the UTAUT2 model inserted in the scope of the adoption of e-books, brings to the research the possibility of studying the relationships that motivate users to adopt the technology, based on a unified and robust model.

Figure 3. Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)



Source: Venkatesh, Thong e Xu (2012)

In order to help the development of the research results in a clear and structured way, the following hypotheses were generated, and each hypothesis below represents a relation between variables presented in the model:

H1: Performance Expectancy (PE) influences Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age and gender of the subjects.

H2: Effort Expectancy (EE) influences Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age, gender and experience of the subjects.

H3: Social Influence (SI) influences Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age, gender and experience of the subjects.

H4: Facilitating Conditions (FC) influence Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age and experience of the subjects.

H5: Hedonic Motivation (HM) influences Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age, gender and experience of the subjects.

H6: Perceived Price Value (PV) influences Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age and gender of the subjects.

H7: Habit (HT) influences Behavioral Intention (BI) of e-book use, and this relationship can be moderated by the age, gender and experience of the subjects.

H8: Facilitating Conditions (FC) are direct influencers of Use Behavior (USE) of e-books, and this relation can be moderated by the age and experience of the subjects.

H9: Habit (HT) is a direct influencer on Use Behavior (USE) of e-books, and this relation can be moderated by the age, gender and experience of the subjects.

H10: Behavioral Intention (BI) is a direct influencer on Use Behavior (USE) of e-books, and this relationship can be moderated by the experience of the subjects.

3. METHOD

This study is of a quantitative-descriptive nature, carried out through a survey with the application of a questionnaire. The study uses the UTAUT2 model proposed by Venkatesh, Thong and Xu (2012), in the context of the use of e-books, being the voluntary adoption of this technology on the part of the user. The study subjects are users of e-books, who use them for recreational or academic purposes. A database was provided by the Distance Education Center (Centro de Educação a Distância - CEAD) of the University of Brasília (UnB), which has been promoting courses in distance learning since 1979. This database had 118,456 e-mail addresses of participants on courses offered by CEAD, and 1,013 questionnaires were answered voluntarily by the research participants, who are e-book readers, within the period of data collection. Emails containing the questionnaire were sent to all the addresses of the database, and the first 1,013 respondents were analyzed to generate a relevant sample, in order to maintain impartiality and time feasible for the execution of the process. Such sampling can be classified as non-probabilistic, due to accessibility, since not all respondents had equal and different chances of responding to the questionnaire. This is because, although the e-mail containing the online questionnaire was sent to all subjects' addresses from the database, consideration must be given to the fact that some may not have received or seen the message, e-mails have bounced back due to errors in the electronic address, among other unforeseen problems which are common challenges of data collection. CEAD offers undergraduate, graduate and postgraduate courses *lato sensu*, promoting access to education along with the departments of the University of Brasilia, Latin American countries and Portuguese-speaking countries.

We used a questionnaire containing 37 questions. Six questions related to the profile of the subjects, and the other questions (31) were translated from Venkatesh, Thong and Xu (2012) and adapted for e-book acceptance. The participant indicated their degree of

agreement with proposed assertions in the online form, using a scroll bar that ranged from 0 (totally disagree) to 100 (totally agree). The adaptation of the instrument of Venkatesh, Thong and Xu (2012) took into account the variables that influence the acceptance of technology and tailored them to the reality of the use of e-books. With respect to the adaptation of the original seven-point scale (Likert-type) to a scale from 0 to 100, this change was theoretically grounded by Stevens (1946) who indicates that an ordinal qualitative scale, such as a 7-point concordance scale, is more applicable when related to a non-parametric analysis technique. The scale from 0 to 100 points, in the opinion of the authors of this study, would improve the measurement of the perceptions of the subject, since the scale from 0 to 100 would assimilate the studied variable with a continuous variable, which would be appropriate to the method we use in this study (generalized least squares). It is worth stressing that the study replicates the model presented in Venkatesh, Thong and Xu (2012), focusing on the study of e-book acceptance, only adapting the scale of the data collection instrument, as previously explained. As for questions related to the subjects' profiles, they also allowed to collect data about the respondents' gender, age and experience, but also to screen only the questionnaires answered by readers of digital books, and the respondents should indicate if they had already read any book in digital format.

Regarding the measurement of the variables, we adapted the variables presented in the UTAUT model (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Behavioral Intention and Use Behavior) from Venkatesh et al. (2003). We adapted the additional variables presented in the UTAUT2 model (Habit, Price Value, Hedonic Motivation) from Venkatesh, Thong and Xu (2012). With the exception of the variable Use Behavior, we measured all variables using the Likert scale from 0 to 100 points. We measured the variable Use Behavior by a composite of the frequency at which respondents used digital books, which corresponds to the number of e-books read in a 12-month period, and the frequency at which they use ICTs related to digital books on a scale from 0-10, where 0 = never, and 10 = many times a day.

As for the data analysis procedures we use the R program, which contains the Structural Equation Model (SEM) package for planning of the modeling and for calculation. We estimate the parameters of the model through Generalized Least Squares in order to correct any heterogeneities present in the sample. Regarding the database, we clarify that there is no missing data and that outliers are included in the statistics. Due to the complexity of the model (excessive number of parameters and relations), we needed to use the Jackknife resampling method (QUENOUILLE, 1956) to estimate the standard errors of the model parameters.

In addition, we grouped the items related to each variable and estimated the relationships from what the conceptual UTAUT2 model proposed (VENKATESH; THONG; XU, 2012). The definition of the relations allowed the elaboration of the structural equations model and we were able to calculate the effect (parameter estimate) of each of the relationships between the variables of the model, together with their significance represented by the standard error and critical level obtained. We show the relations between variables in this research, which are significant for the model.

4. RESULTS AND DISCUSSION

4.1. RESEARCH SUBJECT PROFILE DESCRIPTION

We received a 1,013 questionnaires, of which 346 (34.16 % of the total) were answered by men and 667 (65.84 %) were answered by women.

The age of the interviewees ranged from 18 to 68 years old and, in relation to the level of schooling, 3 (0.3 %) had completed elementary education, 29 (2.86 %) had completed secondary education, 287 (28.33 %) had not completed higher education, 288 (28.43 %) had

BBR completed higher education, 327 (32.28 %) had postgraduate degree courses, 64 (6.32 %) had a master's degree, and 15 (1.48 %) had a doctorate.

15,6 Regarding reading experience, 92 (9.08 %) read at least one book per year, 390 (38.50 %) read from 2 to 4 read books per year, 226 (22.31 %) read from 5 to 7 books per year, 132 (13.03 %) read from 8 to 10 books per year, and 173 (17.08 %) read more than 10 books per year.

576 On reading e-books, 536 (52.91 %) respondents reported that only one of the books read was an e-book, 377 (37.22 %) reported that 2 to 4 books were e-books, 52 (5.13 %) reported that from 5 to 7 books were e-books, 23 (2.27 %) reported that 8 to 10 books were e-books, and 25 (2.47 %) reported that more than 10 of these books were e-books.

The data collected on the reading of e-books were used to measure the moderating variable Experience (EXP), according to the number of e-books read by the subjects in the period of one year. This variable (EXP) ranked the respondents as follows: reader of only one e-book - poorly experienced; reader of 2 to 4 e-books - familiar; reader of 5 to 7 e-books - experienced; reader of 8 to 10 e-books - very experienced; reader of more than 10 e-books - dominates the technology.

In analyzing the data collected in relation to the profile of the respondents, we noted that there were a significant number of questionnaires answered by women, consisting of 667 of the 1013 questionnaires (approximately 65.84 %). This fact was totally random, given that the database used had 118,456 e-mail addresses and the respondents were selected in order of response (1,013 questionnaires were obtained and the collection was concluded). Although gender plays a key role in accepting technologies, the study is not focused on differences by gender categories, but rather on the moderation relations between gender and other variables in the model.

Having presented the profile of the research participants, the results of the data analysis will be presented as follows.

4.2. THE FREQUENCY OF USE BEHAVIOR (USE) OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) RELATED TO DIGITAL BOOKS.

In the questionnaire presented by Venkatesh, Thong and Xu (2012), the author measured the variable Use Behavior, through a composite formed by both the frequency at which the interviewees use the mobile Internet service and the variety of services and ICTs that have their use related to this technology (mobile Internet). As adapted from the 2012 study, we analyzed ICTs with which the users of digital books could also deal with. As a way to better understand the profile of these users and to outline characteristics of e-book use, we collected data on how many digital books the subjects of the research had read in a 12-month period.

Additionally, in the questionnaire of this research, we added an input question where the respondents, in order to continue responding to the questionnaire, should first inform if they have already had any contact with digital books, thus distinguishing users from nonusers.

To measure the number of digital books read in a 12-month period, the user should first state the number of books they had read during this period, subsequently showing how many of these books had been in digital format.

In order to measure the mean frequency of use of ICTs related to e-books, the respondents selected on a scale from 0 (never) to 10 (many times a day), the degree at which they use the following tools: tablets, SMS (text messaging), Internet browser, e-books, and electronic games, as shown in Table 1.

As can be seen, the use of the Internet, e-books and SMS represents a significant frequency among the subjects of the research. These data, besides better consolidating the

Table 1. Mean frequency of Use Behavior (USE) of ICT related technologies

Construct	Assertion	Mean
Use Behavior (Actual)	USE1 Tablet	3.71
	USE2 SMS	6.90
	USE3 Internet Browser	9.44
	USE4 e-Books	7.10
	USE5 Electronic games	3.51

Source: Research results (2015).

profile of the respondents, also help to understand their behavior of use of both digital books and ICTs, which have a direct relationship with e-books.

4.3. THE EFFECT OF PERFORMANCE EXPECTANCY (PE) ON BEHAVIORAL INTENTION (BI) OF THE USE OF E-BOOKS

Initially, we verified the means of the values obtained on the 0 to 100 scale related to assertions PE1, PE3 and PE4 presented in Table 2, which deal with Performance Expectancy, presenting the following means:

The effect of the direct relationship between Performance Expectancy (PE) and Behavioral Intention (BI) of e-books use (0.000782) was not significant at $p < 0.01$. The relationship, when moderated by Age, had a significant effect ($p < 0.01$) corresponding to 3.396414. When the relationship was moderated by Gender, the effect was 8.101312 ($p < 0.01$).

4.4. THE EFFECT OF EFFORT EXPECTANCY (EE) ON BEHAVIORAL INTENTION (BI) OF E-BOOK USE

For the variable Effort Expectancy, we formulated the assertions EE1, EE2, EE3 and EE4, whose response means are presented in Table 3, with a scale varying from 0 to 100 points.

Data analysis confirmed the UTAUT2 model, showing significant effect (-0.007249) between Effort Expectancy (EE) and Behavioral Intention (BI). The relationship, when moderated by Age, produced an effect of 4.711810. When the relationship was moderated by Gender the effect was 10.472413. The effect exerted by the moderating variable Experience is 82.706993. All tests presented significance ($p < 0.01$).

4.5. THE EFFECT OF SOCIAL INFLUENCE (SI) ON BEHAVIORAL INTENTION (BI) OF E-BOOK USE

For the variable Social Influence (SI), we formulated the assertions SI1, SI2 and SI3, whose response means are presented in Table 4, with a scale varying from 0 to 100 points.

Table 2. Means obtained in relation to Performance Expectancy (PE) for the use of e-books

Construct	Assertion	Mean
Performance Expectancy	PE1. I consider e-books important for my day to day life.	63.22
	PE3. E-books help me as a way to read faster.	61.50
	PE4. Using e-books as a means of reading increases my productivity.	56.90

Source: Research results (2015).

Table 3. Means obtained in relation to the Effort Expectancy (EE) for the use of e-books

Construct	Assertion	Mean
Effort Expectancy	EE1. Learning how to use e-books is easy for me.	76.29
	EE2. My interaction with e-books is clear and easy to understand.	73.71
	EE3. I consider e-books an easy-to-use tool.	76.71
	EE4. I find it easy to become proficient with the e-book reading tool.	76.32

Source: Research results (2015).

Table 4. Médias obtidas em relação à Influência Social (IS) para o uso de e-books

Construct	Assertion	Mean
Social Influence	SI1. People who are important to me think I should use e-books.	48.08
	SI2. People who influence my behavior think I should read in digital form.	46.38
	SI3. People whose opinion I value prefer me to use e-books.	45.67

Source: Research results (2015)

Data analysis showed an effect (0.001471) between Social Influence (SI) and Behavioral Intention (BI), albeit not significant at $p < 0.01$. The relation will have a significant effect when moderated by Age (effect 3.5558921; $p < 0.01$); Gender (effect 7.3730093, $p < 0.01$) and Experience (effect 62.776214; $p < 0.01$).

4.6. THE EFFECT OF FACILITATING CONDITIONS (FC) ON BEHAVIORAL INTENTION (BI) OF USING E-BOOKS

We formulated the variables FC1, FC2, FC3 and FC4 for Facilitating Conditions (FC), whose response means are presented in Table 5, with a scale ranging from 0 to 100 points.

The analysis did not confirm significance ($p < 0.01$) in the negative effect (-0.000868) found in the relation of influence of Facilitating Conditions (FC) on Behavioral Intention (BI). The relationship will have a significant effect, when moderated by Age (effect 4.7323898; $p < 0.01$) and Experience (effect 78.463796; $p < 0.01$).

The variable Facilitating Conditions (FC) has a significant effect (0.125277; $p < 0.01$) on the relation of direct influence on Use Behavior (USE) of e-books.

4.7. THE EFFECT OF HEDONIC MOTIVATION (HM) ON BEHAVIORAL INTENTION (BI) ON THE USE OF E-BOOKS

For the Hedonic Motivation variable (HM), we formulated the assertions HM1, HM2 and HM3, whose response means are presented in Table 6, with a scale ranging from 0 to 100 points.

The analysis did not confirm significance ($p < 0.01$) in the negative effect (-0.003262) between Hedonic Motivation (HM) and Behavioral Intention (BI). The relationship will have a significant effect when moderated by Age (effect 3.672709; $p < 0.01$); Gender (effect 8.0018696; $p < 0.01$) and by Experience (effect 63.258582; $p < 0.01$).

Table 5. Means obtained in relation to Facilitating Conditions (FC) for the use of e-books

Construct	Assertion	Mean
Facilitating Conditions	FC1. I have the necessary sources and resources to use tablets and e-books.	70.28
	FC2. I have the knowledge necessary to use e-books.	80.79
	FC3. E-books are compatible with other technologies that I use.	74.97
	FC4. I can get support from other people when I have difficulties with e-books.	68.03

Source: Research results (2015)

Table 6. Means obtained in relation to Hedonic Motivation (HM) for the use of e-books

Construct	Assertion	Mean
Hedonic Motivation	HM1. Using e-books is fun.	60.08
	HM2. Using e-books is enjoyable.	63.01
	HM3. Using e-books is a form of entertainment.	64.78

Source: Research results (2015)

4.8. THE PRICE VALUE (PV) EFFECT PERCEIVED IN BEHAVIORAL INTENTION (BI) OF E-BOOK USE

For the variable Price Value (PV), we formulated the assertions PV1, PV2 and PV3, whose response means are presented in Table 7, with a scale ranging from 0 to 100 points.

The analysis did not confirm significance ($p < 0.01$) in the negative effect (-0.000167) between Price Value (PV) and Behavioral Intention (BI). The relationship will have a significant effect when moderated by Age (effect 3.584430; $p < 0.01$) and by Gender (effect 7.795411; $p < 0.01$).

4.9. THE EFFECT OF HABIT (HT) ON BEHAVIORAL INTENTION (BI) AND ON USE BEHAVIOR (USE) OF E-BOOKS

For the variable Habit (HT), we formulated the assertions HT1, HT2 and HT3, whose response means are presented in Table 8, with a scale ranging from 0 to 100 points.

The results were significant, as can be observed in the positive effect (0.007280018) between Habit (HT) and Behavioral Intention (BI). The relationship, when moderated by Age, had an effect of 3.5126229. When the relationship was moderated by Gender, the effect was 7.4181099. The effect exerted by the moderator Experience is 61.265890. In all tests, significance was set at $p < 0.01$

The Habit (HT) variable also has a significant direct relation with the dependent variable Use Behavior (USE) of e-books. The effect of this ratio was 0.01640. The effect of the moderating variable Age with the relation between Habit (HT) and Use Behavior (USE) was 5.934185. The effect of Gender on the relation between Habit and Use Behavior was 13.015797. The effect of Experience was 104.325102. All tests presented significance $p < 0.01$.

Table 7. Means obtained in relation to Price Value (PV) for the use of e-books

Construct	Assertion	Mean
Price Value	PV1. The pricing of digital books is reasonable.	56.41
	PV2. E-books are a good investment compared to the price paid for them.	61.28
	PV3. Using e-books brings me reasonable price value.	62.00

Source: Research results (2015)

Table 8. Means obtained in relation to the Habit (HT) of using e-books

Construct	Assertion	Mean
Habit	HT1: Using e-books has become a habit for me.	46.95
	HT2: I consider myself addicted to the use of e-books.	30.72
	HT3: I must use e-books.	56.64

Source: Research results (2015)

4.10. BEHAVIORAL INTENTION (BI) AS AN INFLUENCER OF USE BEHAVIOR (USE) OF E-BOOKS

For the Behavioral Intention (BI) variable, we formulated assertions BI1, BI2 and BI3, whose response means are presented in Table 9, with a scale ranging from 0 to 100 points.

The variable Behavioral Intention (BI) is influenced by the seven other input variables presented in the model and, in turn, influences Use Behavior, and is also moderated by Experience. The effect of this relationship has a value of 0.012706 ($p < 0.01$) and the effect of the Experience moderator with this relation is 102.749286 ($p < 0.01$).

The effect of Habit on Behavioral Intention is 0.00728002 ($p < 0.01$) and that of Social Influence is 0.001471, but in this case, it is not significant at $p < 0.01$. Effort Expectancy has a significant effect of 0.007249 ($p < 0.01$) on Behavioral Intention.

When the variables that have a direct influence relation to the use of e-books are analyzed, Facilitating Conditions has a significant effect of 0.1252769 ($p < 0.01$), Habit also has a significant effect (0.016401; $p < 0.01$), as well as Behavioral Intention (0.012706; $p < 0.01$). This result is corroborated by the study by Hsu et al. (2017), developed in Taiwan with a sample of 343 questionnaires, whose objective was to examine key factors that affect the adoption of e-books based on the UTAUT theory. The results of the authors' research showed that the adoption of e-books is determined by Performance expectancy (PE), Effort

Table 9. Means obtained in relation to Behavioral Intention (BI) for the use of e-books

Construct	Assertion	Mean
Behavioral Intention	BI1: I intend to continue using e-books in the future.	68.63
	BI2: I will always try to use e-books in my day-to-day life.	57.36
	BI3: I have plans to continue using e-books often.	61.70

Source: Research results (2015)

Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC), covered in this research, as well as other influencing variables, according to the authors, but not employed in this study, namely: perception of benefit, trust of benevolence and environmental concern.

Table 10 summarizes the effects of the independent direct variables on the variables Behavioral Intention and Use Behavior of e-books, as verified in this research.

From the results obtained with the research, we summarize the rejection or non-rejection of the hypotheses of the study, as shown in Table 11.

It should be emphasized that when moderated by Gender, Age, and Experience, the relations presented in hypotheses that test the influence of independent variables on the dependent variable Use Behavior (H1 to H7) cannot be rejected. This finds support in the seminal study by Venkatesh, Thong and Xu (2012). However, this is not the case in Maduku (2015), a study conducted in South Africa with 544 students about gender differences in the behavioral antecedents of the intention to use e-books. When Gender was included as moderator of these relations, Gender did not significantly moderate these relationships, except in the situation partially represented in H4, in which Facilitating Conditions (FC) influence Behavioral Intention (BI), and this relationship can be moderated by Gender.

Table 10. Table-Summary of the effects of direct influencing variables on Behavioral Intention and Use Behavior of e-books

Variables	Effect	t(99%)
PE->BI	0.000782	--
EE->BI	-0.007249	**
SI->BI	0.001471	--
FC->BI	-0.000868	--
HM->BI	-0.003262	--
PV->BI	-0.0001674	--
HT->BI	0.00728002	**
FC->USE	0.1252769	**
HT->USE	0.01640135	**
BI->USE	0.01270557	**

Caption: PE: performance expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; HM: Hedonic Motivation; PV: Price Value; HT: Habit; USE: Use Behavior; BI: Behavioral Intention. ** p <0.01. Source: Research results (2015).

Table 11. Table-Summary of effects found in the relationships analyzed in the research

Study hypotheses	*Effect of the direct influence relations between independent variables Behavioral Intention and Use Behavior (Without moderation)	**Effect of the relations moderated by Age, Gender and Experience
H1: "Performance Expectancy (PE) influences Behavioral Intention (BI) of using e-books, and this relation can be moderated by the subjects' age and gender."	Not significant H1 is rejected	Significant H1 Cannot be rejected

<p>H2: Effort Expectancy (EE) is influenced by Behavioral Intention (BI) of using e-books, and this relation may be moderated by the subjects' age, gender and experience.</p>	<p>Significant H2 Cannot be rejected</p>	<p>Significant H1 Cannot be rejected</p>
<p>H3: Social Influence (SI) influences Behavioral Intention (BI) of using e-books, and this relation may be moderated by subjects' age, gender and experience.</p>	<p>Not significant H3 is rejected</p>	<p>Significant H3 Cannot be rejected</p>
<p>H4: Facilitating Conditions (FC) influence Behavioral Intention (BI) of using e-books, and this relation may be moderated by subjects' age, gender and experience.</p>	<p>Not significant H4 is rejected</p>	<p>Significant H4 Cannot be rejected</p>
<p>H5: Hedonic Motivation (HM) influences Behavioral Intention (BI) of using e-books, and this relation may be moderated by subjects' age, gender and experience.</p>	<p>Not significant H5 is rejected</p>	<p>Significant H5 Cannot be rejected</p>
<p>H6: The perceived Price Value (PV) influences Behavioral Intention (BI) of using e-books, and this relation may be moderated by subjects' age, gender and experience.</p>	<p>Not significant H6 is rejected</p>	<p>Significant H6 Cannot be rejected</p>
<p>H7: Habit (HT) influences Behavioral Intention (BI) of using e-books, and this relation may be moderated by subjects' age, gender and experience.</p>	<p>Significant H7 Cannot be rejected</p>	<p>Significant H7 Cannot be rejected</p>
<p>H8: Facilitating Conditions (FC) directly influence Use Behavior (USE) of e-books, and this relation may be moderated by subjects' age and experience.</p>	<p>Significant H8 Cannot be rejected</p>	<p>Significant H8 Cannot be rejected</p>
<p>H9: Facilitating Conditions (FC) directly influence Use Behavior (USE) of e-books, and this relation may be moderated by subjects' age, gender and experience.</p>	<p>Significant H9 Cannot be rejected</p>	<p>Significant H9 Cannot be rejected</p>
<p>H10: Behavioral Intention (BI) directly influences Use Behavior (USE) of e-books, and this relation may be moderated by subjects' experience.</p>	<p>Significant H10 Cannot be rejected</p>	<p>Significant H10 Cannot be rejected</p>

Significance of the tests: $P < 0.01$; $t (99\%)$. * The relations effect test, when not moderated by Age, Gender and Experience of subjects. ** The relations effect test, when moderated by Age, Gender and Experience of subjects. Source: Research results (2015).

4.11. AGE, GENDER AND EXPERIENCE AS MODERATORS OF THE RELATION BETWEEN THE INFLUENCING VARIABLES AND BEHAVIORAL INTENTION AND USE BEHAVIOR OF E-BOOKS

An important focus given to data discussion and hypotheses testing was the analysis of the effect that the moderating variables Age, Gender and Experience exert on the direct influence relation of the independent variables to Behavioral Intention and Use Behavior of the studied technology. As shown in Table 11, if the test is only to verify the significance of the effects related to direct relationships between independent variables and Behavioral Intention and Use Behavior of e-books, five of the hypotheses are rejected and five cannot be rejected. However, as can be seen in the second column of Table 11, when the age, gender and experience of the subjects are included, then all ten hypotheses formulated in this study cannot be rejected at $p < 0.01$.

Three tables (Tables 12, 13 and 14) present the effect of the moderating variables (Age, Gender and Experience) on the influence relations between the direct influencing variables of Behavioral Intention and Use Behavior of e-books.

The effect of the variable “Age”, when moderating the relations between independent variables (direct influencers) proposed in the UTAUT2 model (VENKATESH; THONG; XU, 2012) and Behavioral Intention and Use Behavior of e-books, has always been significant

Table 12. Effect of the moderating variable Age (AGE) on the predictive relations proposed in the UTAUT2 model on Behavioral Intention and Use Behavior of e-books

Variables	Effect	t(99%)
AGE->PE	3.396414	**
AGE->EE	4.71181	**
AGE->SI	3.555892	**
AGE->FC	4.73239	**
AGE->HM	3.672709	**
AGE->PV	3.58443	**
AGE->HT	3.512623	**
AGE->(HT->USE)	5.934185	**

PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; HM: Hedonic Motivation; PV: Price Value; HT: Habit; USE: Use Behavior. ** $p < 0.01$. Source: Research results (2015).

Table 13. Effect of the moderating variable Gender (GDR) on the predictive relations proposed in the UTAUT2 model on Behavioral Intention and Use Behavior of e-books

Variables	Effect	t(99%)
GDR->PR	8.101312	**
GDR->EE	10.47241	**
GDR->SI	7.373009	**
GDR->HM	8.00187	**
GDR->FC	7.395503	**
GDR->PV	7.795411	**
GDR->HT	7.41811	**
GDR->(HT->USE)	13.0158	**

PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; HM: Hedonic Motivation; FC: Facilitating Conditions; PV: Price Value; HT: Habit; USE: Use Behavior. ** $p < 0.01$. Source: Research results (2015).

Table 14. Effect of the moderating variable Experience (EXP) on prediction relations proposed in the UTAUT2 model on Behavioral Intention and Use Behavior of e-books

Variables	Effect	t(99%)
EXP->EE	82.706993	**
EXP->SI	62.7762137	**
EXP->FC	78.4637962	**
EXP->HM	63.2585982	**
EXP->HT	61.26589	**
EXP->(HT->USE)	104.325102	**
EXP>(BI->USE)	102.749286	**

EXP: Experience; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; HM: Hedonic Motivation; HT: Habit; USE: Use Behavior; BI: Behavioral Intention. ** $p < 0.01$. Source: Research results (2015).

$p < 0.01$). The relationships and the respective effects of the moderating variable Age are shown in Table 12.

The effect of the variable “Gender”, when moderating the relations between independent variables (direct influencers) proposed in the UTAUT2 model (VENKATESH; THONG; XU, 2012) and Behavioral Intention and Use Behavior of e-books, has always been significant $p < 0.01$). The relations and respective effects of the moderating variable Gender are shown in Table 13 below:

Maduku (2015), as previously mentioned, concluded that although Gender appears to moderate the relationship between Facilitating Conditions (FC) and Behavioral Intention (BI), surprisingly, we found no significant gender moderating effects in Performance Expectancy (PE), Effort Expectancy (EE) and Social Influence (SI), which is different to what occurred in this study.

Nurkhin, Rohman and Mukhibad (2017) developed a study in Indonesia with 259 university students, seeking to analyze the influence of these variables of the UTAUT model as proposed in 2003 by Venkatesh et al. (2003) on the intention to use and in the behavior of use of electronic journals (e-journals). The results of the study showed that Performance Expectancy (PE) and Effort Expectancy (EE) for the use of e-journals significantly impacted Behavioral Intention (BI) ($p < 0.05$), even when relations are moderated by Gender, while Social Influence (SI) did not show a significant influence on BI ($p > 0.05$), even when the relation was moderated by Gender. Other profile variables of the subjects were not studied by the researchers. The research of the mentioned authors demonstrates total convergence with the result found in this study, according to Hypothesis 3 (H3 - see Table 11).

The effect of the variable “Experience”, when moderating relations between independent variables (direct influencers) proposed in the UTAUT2 model (VENKATESH; THONG; XU, 2012) and Behavioral Intention and Use Behavior of e-books, has always been significant $p < 0.01$). The relations and respective effects of the moderating variable Gender are shown in Table 14 below:

Finally, from the presentation and discussion of the results found in the application of UTAUT2 to the context of e-book users, it is clear that at $p < 0.01$, all influence relations of the model on Behavioral Intention and Use Behavior of e-books have a significant effect, provided that the profile variables of the subjects, such as age, gender, and experience, are included as moderators. When the subjects’ profiles are disregarded, only 50 % of the hypotheses are supported by the tests ($p < 0.01$). This may explain the importance placed by Venkatesh and colleagues in all their studies (VENKATESH et al., 2003; VENKATESH; THONG; XU, 2012) on the profile variables of technology users, as moderators of the relations studied. However, most recent studies also demonstrate the strength of Gender as a

moderating variable in these studies, irrespective of geographic distances between the loci of the research, and regardless of the significance of age among others (MADUKU, 2015; NURKHIN; ROHMAN; MUKHIBAD, 2017).

Additionally, as pointed out in this research, Habit, Effort Expectancy, Behavioral Intention, and Facilitating Conditions are significant variables in the sense of stimulating individuals to use digital books, directly contributing to users' behavior; thus, an increase in the use of this book technology in the coming years is expected.

According to the study by Van der Velde and Ernst (2009), students and researchers were convinced of the success of digital book technology for its ease of research and access. Both in universities and libraries, the collection of many of these institutions already presents this tendency, where some of the books are in digital format, as are academic articles and other types of publications. According to Ashcroft (2011), having a collection of digital books has become an important factor for several libraries and universities, with some of these institutions having more registrations after making digital books available to their users. Remote and continuous access to archives are some of the advantages of new digital libraries.

Despite the growing use of e-books, a substitution of book technology by digital book technology is not expected. Rather, the complementary use of both technologies is expected, because access to large digital book databases makes it easier to access specific data and materials, and the user has the option of finding the necessary book in digital format and then deciding whether to purchase the printed version, download it in the digital format, or even read it online.

Figure 4 below provides the general picture of the effects obtained in the relations studied.

5. FINAL CONSIDERATIONS

This study applied the UTAUT2 model by Venkatesh, Thong and Xu (2012) in the study of the acceptance of e-books among readers of the Brazilian population, verifying that the model is valid not only for different technologies, but also for different cultures and countries. Studies recently cited in other continents (Africa, Asia) have shown that UTAUT continues to be robust in supporting studies on the adoption and acceptance of technologies by the user (MADUKU, 2015; NURKHIN; ROHMAN; MUKHIBAD, 2017; HSU et al., 2017).

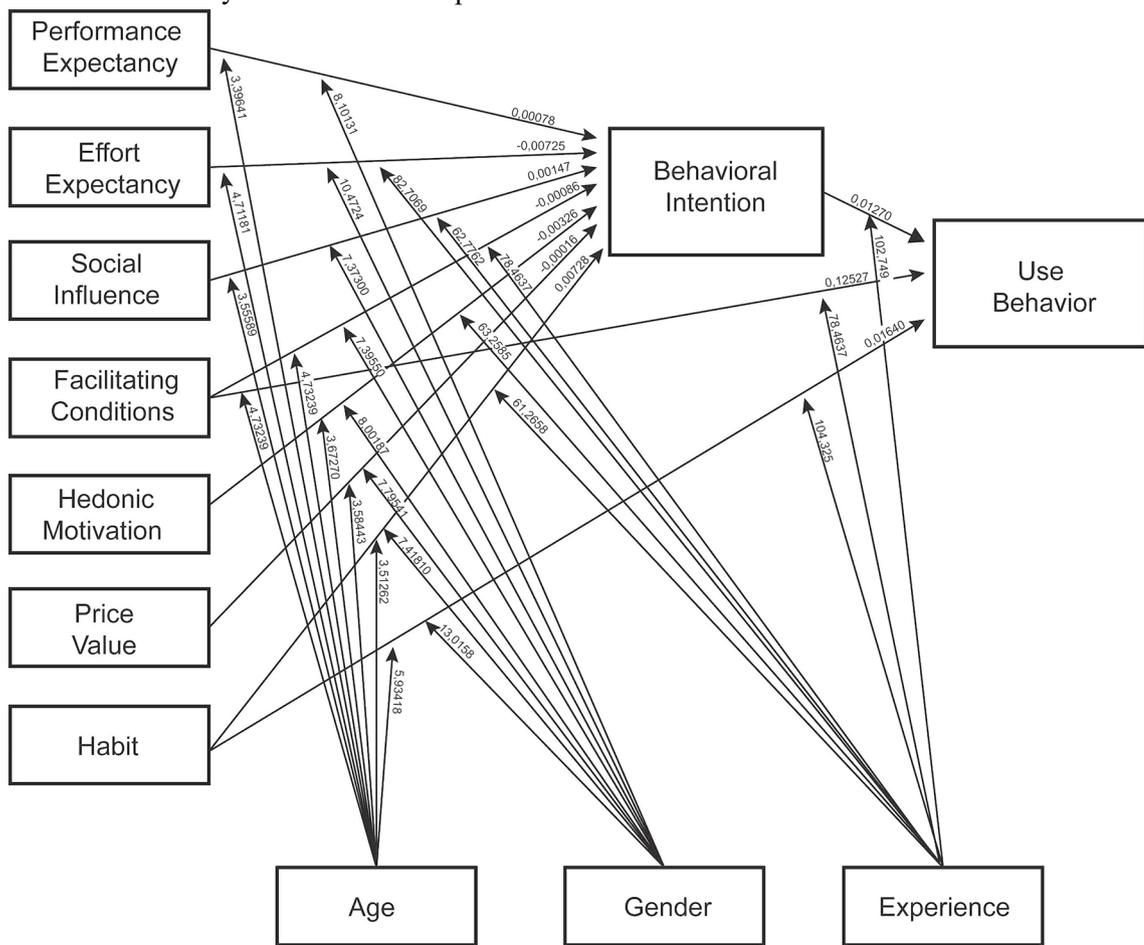
It was confirmed that all the variables presented in the model have an effect in relation to Behavioral Intention and Use Behavior of e-book technology, as long as the relations between the influencing variables and Behavioral Intention (BI) and Use Behavior (USE) of the studied technology are moderated by Age, Gender, and Experience.

Finally, it should be noted that the model used was saturated due to the number of parameters and relations. We addressed this parametric saturation in part by means of Jackknife resampling. However, the coefficient of determination of the model (R^2) was higher than 0.9, corroborating the saturation. Therefore, we suggest that future studies use samples that allow the presence of at least two distinct observations for each combination of relations used, treating their complexity in relation to the number of parameters.

In addition, we suggest that future studies use longitudinal perspectives of data collection, with monitoring of the evolution of the relationship between user and technology, in order to observe if there are differences between the effects of the relations existing in the model.

The UTAUT theory continues to be widely used throughout the world for the study of technology acceptance. In Brazil, it would be important to advance the empirical task in the search for the knowledge of consumers, as well as students, regarding the use of

Figure 4. Finalized conceptual framework, elucidating the effects of relations between variables that moderate or directly influence the acceptance of e-books.



Significance $p < 0.01$ for effects, where significant. Source: Research results (2015)

technologies as the interface of the relations between provider and user of diverse services. The study by Floyd, Rigole and Stines, which was recently published (2017), inspires those interested in the subject to develop, in Brazil and Latin America, studies aimed at verifying students' perceptions regarding the use of videoconferencing technologies in classes. Considering that generation Z individuals (or millennials – young people born from 1992 to the last decade, 2010), who are digital natives, are probably not rejecting the new educational technologies. The remaining question is whether or not, for the previous generations (generation X for example, born between 1950 and 1970, or generation Y, born between 1970 and 1990), the variables proposed as moderators in UTAUT continue to play an important role in the use of this theory for this type of study. After all, with the proliferation of online courses, more mature people have returned to virtual classrooms. In this perspective, the authors of this research understand that UTAUT continues providing an interesting theoretical framework for the study of the service provider–service user interaction, whose interaction is mediated by ICTs.

6. CONTRIBUTION OF THE AUTHORS TO THE WORK

Contribution of author 1: elaboration of the research project, elaboration of the theoretical revision that generated the hypotheses of the study, execution of field research, treatment and analysis of data, discussion of results and conclusions.

Contribution of author 2: elaboration of the research project, elaboration of the theoretical revision that generated the hypotheses of the study, execution of field research, treatment and analysis of data, discussion of results and conclusions.

Contribution of author 3: treatment and analysis of the data, focusing on the tests of the hypotheses of the research and applications of the statistical techniques, participating in the decision process regarding the necessary analyzes, results and conclusions.

Contribution of author 4: organization of the database to be submitted to the treatment and tests of the hypotheses of the research and applications of statistical techniques, participating in the decision making process of the analyzes, results and conclusions.

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