

Motivational Factors and the Intention of Use of a Virtual Learning Environment

A Preliminary Study about an e-Learning Application Developed by the Brazilian Ministry of Education

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Abstract: This research aims to verify the impact of motivational factors on the intention of use of a Virtual Learning Environment. The environment studied was an e-government web application used by The Brazilian Ministry of Education offered to Brazilian high schools. In this preliminary approach, a case study was done in a private school in Rio de Janeiro followed by an experiment with 20 of its students. Qualitative and quantitative data allowed to endorse some of the results. Previous studies have indicated that teenagers tend to be motivated by playful environments, pointing to the importance of the perceived enjoyment factor. Nevertheless, in this study the perceived usefulness factor appeared as the greatest motivator for the intention of use of the adopted technology. The results of this study will be beneficial for increasing our understanding of new generation adoption of technology.

1 INTRODUCTION

Like many other sectors, the education sector has been modified and improved by the use of technology. Nowadays the use of Virtual learning Environments or Blended Environments are becoming ordinary, especially for the new generation. Teenagers are enrolling in educational courses with a high technological expectation. The aim of this research is to throw some light and to arise some questions about which are the relevant factors when dealing with technological adoption by this new generation.

Technology adoption has been the subject of many studies (Davis, 1986; Dias, 2001; Silva, 2006; Raaij, Schepers, 2008; Ghosh, Pries, 2013). The motivation for this research is to understand the behavior of teenaged students in relation to a Virtual Learning Environment. The target population was specified as Brazilian teenaged students.

The Brazilian Ministry of Education built an e-government platform called e-Proinfo (MEC, 2013). The studied group was composed by first and second

year high school students. This article is based on the following question: **“How do motivational factors impact the intention of use of a Virtual Learning Environment (VLE) by school students?”**

This investigation focused three important motivational factors in technology adoption (Davis, 1986; 1989; Fishbein, Ajzen, 1975):

- *perceived enjoyment*
- *perceived usefulness*
- *perceived ease of use*

The research aims to investigate how these factors are perceived by the high school students of a private school in relation to the VLE offered. It intends to analyze the impact of these factors on the *intention of use* of that environment.

2 RESEARCH MODEL

This research could be classified as a multi-method approach. It's composed of a case study and an experiment, see Figure 1. It intends to study the

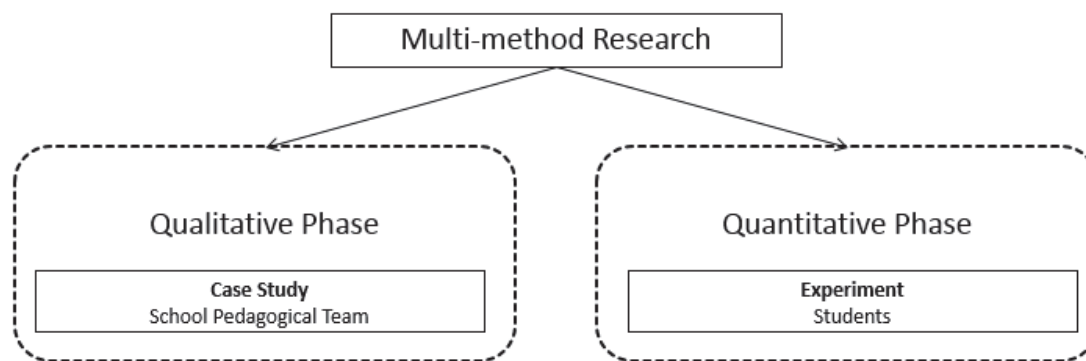


Figure 1: Transformative Multi-method Research Design.

phenomenon of technology adoption from different and complementary perspectives which according to Creswell (2008) is a transformative multi-method research approach. It collects two types of data satisfying different perspectives. The qualitative phase consists of a case study focused on the organizational perspective, i.e., the school’s point of view, and the quantitative phase consists of an experiment focused on the student’s perspective. A comparison of these two different perceptions of the same phenomenon was made in this study.

The case study method allows a more detailed and qualitative approach while the experiment method makes possible a more quantitative and objective analysis (Dias, Silva, 2010).

The case study was composed of the following:

- an interview with the pedagogical coordinator of the private school
- some visits to observe the school routine
- objective interviews with the pedagogical team

In addition, documents describing the school’s educational system were analyzed.

Twenty students from first and second year high school of the investigated school volunteered in the experiment. The experiment focused the same motivational factors as the case study. Some open questions were added in order to confirm the measured factors.

This work is part of an ongoing research towards investigating teenaged students’ behavior in adopting educational technologies (Marinho et al., 2013, 2014).

3 VIRTUAL LEARNING ENVIRONMENT (VLE)

A Virtual Learning Environment (VLE) is a web application where educational contents can be assembled with a variety of different accessing tools

(Santos, 2002; MEC, 2013). A VLE helps to manage a repository of educational contents and student evaluations. A constant monitoring of the progress made by participants can be done. The VLE can be used as an addition to classroom learning (blended learning) or only virtually. Many classes may occur at the same time.

Forums, chat rooms, text messaging, videos and calendars are some of the tools offered by a VLE which promote interaction among participants in a more ludic way. A VLE also manages different types of participants; among others, it can be used by students, teachers, and coordinators.

This technology allows us to enhance the traditional education practice or to completely transform the process of teaching and learning through a technology rich environment (Bray, Tangney, 2013) that brings enjoyment to how education is experienced.

Li *et al.* (2008) present a survey with some important technological aspects supporting e learning nowadays. Li *et al.* (2009) show some future technologies that can enrich the learning process.

4 TECHNOLOGY ADOPTION MODEL (TAM)

Many researchers have investigated user behavior when faced with a new technology. TAM, Technology Acceptance Model (Davis, 1986), is a very robust theory since a lot of empirical studies verified its constructs in relation to different settings, persons, ages, and times (Dias, 1998, 2001; Dias et al., 2005; Silva, Dias, 2004; Silva, 2006; Raaji, Shepers, 2008; Ghosh, Pries, 2013). TAM is an applied study of the attitudinal components of the Fishbein and Ajzen (1975) study. This psychological human behavioral model describes human behavior as a variable dependent on the intention of behavior.

Following this model, the intention of behavior is affected by an attitudinal component and a normative component:

$B \approx BI = w1.A + w2.SN$ (Fishbein, Ajzen, 1975), thus:

B → behavior

BI → behavior intention

A → attitude → attitudinal component such as beliefs/perceptions of consequences that would interfere in the final attitude

SN → subjective norm → normative component implying how social context affects intention of a certain attitude

w1 e w2 → components' weights

Davis (1986) drops down the normative component of the Fishbein and Ajzen (1975) model and its weights. Two basic factors were selected by Davis (1986) to compose these attitudinal components when referring to technology adoption: *perceived usefulness* and *perceived ease of use*.

Previous studies (Dias, 2001; Bray, Tangney, 2013) have indicated that teenagers tend to use the web environment in a more playful way. Thus, an antecedent included in this research was *perceived enjoyment* in order to verify teenagers perception.

The intention of behavior factors followed the theoretical model shown in Figure 2. *Actual use* could not be evaluated because the VLE was only available to the students during the experiment.

The *perceived usefulness* of a VLE is defined as “the degree to which an individual believes that using a particular system would enhance his or her job performance” (Davis, 1986).

The *perceived ease of use* of a VLE is defined as “the degree to which an individual believes that using a particular system would be free of physical or mental effort” (Davis, 1986).

The *perceived enjoyment* of a VLE is defined as “the extent to which the activity of using the computer is perceived as being enjoyable in its own right, apart from any performance consequences that may be anticipated” (Davis, Bagozzi, Warshaw, 1992).

5 ENVIRONMENT RESEARCH DESCRIPTION

The VLE used in this experiment was a virtual collaborative learning environment developed by the Brazilian Ministry of Education. It intends to promote a pedagogical use of information technology in public high schools. It allows the creation, management and development of many pedagogical elements, such as online courses, research projects, collaborative projects, and so on.

This VLE is offered by The Brazilian Ministry of Education (MEC, 2013). The name of the course content is “Qualification in Digital Technology”. The topics addressed are distance education, network societies and data processing evolution. It aims to prepare students to help each other in using schools labs.

The “Qualification in Digital Technology” is composed by four modules:

- introduction
- hardware
- the operational system
- computers maintenance

Forum, chat rooms, text production and collective text production are some of the available technological options.

This VLE can be categorized as an asynchronous and web-based learning solution (Li *et al.*, 2008). It allows users to learn according to their own schedule.

The case studied is a thirty-seven years old traditional private school in the west zone of Rio de Janeiro which began with 300 students in its high school and which now has more than 2,000 students. The interviewed pedagogical coordinator has worked at the school since its creation.

The school has its own educational system. It also has a site that was developed on its own. The site contains information on both the academics and the administration which is available to students and parents.

The classes have a traditional format. The school

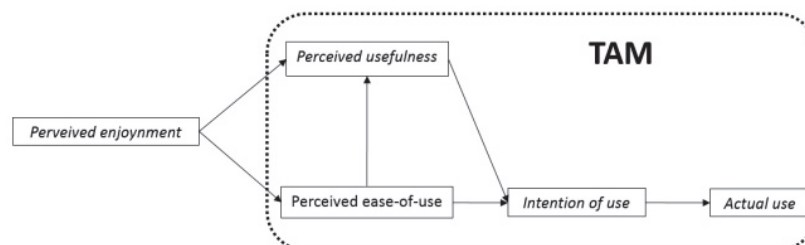


Figure 2: Technology Acceptance Model and Perceived Enjoyment Antecedent.

has some technological support used to help teachers on their classes: a multimedia kit with a computer and a data show is available to teachers if they want to expand their approach to a topic.

The school computer laboratory contains 25 computers with internet connection. This laboratory was used during the experiment.

Demographic information such as age and gender were collected as it was necessary to know the student profiles. All students were volunteers without prior knowledge of the VLE. The experiment occurred during class breaks which lasted thirty minutes. In the beginning of the experiment the computers were all logged into the VLE.

After some initial explanation of the experiment's objectives, the students were asked to perform five tasks. These tasks stimulated the navigation around the environment. After that, the students could navigate freely in the VLE for an unstipulated amount of time.

At the end of the experiment, the students had to fill out a questionnaire. The questionnaire contained 12 statements on different aspects of the research. Each aspect related to a motivational factor described above. The statements were given in random order.

For each statement, the students had to choose a value on a Likert scale of seven points. This Likert scale varied from "(1) totally disagree" to "(7) totally agree". The factor presented good coefficient of internal consistency using Cronbach's Alpha (Hair *et al.*, 1998), as show in Figure 3.

Motivational Factor	Cronbach's Alpha
<i>Perceived enjoyment</i>	0,88
<i>Perceived ease of use</i>	0,84
<i>Perveived usefulness</i>	0,76
<i>Intention of use</i>	0,82

Figure 3: Cronbach's Alpha.

Four open-ended questions and a field for comments were also given to the students. The questions were also related to the motivational factors. The whole process was accompanied by the researcher and his assistant in order to observe the participants' behavior.

6 PRELIMINARY RESULTS

The demographic profile of the experiment participating students is shown in Figure 4.

Year of High School	Total	Percentual
1 st	9	45%
2 nd	11	55%
Gender	Quantity	Percentual
Male	7	35%
Female	13	65%
Age	Quantity	Percentual
14	1	5%
15	9	45%
16	10	50%

Figure 4: Demographic variables.

Considering their use of technology and access to the internet, the profile of the interviewed students in our sample is the following:

- All have access to a computer and internet connection at home
- 90% have cell phones with internet access
- 80% access the internet on a daily basis

For each statement, an average was calculated by dividing the sum of the answers given to each statement by the number of valid respondents, as shown in Figure 5.

The factor with highest average (5.70) was *perceived usefulness* showing that students were most motivated by using of the VLE. In addition, this information was confirmed by the answers given to the open-ended question corresponding to this factor. *Perceived enjoyment* obtained the lowest average: 4.68. The timing of the experiment could have affected this result as it was done during the students' break time between classes, which is only 30 minutes, a time the students want to enjoy themselves.

Some students praised the different ways of navigating, but others struggled to locate items on the screen. One student didn't see the navigation options of the VLE because it was hidden under a fixed operational system actualization window.

Students demonstrated good interaction with computers. None of them related any difficulty in their use. They also showed a great ability to focus on a goal. To finish the experiment, the students spent an average of 10 minutes. Recalling that the interval used for the experiment was 30 minutes, the majority of the students showed interest in the topic addressed by the course. In the open-ended questions, only five of them declared that they didn't want to participate in the course.

Factor	Statement	Average	
		Statement	Factor
<i>Perceived enjoyment</i>	Use the VLE is fun	4,85	4,68
	I don't see time passing when using VLE	4,65	
	I find pleasurable to use the VLE	4,55	
<i>Perceived ease of use</i>	I find easy to use the VLE while learning about the topic	5,53	5,59
	I find easy to learning about the topic using the VLE	5,55	
	I find easy to use the VLE	5,70	
<i>Perceived usefulness</i>	Using VLE improves my learning performance	5,37	5,70
	Using VLE increases my learning productivity	5,60	
	Using VLE refine the quality of my learning	5,85	
	Overall, i find the VLE useful	6,00	
<i>Intention of use</i>	If i have access to VLE, i think i'll use it	4,85	5,03
	If i have access to VLE, i intend to use it	5,20	

Figure 5: Obtained average values.

7 DISCUSSION OF THE RESULTS

In this study, *perceived usefulness* was identified as the greatest motivator to make students adopt this technology. This endorses previous studies with adults (Dias, 1998; 2001; 2005; Dias *et al.*, 2005; Silva, 2006; Raaij, Schepers, 2008; Ghosh, Pries, 2013).

The experiment had only 20 students from a specific area of Rio de Janeiro. This research cannot be considered conclusive but reinforces the evaluated factors. It also enables insights to arise.

Although Dias (2001) makes us aware of the importance of the *perceived enjoyment* factor in a teenaged group, in this research this factor had the lowest average among the observed factors. This result can be explained by the students' anxiety in finishing the tasks. They also didn't spend much time exploring the technological tools offered. They didn't use some playful options such as chat or simulators.

One of the tasks of the experiment was to browse the VLE for some biographical information. This task forced students to use a content visualization tool in the VLE. This tool was praised by the students for its content and presentation format.

The *low Intention of use* value could be explained by the lack of time spent on the experiment and lack of training given to the students on the VLE. Therefore the students lacked sufficient contact with all offered technological tools.

Sometimes in the environment, a navigation tab was disposed on the bottom of the screen. Usually, the operational system showed some alerts in this area too. This kind of alert window inhibited the students' visualization of an important part of the offered content. For example, the use of a plug-in was required on one of the computers during the

experiment. This alert window overlapped the navigation tab's visualization.

Students received a great quantity of information in a short period, it could have generated a cognitive overload that may explain the increased focus on doing the tasks. Future research can use VLE training as a moderator variable for the studied motivational factors.

In general, students who took part in the experiment were daily internet users. The offered technology is not new to them. Future studies could verify the previous computer knowledge of participants, especially previous experience using the environment studied.

Survey information was collected from students of a private institution. Similar studies are suggested with students of public institutions in order to compare and validate results. The existence of relevant differences could be verified in such a comparison.

8 CONCLUSIONS

As observed by Dias (2001), motivational factors in the use of a technology show a significant difference between adults and youths. In a study with teenagers, it was expected that the *perceived enjoyment* would have been the most important factor to impact the *intention of use*.

Nevertheless, *perceived usefulness* appeared to be the most important factor in this experiment. It could be explained by the group's great ability to focus on a goal and by the short period of time in which the experiment took place.

The *perceived enjoyment* factor had the lowest average in the evaluated factors. This could be associated with the speed of the execution of the task and the lack of freely using the VLE's playful tools.

This research is part of an ongoing investigation about teenaged students' perception of technology adoption (Marinho *et al.*, 2013, 2014). Presently, a larger sample size is being collected to endorse or to refute the results of this preliminary study through a linear regression analysis with the three motivational factors as predictors and a correlation analysis between intended and actual use.

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