Factors that affect the intention to continue using e-learning systems: a study with federal public servants

CRISTIANE APERCIDA DA SILVA ¹ ²
EDICREIA ANDRADE DOS SANTOS ³
¹ Universidade Federal de Grande Dourados (UFGD), Dourados – MS, Brazil
² Universidade Federal de Santa Catarina (UFSC) / Graduate program in accounting, Florianópolis – SC, Brazil
³ Universidade Federal do Paraná (UFPR), Curitiba – PR, Brazil

Abstract
This study purpose to examine what are the reflexes of cognitive flaws in the use of the internet by federal public servants in the satisfaction of content design, in the satisfaction of interface design and of these types of design in the perceived utility value and in the intention of continuity of the use of e-learning systems adopted in the improvement courses. To this end, a descriptive research was carried out, with a quantitative approach and data collected from a survey applied to 50 civil servants of a federal university hospital located in the Midwest Region of Brazil. To test the hypotheses, the technique of structural equations was applied. The results indicated that the perceived utility value positively affects the intention to continue using it, however, it was not possible to confirm that cognitive failure on the internet negatively affects the individual's satisfaction with the content design and the system interface design and -learning, nor that satisfaction with content design and interface design positively affects the perceived utility value. In times of financial limitations, especially in the public sector, e-learning systems enable training to reach diverse geographically dispersed workforces, becoming popular tools to facilitate teaching and learning processes that enable flexible learning.

Keywords: Content design. Interface design. Hospital. Intention.

Article submitted on January 25, 2020 and accepted on April 06, 2020.
[Translated version] Note: All quotes in English translated by this article’s translator.
DOI: http://dx.doi.org/10.12660/rgplp.v1n1.2020.81044
Fatores que afetam a intenção de continuidade do uso de sistemas e-learning: um estudo com servidores públicos federais

Resumo
Este estudo teve por objetivo examinar quais são os reflexos das falhas cognitivas no uso da internet por parte dos servidores públicos federais na satisfação do design de conteúdo, na satisfação do design de interface e desses tipos de design no valor de utilidade percebida e na intenção de continuidade do uso dos sistemas e-learning adotados nos cursos de aperfeiçoamento. Para tanto, realizou-se uma pesquisa descritiva, com abordagem quantitativa e dados coletados a partir de um survey aplicado a 50 servidores públicos de um hospital universitário federal localizado na Região Centro-Oeste do Brasil. Para testar as hipóteses, aplicou-se a técnica de equações estruturais. Os resultados indicaram que o valor de utilidade percebida afeta positivamente a intenção de continuidade do uso, porém, não foi possível confirmar que a falha cognitiva na internet afeta negativamente a satisfação do indivíduo com o design de conteúdo e o design de interface do sistema e-learning, nem que a satisfação com o design de conteúdo e o design de interface afeta positivamente o valor de utilidade percebida. Em tempos de limitações financeiras, especialmente no setor público, os sistemas e-learning possibilitam que o treinamento atinja diversas forças de trabalho dispersas geograficamente, tornando-se ferramentas populares para facilitar processos de ensino e aprendizagem que viabilizam um aprendizado flexível.


Fatores que afectan la intención de continuar utilizando sistemas de aprendizaje electrónico: un estudio con servidores públicos federales

Resumen
Este estudio tuvo como objetivo examinar cuáles son los reflejos de las fallas cognitivas cuando los servidores públicos federales usan Internet en la satisfacción del diseño de contenido, en la satisfacción del diseño de la interfaz y de estos en el valor de utilidad percibido y en la intención de continuar usando los sistemas y -aprendizaje utilizado en cursos de formación. Con este fin, se realizó una investigación descriptiva, con un enfoque cuantitativo y con datos recopilados de una encuesta aplicada a 50 funcionarios de un hospital universitario federal ubicado en la región del Medio Oeste de Brasil. Para probar las hipótesis, se aplicó la técnica de ecuaciones estructurales. Entre los resultados, se observó que el valor de utilidad percibido afecta positivamente la intención de continuar usándolo, sin embargo, no fue posible confirmar que la falla cognitiva en Internet afecte negativamente la satisfacción del individuo con el diseño de contenido y el diseño de la interfaz, el sistema de aprendizaje electrónico, y esa satisfacción con el diseño de contenido y el diseño de la interfaz afectan positivamente el valor de utilidad percibido. En tiempos de limitaciones financieras, especialmente en el sector público, el aprendizaje electrónico permite que la capacitación llegue a varias fuerzas de trabajo dispersas geográficamente, convirtiéndose en herramientas populares para facilitar los procesos de enseñanza y aprendizaje que permiten un aprendizaje flexible.

Palabras clave: Diseño de contenidos. Diseño de interfaz. Hospital Intención.
INTRODUCTION

E-learning (electronic learning) generally refers to the use of computer network technology, mainly through the intranet or the internet to provide information and instructions to individuals (SALAS, KOSARZYCKI, BURKE et al., 2002), which is developed in a complex ecosystem integrating technology and teaching techniques to produce an innovative educational format (SAN-MARTÍN, JIMÉNEZ, RODRÍGUEZ-TORRICO et al., 2020).

The characteristics of e-learning fulfill the requirements for learning in a technologically advanced society and have created a great demand for institutions for e-learning systems (SALAS, KOSARZYCKI, BURKE et al., 2002). E-learning also gives the possibility for extending the face-to-face training for diversified and geographically dispersed workforces, in an efficient way that can be implemented on-demand at a lower cost than in loco learning (LEE, HSIEH and MA, 2011; AL-FRAIHAT, JOY and SINCLAIR, 2020).

In the last years, e-learning systems have become popular tools to facilitate the teaching and learning processes and they enable flexible and student-centered training (LEE, HSIEH and MA, 2011). In this case, the e-learning system can integrate a wide variety of instructional materials (e.g., via audio, video, and text media) transmitted by email, live chat sessions, online discussions, forums, questionnaires, etc. (AL-FRAIHAT, JOY and SINCLAIR, 2020).

Furthermore, e-learning includes internet, intranet, extranet, satellite transmissions, interactive TV, and CD-ROMs, enabling synchronous and asynchronous communication and instructional delivery between professors and students. As a consequence, these e-learning systems can meet the needs of several individuals in a better way, such as public servants who are geographically dispersed or who have conflicting schedules (LEE, HSIEH and MA, 2011).

However, several factors can make the learning process unachievable through e-learning. Concerning the cognitive process, one of these factors is the cognitive failure, which refers to a detachment from the functional cognitive operation and includes negligence, loss of memorized information, distraction and, lack of ideas (BROADBENT, COOPER, FITZGERALD et al., 1982). Such failures can be the result of distraction from external stimuli (e.g., loud noises), thoughts and internal distractions (e.g., daydreams) and ramblings or distractions from the mind that can lead to mistakes in achieving a task. Moreover, cognitive failure may reflect a decrease in the efficiency of perceptual levels of selective attention (i.e., unfocused perceptual resources) (HONG, TAI, HWANG et al., 2017).

A person with attention deficiency has difficulty concentrating, he suffers from increased irritability and is prone to errors in cognitive tasks. When cognitive failure occurs in the use of the internet, it can impact the user’s satisfaction with the interface design and the content design of a system, which will also affect the decrease in the perceived utility value and the non-intention of continuing the use of that system. In this context, Liu (2005) argued that there is still limited evidence to indicate how cognitive failure in the use of the Internet manifests itself, cognitively and affectionately, regarding an e-learning system.
Given the above, this article seeks to answer the following question:

- What are the reflexes of cognitive failures in the use of the internet, in the satisfaction of content and interface design, in the perceived utility value and in the intention to continue using government e-learning systems?

Therefore, this study aimed to examine what are the reflexes of cognitive failures in the use of the internet by federal public servants, in the satisfaction of content design, in the satisfaction of interface design and of these kinds of design in the perceived utility value and in the intention to continue using the e-learning systems adopted in the enhancement courses.

Although there is substantial research on the impact of e-learning on academic learning, few studies have examined the perceptions of professionals in the labor market regarding this pedagogical innovation in the workplace (CHIU and WANG, 2008). This gap is significant due to the fact that the lack of consideration of individuals’ perceptions and attitudes regarding e-learning in the workplace can prevent the use of e-learning systems, especially in the public sector (VAUGHAN and MACVICAR, 2004; ADMIRAAL and LOCKHORST, 2009).

Thus, it is important to understand the role of individual attitudes towards technology (SANTOS, MOURA, MATOS et al., 2019), since the use of e-learning depends on it (AHMED, 2010). The constant changes and updates of e-learning technologies highlight the value of exploring the impact of individuals’ digital literacy and its adoption in the workplace. Digital literacy includes more than the ability to use certain software or another digital device; it involves a wide variety of complex cognitive, emotional and sociological skills, which are important for users to be more effective in digital environments (MARTIN and MADIGAN, 2006).

**THEORETICAL FRAMEWORK**

**Cognitive failure on the internet, content design and interface design**

Regarding the cognitive process, cognitive failure is the individual’s incapacity related to his perception and memory capacity when performing a task (SCHMIDT, NEUBACH and HEUER, 2007). An individual with attention deficit has difficulty concentrating, he suffers from increased irritability and he is prone to errors in his tasks (WHELAN, ISLAM and BROOKS, 2017, 2020). As such, they cannot easily remain in an environment that requires interaction with learning tasks (STAATS, KIEVIET and HARTIG, 2003). Therefore, when using the internet, cognitive failures can affect the perception of the content design and the interface design of the search page, the software or of the used system, etc.

Concerning the content design of e-learning systems, Al-Samarraie, Teo and Abbas (2013) found that presenting content with a good structure can influence the students’ attention, which can lead them to think deeply and help them to better understand the content. If students are unable to figure out how the content should be connected, they will not be able to understand the meaning of the information presented. Thus, previous studies
have examined the effects of content quality to check if participants could understand it better, in addition to encouraging them to improve the usability of learning systems (WOODS and HOLLNAGEL, 2006).

On one hand, the multimedia design has the purpose of dealing with the problems inherent in the interface design perceived by the user (SUTCLIFFE, KURNIAWAN and SHIN, 2006). Connolly, Stanfield and Hainey (2009) found that there are variables relevant to multimedia design that affect the overall efficiency of an e-learning system and suggested that the interface and course content can be used to explore its effectiveness. A system with good interface design is easy to use, as users scan the screen and identify relevant information easily. On the other hand, a poorly designed interface (eg, badly represented icons and buttons) can create confusion and be misunderstood (CHO, CHENG and LAI, 2009). Evidence shows that the interface should guide the project of directing attention to achieve salient effects in different media (GARDINER and CHRISTIE, 1987), based on cognitive models of users’ attention and information processing skills (WICKENS, 1993).

Focusing on attention-directed design, the creation of human-computer interfaces may be necessary as a channel to apply more effective e-learning systems. Moreover, studies have observed that educators must design menus for digital learning courses in e-learning systems with good content and an easy-to-understand interface (REISETTER, LAPOINTE and KORCUSKA, 2007). Therefore, the interface and learning content must be harmonious and useful.

Other studies have investigated more deeply, what influences the perception of content design and interface design. Hong, Tai, Hwang et al. (2017) analyzed the users’ perception of content design and interface design of a Taiwanese government e-learning system. Among the results obtained, the authors found that if users have a high level of cognitive failure when using the internet, they will have low satisfaction with the content design and interface design of the e-learning system. Furthermore, the results also showed that if users are satisfied with the content and interface design project, they will realize the value of utility and, if this occurs, they will have the intention to continue using the e-learning system.

Based on the above, this study proposes the following research hypotheses:

**H1.** Cognitive failure on the internet negatively influences satisfaction with the content design of an e-learning system.

**H2.** Cognitive failure on the internet negatively influences satisfaction with the interface design of an e-learning system.

The non-rejection of the hypotheses H1 and H2 will indicate that cognitive failure on the internet plays an essential role in defining the use of an e-learning system. Also, when designing e-learning systems for instruction and/or training courses for government employees and when deciding where to invest efforts, one must consider how content design and interface design interact with behavioral intent mediated by the value of perceived utility.
Value of perceived utility and the intention of continuity of use

The perceived utility is defined as the degree to which an individual believes that a certain system will improve the performance of their work within an organizational context (DAVIS, 1989; SANTOS, MOURA, MATOS et al., 2019). Information systems researchers have stated that the value of perceived utility is valid when predicting the acceptance of the individual in several systems (DAVIS, 1989; VENKATESH, 2000; VENKATESH and DAVIS, 2000; HSU and LU, 2004). Previous studies revealed that the perceived utility value positively affected users’ behavioral intention to use technological systems (MARLER and DULEBOHN, 2005; HONG, TAI, HWANG et al., 2017).

In the context of e-learning systems within organizations, the perceived utility value refers to the extent that employees believe that the use of these systems will improve their learning performance. Therefore, it appears that, when employees perceive greater utility in an e-learning system, their acceptance will be more positive, which, consequently, improves their learning experience, increases their satisfaction and their intention to continue using the system in the future (ARBAUGH and DURAY, 2002; PITUCH and LEE, 2006).

Hence, the perceived utility value refers to how well a task relates to current goals, in addition to being a strong predictor of the individual’s options and Future Plans (ECCLES, 2005). Furthermore, the value reflects whether the functions of information systems are capable of meeting operational needs, while the utility focuses on the effectiveness perceived by users in transferring knowledge learned to the workplace.

In this sense, researches have investigated, through the perceptions of employees, the factors that influence the adoption and intention to use e-learning systems in the institutional context (CHENG, WANG, YANG et al., 2011; LEE, HSIEH and MA, 2011; LIN, HUANG and ZHANG, 2019). Given that, the intention of use or continuity of use can be understood by the amount of effort that the student is willing to make to use or continue using the tool in his activities (AJZEN and FISHBEIN, 1980).

Lee, Hsieh and Ma (2011) examined the influence of four determinants (individual, organizational, task characteristics and, subjective norm) on the perceived utility and intention to use e-learning systems. The authors found that organizational support and managerial support significantly affected perceived utility and the intention to use, in addition to confirming that individuals with experience in using computers and self-efficacy in their use had significantly positive effects on perceived ease of use. Furthermore, from the results, they concluded that the external variables that affect the perception of the utility, the perceived ease of use and, the intention to use should be considered important factors in the design process and the implementation and the use of e-learning systems.

Cheng, Wang, Yang et al. (2011) examined in China the influences of individual learning support and the perceived social support in the acceptance of e-learning systems based on competences. The results pointed out the positive effects of the support for perceived individual learning and the perceived social support to promote a cooperation standard about the employees’ intention to use the e-learning system. They also found that the perceived social support for improving social ties had a negative effect on employees’ behavioral intent. Additionally, they confirmed that demographic characteristics, such as gender, age, previous experience, and differences in work experience, have significant influences on acceptance.
Lin, Huang and Zhang (2019) investigated the relationship between employees’ perceptions of the use of an e-learning system, within an existing organizational learning culture (OLC), and job satisfaction. The results suggest that employees’ acceptance in the use of e-learning is a positive indicator of OLC and employees’ job satisfaction; OLC mediates the relationship between the use and the acceptance of e-learning by employees and their satisfaction at work.

Based on the arguments presented, the following research hypotheses are postulated:

**H3.** Satisfaction with content design positively influences the perceived utility value of an e-learning system.

**H4.** Satisfaction with the interface design positively influences the perceived utility value of an e-learning system.

**H5.** The perceived utility value positively influences the intention to continue using an e-learning system.

The non-rejection of the hypotheses **H3** and **H4** indicates that the perceived utility value of an e-learning system is positively influenced by satisfaction with an individual’s content design and interface design. Furthermore, the non-rejection of **H5** will indicate that the intention to continue using an e-learning system is positively influenced by the perceived utility value of a user.

These hypotheses are represented in Figure 1.

**FIGURE 1**
Research design

The confirmation of the hypotheses will indicate that the cognitive failures in the use of the internet negatively reflect on the individual’s satisfaction with the content design and the interface design of an e-learning system; and that these, on the other hand, reflect positively on the value of perceived utility and on the individuals’ intention to continue using it.
METHODOLOGY

Research population

This descriptive research was carried out with a predominantly quantitative approach based on a survey, using the data collection method through the application of a questionnaire to public servants of a federal university hospital located in the Midwest Region of Brazil. The final sample was non-probabilistic because of accessibility, given that one of the authors works at this institution, and added up to 50 responses.

The survey data was collected through a questionnaire applied through the Google Docs platform and sent to servers in May and June 2019. The choice of public servants is justified first by the fact that, in recent years, due to the reduction of costs, public institutions are using the e-learning modality for the permanent qualification of their servants, secondly to the pretension of progress in their careers, given that the realization of courses in this modality, aligned with the career plans of each category of public servants, has increased due to its practicality, flexibility and, efficiency.

Furthermore, e-learning technology has had a profound impact on education, learning methods and, teaching. In traditional training, accessibility to learning materials is restricted and collaboration and communication are also limited to individuals in the same classroom (AL-FRAIHAT, JOY and SINCLAIR, 2020). In e-learning, a large number of learning resources in different formats are available on the internet, promoting individualized learning and transcending geographical boundaries (AL-FRAIHAT, JOY and SINCLAIR, 2020).

Research constructs and measurement of variables

The study has 5 main constructs: a) internet cognitive failure (ICF); b) satisfaction with the content design (SCD); c) satisfaction with the interface design (SID); d) perceived utility value (UV); and e) intention to continue using (IC). These constructs were measured from multiple items, with a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree”. Box 1 presents the constructs, the questions that make up the research instrument and, the respective references.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Questions</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet cognitive failure (ICF)</td>
<td>I often misinterpret the meaning of the message, so I must read it again.</td>
<td>Daniel and Woody (2013)</td>
</tr>
<tr>
<td></td>
<td>I often find it difficult to find the information I need on the web page.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If there are too many messages on the screen, I always miss the information that is there.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I often lose the location of what I publish on the internet.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I often forget what message I posted.</td>
<td></td>
</tr>
</tbody>
</table>

Continue
<table>
<thead>
<tr>
<th>Constructs</th>
<th>Questions</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>satisfaction with the content design (SCD)</td>
<td>The content of the system is easy to understand.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The hierarchical structure of the content is easy to follow.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The feedback (help tool) offered by the system can help me understand the content.</td>
<td>Vekiri (2013)</td>
</tr>
<tr>
<td></td>
<td>In general, the connection between the units (content) is easy for me to follow.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel that the content of the courses in the system is designed according to the student’s level.</td>
<td></td>
</tr>
<tr>
<td>satisfaction with the interface design (SID)</td>
<td>The system worked steadily without interrupting my learning.</td>
<td>Lohr (2000)</td>
</tr>
<tr>
<td></td>
<td>The course images did not interfere with my learning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The course music and / or sound effects did not interfere with my learning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The course operation did not interfere with my learning.</td>
<td></td>
</tr>
<tr>
<td>Perceived utility value (UV)</td>
<td>The knowledge gained from online learning is beneficial for my work.</td>
<td>Lohr (2000)</td>
</tr>
<tr>
<td></td>
<td>I gained more relevant knowledge from online learning courses than I did from work.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I learned the necessary daily knowledge through online courses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel that online courses can improve my job performance.</td>
<td></td>
</tr>
<tr>
<td>Intention to continue using (IC)</td>
<td>I would choose to have online learning to gain knowledge related to my work.</td>
<td>Chiu, Chiu and Chang (2007)</td>
</tr>
<tr>
<td></td>
<td>I would choose to have online learning to gain knowledge relevant to my position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would choose to have online learning to gain knowledge for my daily life.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would recommend others to take courses through the online system.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

The research instrument mentioned the respondent to relate his experiences with enhancement courses carried out through online systems and was presented in 2 blocks, the first being divided into 5 constructs and the second referring to the data to characterize the profile of the respondents.

In the first block, the first construct highlighted aspects related to internet cognitive failures (ICF), with support from Daniel and Woody (2013). The second treated satisfaction with the content design (SCD), with questions based on the study by Hong, Tai, Hwang et al. (2017). The third covered satisfaction with interface design (SID), with questions based on the study by Vekiri (2013). The fourth dealt with the value of perceived utility (UV) with questions based on the study by Lohr (2000). The fifth and last construct treated the intention of continue using...
(IC), with questions based on the study by Chiu, Chiu and Chang (2007). Finally, the second block was composed of 4 statements that aimed to identify age, position, education and, time spent in the public service.

To analyze the data, we used the technique of structural equation modeling [SEM], estimated from partial least squares [PLS]. PLS makes it possible to test a set of variables, in order to investigate the level of explanation of the predictor variables for the dependent variables (multiple regression aspects), with the indicative of the most important predictor variable (factorial analysis) (KLEM, 2006).

**DESCRIPTION AND ANALYSIS OF RESULTS**

**Profile of respondents**

The characteristics of the respondents are shown in Table 1 (time of service, age and, position).

<table>
<thead>
<tr>
<th>Service time</th>
<th>N</th>
<th>%</th>
<th>Age</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 1 year</td>
<td></td>
<td></td>
<td>From 18 to 24 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From 1 to 5 years</td>
<td>23</td>
<td>46%</td>
<td>From 25 to 30 years</td>
<td>8</td>
<td>16%</td>
</tr>
<tr>
<td>From 5 to 10 years</td>
<td>17</td>
<td>34%</td>
<td>From 30 to 35 years</td>
<td>13</td>
<td>26%</td>
</tr>
<tr>
<td>From 10 to 15 years</td>
<td>9</td>
<td>18%</td>
<td>From 35 to 40 years</td>
<td>14</td>
<td>28%</td>
</tr>
<tr>
<td>Above 15 years</td>
<td>2</td>
<td>4%</td>
<td>From 40 to 45 years</td>
<td>13</td>
<td>26%</td>
</tr>
<tr>
<td>Over 45 years</td>
<td>2</td>
<td>4%</td>
<td></td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100%</td>
<td><strong>Total</strong></td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position/function</th>
<th>N</th>
<th>%</th>
<th>Position/function (continuation)</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>4</td>
<td>8%</td>
<td>Economist</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Accounting analyst</td>
<td>1</td>
<td>2%</td>
<td>Nurse</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>Admin Analyst</td>
<td>1</td>
<td>2%</td>
<td>Statistic</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Administrative Analyst - Economics</td>
<td>1</td>
<td>2%</td>
<td>Physiotherapist</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Accounting analyst</td>
<td>1</td>
<td>2%</td>
<td>Pedagogy</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Administrative assistant</td>
<td>17</td>
<td>34%</td>
<td>Administrative technician</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Head of Unit</td>
<td>2</td>
<td>4%</td>
<td>Sports coach</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Accounting Sciences</td>
<td>1</td>
<td>2%</td>
<td>Administrative Technician - Education</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Counter</td>
<td>5</td>
<td>10%</td>
<td>Interpreter Translator</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Teacher</td>
<td>1</td>
<td>2%</td>
<td>Total</td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.
According to the demographic data identified in Table 1, it appears that the majority of respondents (28%) are aged between 35 and 40 years, followed, respectively, by those aged from 30 to 35 and from 40 to 45 years, both age groups with (26%), while 16% are in the age group between 25 and 30 years old and those over 45 years old total 0.04%.

With regards to the time of service, it is analyzed that 46% have 1 to 5 years of service, followed by 34% with 5 to 10 years, 18% with 10 to 15 years and 4% over 15 years. Concerning the position exercised by the interviewees, within a total of 20 functions, it was revealed that the majority (34%) works as an administrative assistant, followed by two other positions that assumed prominence - accountant and nurse (both with 10%). The various other positions mentioned do not exceed 4%. Additionally, the graduation of respondents was solicited, totaling 27 different areas, among which the following can be mentioned: Administration (15); Accounting and Nursing (3 each); Statistics (2); and Systems Analysis, Economic Sciences, Law, Engineering, Public Management, Physiotherapy, Geography, Arts (Portuguese and English), Agribusiness, Pedagogy, Physical Education and Advertising (1 each).

**Measurement model**

To test the data, the PLS-SEM model was applied and analyzed in 2 steps: a) measurement model; and b) structural model (HAI R JUNIOR, HULT, RINGLE et al., 2014).

In order to analyze the measurement model, the reliability (individual and composite) and the validities (convergent and discriminant) of the measures of the constructs are emphasized (RINGLE, SILVA and BIDO, 2014). For the measure of reliability, Cronbach’s alpha indicators and composite reliability are observed. According to Hair Junior, Hult, Ringle et al. (2014), indexes below 0.70 and above 0.50 for the reliability coefficients can be accepted when it comes to exploratory models. In the case of this research, it was identified that the perceived utility value construct (UV) presented a coefficient of 0.685; but it can be considered exploratory, given the limited research on the subject.

Subsequently, the convergent validity evaluation was performed using the average variance extracted [AVE], in which the values of each latent variable must be higher than the coefficient of 0.50 (HAI R JUNIOR, HULT, RINGLE et al., 2014). Although it was identified that the construct internet cognitive failure was slightly below the recommended, having the result of 0.472. It was decided not to exclude any of the statements in this construct, given that, theoretically, all were aligned and, in this case, some inclusion would impact the coefficients of other indexes.

The discriminant validity was applied to verify the validity and adequacy of the model. In this study, this criterion was evaluated according to Fornell and Larcker (1981) and is confirmed when the value of the square root of the AVE is higher than the absolute values of the correlations with the other latent variables, both vertically and horizontally (RINGLE, SILVA and BIDO, 2014).

Table 2 presents the results of the criteria detailed above.
TABLE 2
Measurement model results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbach's alpha</th>
<th>Composite reliability</th>
<th>AVE</th>
<th>Discriminant validity</th>
<th>Variables</th>
<th>ICF</th>
<th>IC</th>
<th>SCD</th>
<th>SID</th>
<th>UV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICF</td>
<td>0,737</td>
<td>0,817</td>
<td>0,472</td>
<td>ICF</td>
<td>0,687</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>0,735</td>
<td>0,830</td>
<td>0,570</td>
<td>IC</td>
<td>-0,254</td>
<td>0,755</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCD</td>
<td>0,752</td>
<td>0,835</td>
<td>0,561</td>
<td>SCD</td>
<td>-0,289</td>
<td>0,218</td>
<td>0,749</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SID</td>
<td>0,843</td>
<td>0,890</td>
<td>0,673</td>
<td>SID</td>
<td>-0,283</td>
<td>0,240</td>
<td>0,493</td>
<td>0,821</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VU</td>
<td>0,685</td>
<td>0,816</td>
<td>0,598</td>
<td>VU</td>
<td>-0,243</td>
<td>0,447</td>
<td>0,012</td>
<td>-0,082</td>
<td>0,773</td>
<td></td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

In accordance with Hair Junior, Hult, Ringle et al. (2014), it is highlighted that the results in Table 2 indicate a positive evaluation of the measurement model. Thus, the fulfillment of the criteria for the measurement model and the possibility of proceeding with the evaluation of the structural model is emphasized.

Structural model

For the evaluation of the structural model, estimates of the structural equations were performed by means of bootstrapping analysis to assess the significance of the relationships between the latent variables used in the study and to test the research’s hypotheses (HAIR JUNIOR, HULT, RINGLE et al., 2014). Additionally, Pearson's determination coefficient (R2) was also evaluated, which reflects the predictive validity of the model; and the predictive relevance (q2) or Stone-Geisser indicator, in which the values of endogenous variables must be greater than zero (HAIR JUNIOR, HULT, RINGLE et al., 2014).

The results of the tests performed are presented in Table 3 by the tested model, in which the path coefficients, the significance and, the R2, f2 and, q2 statistics of the endogenous constructions are shown.

TABLE 3
Path coefficients and structural model evaluation

<table>
<thead>
<tr>
<th>Paths</th>
<th>β</th>
<th>t-value</th>
<th>p-value</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICF -&gt; SCD</td>
<td>-0,289</td>
<td>1,176</td>
<td>0,240</td>
<td>H1</td>
</tr>
<tr>
<td>ICF -&gt; SID</td>
<td>-0,283</td>
<td>1,145</td>
<td>0,253</td>
<td>H2</td>
</tr>
<tr>
<td>SCD -&gt; UV</td>
<td>0,069</td>
<td>0,298</td>
<td>0,766</td>
<td>H3</td>
</tr>
<tr>
<td>SID -&gt; UV</td>
<td>-0,116</td>
<td>0,496</td>
<td>0,620</td>
<td>H4</td>
</tr>
<tr>
<td>UV -&gt; IC</td>
<td>0,447</td>
<td>3,876</td>
<td>0,000</td>
<td>H5</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

Note: R²: IC: 0,200; SCD: 0,083; SID: 0,080; UV: 0,010; q²: IC: 0,077; SCD: 0,020; SID: 0,035; UV: -0,014; f²: ICF: 0,087; SCD: 0,004; SID: 0,010; UV: 0,250.
Cognitive failure is the individual’s cognitive disability related to his perception and memory capacity related to the task’s performance (SCHMIDT, NEUBACH and HEUER, 2007), and it can be linked to several situations, one of which is the use of the internet. Therefore, in the first and second hypotheses, we sought to verify its negative impact on the content design and on the interface design of a learning system, as an individual with this disability may have serious difficulties (STAATS, KIEVIET and HARTIG, 2003) even if the content is easy and has a simple interface. Hence, from the obtained coefficients, the hypotheses (1 and 2) were rejected, because, even if the β values are negative in the respective relationships, they were not statistically significant.

In the third and fourth hypotheses, it was theoretically assumed that the easier the content design and the interface design, the better the individual will believe that a certain system will improve the performance of their work within a certain context (DAVIS, 1989). However, based on the results obtained, it was not possible to confirm these relations (H3 and H4).

Information systems researchers have stated that the perceived utility value is valid to predict the individual’s acceptance in various systems (DAVIS, 1989; VENKATESH, 2000; VENKATESH and DAVIS, 2000; HSU and LU, 2004). Thus, it was conjectured to H5, that the perceived utility value is positively related to the intention to continue using, which was confirmed (β: 0.447 and p-value <1%). This result is in line with some previous studies, which revealed that the perceived utility value positively affected users’ behavioral intention to use e-learning systems (MARLER and DULEBOHN, 2005; HONG, TAI, HWANG et al., 2017).

In this context, Lin, Huang and Zhang (2019) accentuate that the integration of e-learning systems in the workplace is beneficial, as it promotes the acquisition of knowledge and the sharing of experiences. And, consequently, the bigger the perceived utility of using e-learning systems is, the higher the intention to continue using this system, especially in public institutions.

**CONCLUSIONS**

This study aimed to examine what are the reflexes of cognitive failures in the use of the internet by federal public servants in the satisfaction of content design and interface design, in the utility value and, in the intention to continue using e-learning systems offered in government courses.

Summarizing, the theoretical-empirical evidence in this study shows that the utility value positively affects the intention to continue using, given that previous research has produced limited results for individual-centered explanations of the use of governmental e-learning systems (HONG, TAI, HWANG et al., 2017). However, it was not possible to confirm neither that cognitive failure on the internet negatively affects the individual’s satisfaction with the content design and interface design of the e-learning system nor that satisfaction with the content design and interface design positively affects the perceived utility value.

With these findings, it can be inferred that further researches that emphasize the variable cognitive failure are needed, given the limited evidence to indicate how the cognitive failure resulting from the use of the internet manifests itself cognitively and affectionately in connection with e-learning systems (LIU, 2005). That is because information and communication technologies have dramatically changed the way people teach and learn.
E-learning, as a new approach to education, highlights student-oriented and lifelong learning (NGO, LAI and WANG, 2004). The characteristics of e-learning fulfill the requirements for learning in a technologically advanced society and have created a great demand from companies for these types of systems. In times of financial limitations, especially in the public sector, e-learning allows training to reach several geographically dispersed workforces efficiently, as it can occur on-demand and at a lower cost than face-to-face training. E-learning systems have become popular tools to facilitate flexible teaching and learning processes.

The findings of this research contribute to the understanding of the intention to continue using technological resources, especially e-learning systems, in addition to highlighting factors that deserve significant attention when offering courses through these tools. These courses can improve the experience and the teaching-learning process in relation to the training of public servants, improving their performance and, consequently, contributing to the expansion of organizational performance; among other organizational objectives is the training of its workers. Organizational performance, in its simplistic state, consists of the achievement of organizational objectives. Organizations must have measurable goals, as this is essential for the involvement and commitment of the employees with the organization (ABUBAKAR, ELREHAIL, ALATAILAT et al., 2019).

However, this research also has some limitations that can be overcome in future studies. Although the data analyzes performed are based on reliable statistical techniques, the sampling method, due to accessibility, and the sample size, relatively small, stand out in the view of the strict requirements of a structural equation modeling technique implemented to validate reliability, the convergent validity and the discriminating validity of the scales. Based on such limitations, it is suggested that future studies expand the sample’s size, extending it to employees of public institutions in other sectors (i.e., Legislative and Judiciary), as well as other institutions of the Executive and, still, other regions of the country.
REFERENCES


FORNELL, C.; LARCKER, D. F. Structural equation models with unobservable variables and measurement error: algebra and statistics. Journal of Marketing Research, v. 18, n. 3, p. 382-388, 1981.


CRISTIANE Aparecida da Silva
ORCID: https://orcid.org/0000-0003-4052-4231
Accountant at the Federal University of Grande Dourados (UFGD); PhD student in accounting by the graduate program in accounting at the Federal University of Santa Catarina, Florianópolis - SC, Brazil.
E-mail: cristianedasilva@ufgd.edu.br

EDICREIA Andrade dos Santos
ORCID: https://orcid.org/0000-0001-8745-3579
PhD in accounting from the graduate program in accounting at the Federal University of Santa Catarina; Professor of Accounting Sciences at the Federal University of Paraná, Curitiba - PR, Brazil.
E-mail: edicreiaandrade@yahoo.com.br