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Article

Virtual Learning Enviroments on face to face graduation courses: the process of adopting technology according to professors' perspective

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ABSTRACT

The concern with adoption and diffusion processes of Virtual Learning Environments is growing to the extent that such technology has been increasingly used as a supportive tool for teaching and learning in higher education classroom. This study aims to understand the environmental conditions in order to adopt and diffuse Virtual Learning Environments in higher education from the teacher's viewpoint, making use of a case study in a Federal University in the south part of Brazil. For this purpose, it was used as an analytical guide the constructs that make up the Unified Theory of Acceptance and Use of Technology – UTAUT. The results reveal the role of structural conditions and organizational management to adopt and diffuse technology, besides the way that professors from the mentioned University use the Virtual Learning Environments. It is also suggested a holistic approach to the investigation of the phenomena, taking into account the professor's teaching style, as well as the history of the different academic units regarding the technologies in question.

Key-words: Virtual learning environment. Adoption. Face-to-face learning.

RESUMO

A preocupação com os processos de adoção e difusão dos Ambientes Virtuais de Aprendizagem é crescente, à medida que tal tecnologia vem sendo utilizada cada vez mais como ferramenta de apoio aos processos de ensino-aprendizagem na educação superior presencial. Este estudo objetiva compreender as condições ambientais para a adoção e difusão de Ambientes Virtuais de Aprendizagem no ensino superior presencial na perspectiva do docente, valendo-se de um estudo de caso em uma universidade federal do sul do Brasil. Para tanto, utilizou-se como guia de análise os construtos que compõem a Teoria Unificada de Aceitação e Uso da Tecnologia – UTAUT. Os resultados revelam o papel das condições estruturais e de gestão da instituição na adoção e difusão da tecnologia, além da caracterização do uso dos ambientes virtuais pelos docentes na universidade estudada. Sugere-se, ainda, uma abordagem mais holística na investigação dos fenômenos, levando em consideração o estilo de ensino do docente, bem como o histórico das diferentes unidades acadêmicas em relação às tecnologias em questão.

Palavras-chave: Ambiente virtual de aprendizagem. Adoção. Difusão. Ensino presencial.

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RESUMÉN

La preocupación por el proceso de adopción y difusión de Ambientes Virtuales de Aprendizaje está creciendo, ya que la tecnología se está utilizando cada vez más como una herramienta de apoyo a los procesos de enseñanza y aprendizaje en el aula de educación superior. Este estudio tiene como objetivo comprender las condiciones ambientales para la adopción y difusión de Ambientes Virtuales de Aprendizaje en la educación superior en la perspectiva de enseñanza en el aula, a partir de un caso de estudio en una universidad federal en el sur de Brasil. Para ello, se utiliza como guía analítica las construcciones que conforman la Teoría Unificada de Aceptación y Uso de Tecnología – UTAUT. Los resultados ponen de manifiesto el papel de las condiciones estructurales y la gestión de la institución en la adopción y difusión de la tecnología, además de la caracterización de la utilización de ambientes virtuales para profesores en la universidad estudiada. Se sugiere, sin embargo, un enfoque más holístico en la investigación de los fenómenos, teniendo en cuenta el estilo de enseñanza del profesor, así como la historia de las diferentes unidades académicas en relación con las tecnologías en cuestión.

Palabras clave: Ambiente virtual de aprendizaje. Adopción. Difusión. Enseñanza en el aula.

INTRODUCTION

The investigation of the individual mechanisms of acceptance and use of information technology (IT) have been a recurring theme in the research of Technology Management. As Venkatesh, Thong and Xu (2012), understanding the impacts resulting from the introduction of a technological innovation and people's behavior on this process is key to realize the benefits of technology deployed.

The revolutionary nature of the introduction of Information and Communication Technologies (ICT) in several areas, such as in economic organizations and social networks, is also evident in education. According Huertas (2007), the application of ICT in education imply new educational and methodological possibilities, requiring a redefinition of the teaching-learning process. Chiuet al. (2005) also point to the importance of the adoption process, and the continued use of technologies by users as determinants of successful employment of the same. Indeed, as Selim (2007), to propose methodologies for the strategic management of educational technology from an approach critical success factors, many authors include the technological dimension as an important element to be considered. In this dimension, are included concerns about the selection and implementation of technology and its acceptance and effective use continued by all involved.

As Rogers (2003), the diffusion of an innovation takes place from individual adoptions over time in a population. The growing interest in understanding the process of adoption of the technology led to the formulation of various models, mainly grounded in psychology and sociology theories. A review and synthesis of eight theories / models of acceptance and use of technology resulted in the unified theory of the proposition of acceptance and use of technology (UTAUT - Unified Theory of Acceptance and Use of Technology) by Venkatesh et al. (2003), which presents itself as the state of the art in this research field. This theoretical structure is particularly useful in understanding the dynamics inherent in the adoption process and dissemination of educational technologies (Straub, 2009).

In the present study, the considered technology are the Virtual Learning Environments (VLE). Such environments are web-based

platforms that provide tools to support teaching and learning processes, such as availability of content, delivery tasks, carrying out activities and interaction among participants. As Longhiet al. (2012), the federal university, object of this study understands the benefits of the introduction of ICT in education in order to enable new pedagogical practices, more interactive and constructivist, recognizing the benefits that such technologies provide the enabling teachers and students to access and share information more efficiently, at any time and place.

The Department of Distance Education University has intensified the encouragement of adoption of such technologies as support for classroom teaching activities as an important and strategic requirement to disseminate educational practices of distance education, preparing and empowering teachers for this type of education, which has shown strong growth trend (NITZKE; GRAVINA; Carneiro, 2008). Nevertheless, in the first quarter of 2013, only 37% of teachers used a virtual learning environment with institutional support in their classrooms.

Therefore the aim of this study is to investigate, in the light of the constructs of UTAUT, environmental conditions for the adoption of virtual environments among teachers in higher education classroom in a federal university in the South of Brazil.

1. THEORETICAL REFERENCE

1.1. The technologies in education and the Virtual Learning Environments

The increasing diffusion of ICT in education is responsible for significant changes in learning communities, giving rise to creative and innovative methods of teaching and learning (MAIA; Meirelles, 2002).

According to Huertas (2007) is defined as educational technologies all derived resource information and communication technology applications to the educational environment, such as online platforms for collaborative learning, digital libraries, materials in electronic format, internet, mobile devices, etc. Learning models arising from this context require a different attitude from both the student and the teacher, compared to traditional teaching methods (MAIA; Meirelles, 2002).

Among the technological innovations applied to education, those based on the web have had special growth and application. In fact Peat (2000) reports that the merger of educational technology with the Internet offers a new generation of experiences in the learning process, which includes the development of Virtual Learning Environments (VLE). According to Tori (2010), VLE environments are usually web-based, intended for the electronic management of virtual courses and learning activities. The environment allows reusability of typical techniques of the classrooms, the development of recreational activities, the improvement of learning strategies, among others, making the teacher interacts with students in order to become a cognitive provocative of the teaching process and learning.

Although many higher education institutions have realized the importance of technology in their teaching and learning processes and made investments to develop and facilitate the implementation and acceptance processes, their effectiveness remains an unanswered question (BOGHKIAN-WHITBY and MORTAGY, 2008). Accordingly, Bower and Hardy (2004) argue that technological innovations bring new issues and concerns and unfamiliar and therefore research is needed to investigate the aspects and factors associated with introducing new techniques of teaching and learning.

In technology projects, involve users in the development process is a strategy widely used aiming at full adequacy of the system (TAIT, Vessey, 1988; HSU et al, 2012.). This practice has been held by developers in the hope that there is an increase in the use of technology, but it is not always possible to involve the whole team, so there is no guarantee that the technology will be suitable for everyone (Lévy, 1993). The failure of computerization may be related precisely to the complexity of a system. Therefore, it is necessary to study the technology conditions of acceptance by users, considering the different institutional, cultural and individual aspects related to the adoption process.

1.2. UTAUT - Unified Theory of Acceptance and Use of Technology

Based on a comprehensive literature review, Venkatesh et al. (2003) developed a unified theory of acceptance and use of technology (UTAUT - Unified Theory of Acceptance and Use of Technology). The UTAUT summarizes eight theories/models of acceptance and use of technology, including Innovation diffusion theory and incorporates four constructs that influence the intended use and the use itself, technology: performance expectancy, effort expectancy, influence social and facilitating conditions. In turn, these constructs have their effects mediated by the moderators: gender, age, experience and willingness to use the technology.

The construct of expectation of performance is based on five models: TAM/TAM2; combination between TAM and TPB; MM; MPCU; RTD and TCS. From the collection of these, Venkatesh et al. (2003) defined performance expectations as the degree to which the individual believes that the use of the system will bring performance gains in their activities. on the other hand the expectation

effort is built on three very similar models in definitions and scale measures: TAM/TAM2; MPCU and RTD. Through it, the individual assesses the degree of difficulty associated with the use of the system (VENKATESH et al., 2003).

Social influence is defined as the degree of perception of the individual in relation to others about the faith of those towards the need of using a new technology (VENKATESH et al., 2003). This construct is especially important when using technology is voluntary, but is significant when adoption is compulsory. Based on the models of subjective norm (TRA, TAM2, TPB/DTPB and the combination TAM / TPB), the social factors (MPCU) and image in (ITD).

The construct called facilitating conditions is described as the degree to which the individual believes there is an organizational and technical infrastructure to support the use of technology in question (VENKATESH et al., 2003). According to the authors, this definition focuses concepts embodied in three different constructs: perceived control of behavior (TPB/DTPB, TAM/TPB combination), facilitating conditions (MPCU) and compatibility (ITD).

From the identification of the constructs of the model, Venkatesh et al. (2003) conducted empirical studies to validate them. The model was applied in two organizations, and the results confirmed the existence of three constructs as direct determinants of intended use and two constructs as direct determinants of use, beyond the influence of the four moderating variables. According to the authors, the model is able to explain 70% of the variance of the intention to use a technology. Figure 1 shows the theoretical model of UTAUT with their constructs and relationships.

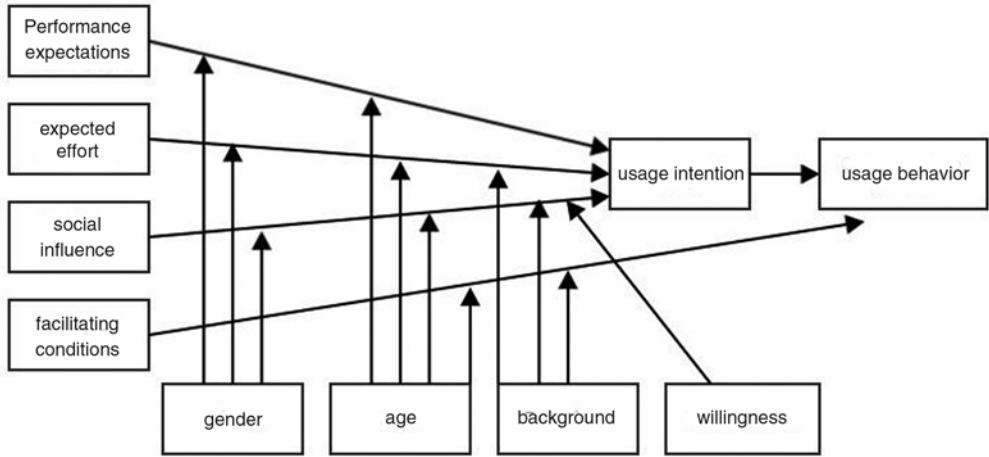


Figure 1: Theoretical Model of UTAUT.

Source: Venkatesh and Morris (2003)

Venkatesh et al. (2003) believe that the model is a useful tool for managers to assess the likelihood of success of a new technology. It also helps in understanding the determinants of acceptance of the use and the design of interventions. In fact, the UTAUT model has been applied massively in studies that deal with the theme of acceptance and use of technology (Bobsin et al, 2009; Dwivedi et al, 2011; TAIWO & DOWNE, 2013).

Thus, the development of UTAUT contributed to the advancement of research on individual acceptance of IT by unifying theoretical perspectives most widespread in literature and incorporating moderators to control the influence of the organizational context, the user experience and demographic characteristics (KAUFMANN 2005).

2. METHOD

2.1. Theoretical framework

Šumak et al. (2011) conducted a meta-analysis on the acceptance of technologies for e-learning. Of the 42 investigated work, only 19% analyzed the acceptance in the teacher/

lecturer perspective. Although the TAM has been the most widely used theory in the studies, the authors draw attention to the need for more studies using the UTAUT in order to validate this unified theory which presents itself as the “state of the art” in the explanation of the phenomenon the adoption of information technology.

This study aims to understand the adoption of the teacher of technology in a regime of free choice, ie where the use of virtual environments is optional for teachers. In this situation, the UTAUT model can provide better grip because, unlike TAM includes the aspect of voluntariness as moderator element of social influence on the intended use of the technology.

Dwivedi et al. (2011), from a systematic review, analyzed 450 articles that mentioned the UTAUT in the context of adoption and diffusion of technologies. Of these, only 43 studies used in fact the model in the investigation of phenomena, which 27 of them availed themselves of a quantitative approach, using statistical tools to analyze the significance of the relations of the constructs of the model.

In all these, the reliability of the original questionnaire to collect data was validated and found significance in the relationship of the independent variables with the dependent variables at levels similar to those found in the original study Venkateshet al. (2003).

In this study, a part on the assumption that the constructs of UTAUT model are significant and valid to explain the adoption of a technology. It aims then, from an exploratory investigation of the determinants of technology adoption factors in classroom higher education understand the meaning

of the constructs of the model in the specific context investigated.

2.2. Methodological Procedures

This research is characterized as a case study because it investigates a specific context - a federal university in southern Brazil, to understand the factors that influence the adoption and diffusion of Virtual Learning Environments by teachers in the classroom higher education. In order to achieve this goal, work steps are defined shown in Figure 2.

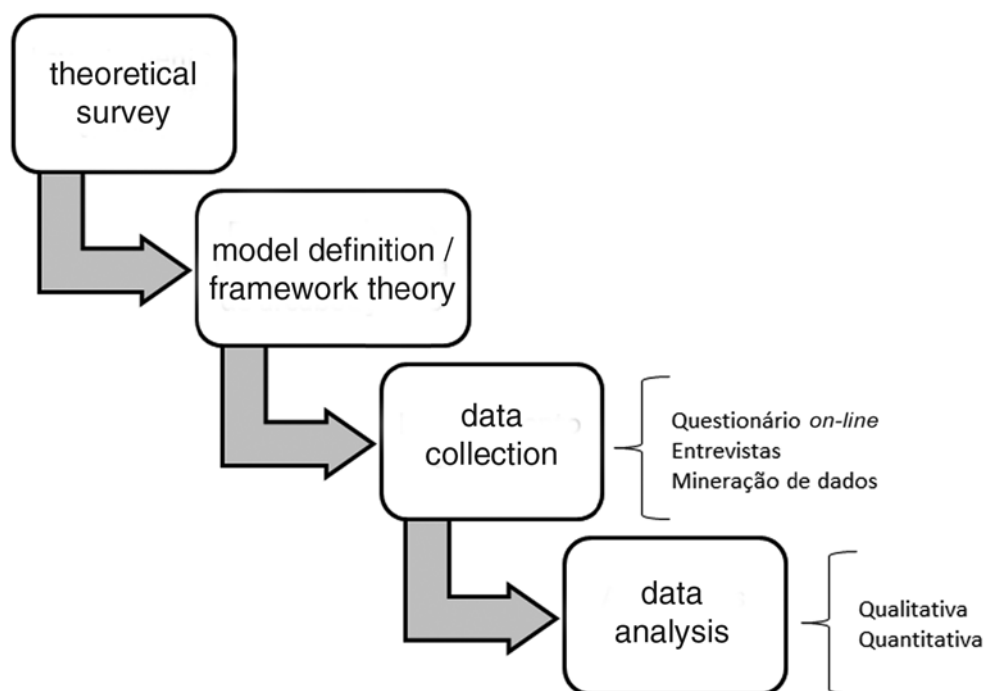


Figure 2: Research Steps.

From the survey of the theoretical framework, it was decided to UTAUT as theoretical framework to investigate the factors that influence the adoption and diffusion of VLE among university professors. This exploratory study takes a multimethod strategy, drawing on quantitative and qualitative analysis to

investigate the phenomenon, using only the four constructs first order of UTAUT model (expected performance, effort expectancy, social influence and facilitating conditions) in interpreting the conditions of adoption of technologies from an inductive approach.

The data collection took place from consultations in the institutional database of the university, direct observation of the researcher and semi-structured interviews with four university professors with the following use of technology profiles: two that often use virtual learning environments, one that recently started to use such tools and one that still does not use it.

The teachers interviewed have at least six years of university, whether permanent or substitute teacher. The guiding questions of the interview were developed by the researcher based on the four constructs first order of UTAUT model that determine the intended use of the technology: performance expectations; expectation effort; social influence; facilitating conditions. The audio of the interviews were recorded and later analyzed in order to identify performance elements, difficulties, support structures and social influence that emerged spontaneously. The interview protocol is in Annex I.

In addition, an online questionnaire was sent to about 180 teachers who attended the last two editions (2012 and 2013) of the Pedagogical Improvement Activities Program (PAAP), resulting in forty respondents. This teacher sample was selected to contain teachers from various academic units of the university and also by a researcher at the ease of contact with the group.

The questionnaire was prepared based on constructs that directly influence the intended use and behavior of use of technology, as proposed by Venkatesh et al. (2003) in UTAUT model. The questions were adapted to the context investigated based on information gathered from interviews and from structural and management conditions offered by the institution. Each of the constructs of direct influence (performance expectancy, effort expectancy, social influence and facilitating conditions) was represented by four questions in the questionnaire, while the intended use

was raised from three issues. The questionnaire items can be seen in Annex II.

In the next section, it is explored the context of support to blended learning technologies in the university investigated. Also shows the use of indices of the main Virtual Environments University, gathered from consultations with institutional databases. Finally, from the interviews and questionnaires presents the results of research in the light of the determinants constructs usage intent and usage behavior, as UTAUT model: **expected performance; expectation effort; social influence; facilitating conditions.**

3. RESULTS

3.1. Technologies in the University's Presential Teaching

In order to facilitate the experience of teachers and students with technology, hoping to leverage the use of Virtual Environments in classroom activities, the Secretariat of Distance Education (SEAD *in portuguese*) and the Data Processing Center (DPC) of the investigated University have studied the possibilities for development, enhancement and integration of these technologies for education. Currently, the university maintains four institutional VLE integrated with Academic Control System (ACS): NAVi, ROODA, and Moodle Virtual Classroom (SAV). All have institutional technical and pedagogical support.

The NAVi⁵ platform was developed at the university itself. The development project, which began in 1999, was headed by Business School which, in turn, has established itself as the forerunner academic unit in offering courses in distance mode (Oliveira et al., 2008). The ROODA platform is also a university project, being developed by Digital Core Technologies Applied to Education (NUTED), Faculty of Education. Moodle

⁵ Learn more about NAVi at: <http://navi.ea.ufrgs.br/>

is already the result of an Australian project and today is confirmed as the most used VLE in the world, with over 66,000 installations in 218 countries. Its implementation at the university was due essentially to the participation of the university in REGESD (Gaúcho Network of Distance Education), and the recommendation of the Ministry of Education as a technological solution for courses under the *Universidade Aberta do Brasil* – UAB.

Finally, the fourth VLE of the Institution, the SAV, differs from the others not to be characterized as an independent platform that can be deployed in other environments and institutions. Even as a virtual environment that offers digital tools to support the processes of teaching - as a forum, notes board, communication by e-mail, among others - this environment is fully integrated into the academic system of the university, depending on your data structure to operate. The SAV is being developed in incremental projects by SEAD, along with the DPC of the University (LONGHI et al., 2012).

Aside from the SAV, other environments (Moodle, ROODA and NAVi) have their own use conditioned to a usage request from the teacher. The activation process is not intuitive and requires a series of actions in the Service Portal of the institution. Regardless of the choice, all environments require staff to a permanent support, in order to ensure security, control and synchronization of academic data. For MOODLE, ROODA and NAVi,

synchronization is unidirectional, ie environments periodically receive the Academic Control System data, but the opposite does not happen, for security reasons. It is worth emphasizing that even fundamentally differing in their conceptions and inner workings of structures, all mentioned environments are characterized as digital teaching tools options to the classroom teachers. Teachers have free choice to decide whether to use such environments, as well as which ones to use to support its activities in the classroom teaching. Therefore, in this study, the conditions and the adoption of criteria for such environments will be analyzed together.

3.2. Intent of Use and effective use of Virtual Environments

Figure 3 gives the scale of the use of virtual environments to support the activities in the classroom teaching, as well as distribution of the use of requests between MOODLE, ROODA, NAVi and SAV environments in the first half of 2013. Data were collected from the base academic university system data. For MOODLE, ROODA and NAVi, the count starts from the teacher's usage request via academic system portal. Still, this request does not necessarily guarantee effective use of environments. As for the SAV, the counting is done by configuration made by the teachers of at least one of the following tools provided by the virtual environment: Forum Gradebook, Frequency List and Collection.

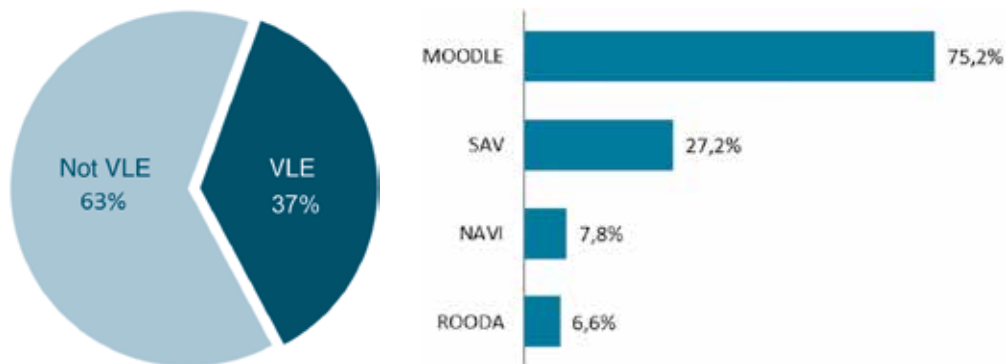


Figure 3: Using virtual environments in the classroom teaching university.

Source: Prepared by the author based on data from the academic system of the institution (2013).

From Figure 3, it can be seen that the use of environments that support the classroom teaching in the institution investigated is still very incipient, where only 37% of undergraduate or graduate classes are present in any of institutional environments (MOODLE, NAVi, ROODA, SAV) in the first half of 2013. These figures translate into 778 teachers who requested or configured a virtual environment from 1864 teachers who have not activated any environment for their disciplines.

Although NAVi and ROODA have been developed at the university itself and institutionally adopted four years ago, is the MOODLE environment that has the largest use. But the SAV has enough volume to effective use, in that it was made available more recently than the other VLE (the first half of 2012). It should be noted also that the choice of environments is not necessarily unique, and you can choose any concurrent combination thereof for a single class.

However, the responses to the questionnaire used in this research diverges the overall average usage at the university. Forty respondents, 61% said they use virtual environments every semester, for all subjects under its responsibility, while 17% reported using VLE every six months for at least one course. Still, 10%

reported using VLE appropriate and, finally, 12% say not use any virtual environment. In relation to the effective usage time of such technologies, 42% of respondents use them several years ago and 30% claim to have used the at least the last two semesters. Meanwhile, 17% were used environments since the last half and, finally, 12% claim having them never used.

The difference in incidence of technology use by the sample respondents teachers to the questionnaire regarding the average overall University use may be influenced by the low average age of the sample (41 years), and also for a short time University, since the PAAP improvement program is usually applied to teachers with fewer years of service. Younger teachers are more likely to use web technologies and also may have acquired significant experience with virtual environments outside the university, either as teachers or as students before they are hired.

As to the intended use, the majority of respondents agreed fully or largely with the intention of using virtual environments in the future. However, the statement “I will always use VLE in my subjects” had average nearest Responses to “partially agree” on a Likert scale of seven points. This result may suggest a further phase of experimentation of teachers

about technology, evaluating performance and possible outcomes.

In the following sections we analyze the context of learning support technologies at the university in light of the four determinants constructs usage intent and use itself as defined in UTAUT model expectation of performance, effort expectancy, social influence and conditions facilitators.

3.3. Performance Expectancy

The Performance expectancy construct reflects the degree to which the individual believes that using the system can help you get performance gains in their work. It reflects the perceived usefulness from the use of technology, the adjustment thereof to the work processes and the relative advantage derived

from its use. As UTAUT model, higher performance expectations, the greater the intended use of the technology.

So that they can understand what performance expectations of teachers to use a virtual environment, you need to analyze what is the purpose of using such technologies in the context investigated. Searching the databases of NAVi platforms, ROODA and MOODLE during the second half of 2011 and first half of 2012, it was possible to raise the capabilities of virtual environments most used in support of classroom teaching. Table 1 displays the percentage of teaching activities that triggered the four major distance education resources in the three virtual environments. Os nomes dos recursos não necessariamente coincidem entre as plataformas investigadas, mas representam funcionalidades comuns a todas.

Table 1: Key Features of the AVA and its use

| Resource | Use Index | Description |
|---------------------------|-----------|---|
| Availability of Materials | 44,37% | Teachers provide learning materials (articles, slides, links, scanned documents, videos, etc.) for students in the virtual environment. |
| MAIL | 25,14% | Integrated email tool to platforms, allowing communication by e-mail between teachers and students. |
| Submission tasks | 12,35% | Repository tasks where students carry some material for the teacher. |
| Forum | 5,15% | Exchange of asynchronous messages, relayed in a logical structure around a topic or issue. |
| Chat | 2,85% | Synchronous message exchange in a chat room, where the teacher often has to mediate the discussions. |

Source: Prepared by the author, using the platform database (2012).

The responses of semi structured interviews corroborate the data presented in Table 1. consulted teachers mentioned as positives performance gain of the possibility of providing material agile, quickly and easily updated and can be accessed by students anywhere, replacing the practice of making available materials to specific folders in a foreign establishment of copies to university.

In the interviews, it has highlighted the ease of communication with students from the integrated email tool to platforms. Finally, it was also highlighted, albeit to a lesser degree, the importance of the task submission tools for the students. According to the teachers surveyed, this feature facilitates access and conference of the work, as well as control of delivery times.

In general, teachers understand these tools as facilitators of the activities of classroom teaching, especially with regard to the time savings in the management of the course materials, organization of tasks and communication with students. In relation to interactive tools (forum and chat), the consulted teachers declare not use them because their use would require a restructuring of pedagogical method and the extra time of reservation to the classroom to monitor and to respond to comments and questions students. In this sense, the low use of such interactive tools is linked to a high

expectation of effort, since teachers recognize its use as an important stimulator learning resource (performance expectations).

The Figure 4 shows the average score of the responses to the questionnaire prepared based on UTAUT model to construct expectation of performance. The overall average of the responses is 5,50, suggesting that respondents agree (somewhere between half and largely) that the use of virtual environments in the classroom teaching brings performance gains in teaching activities.

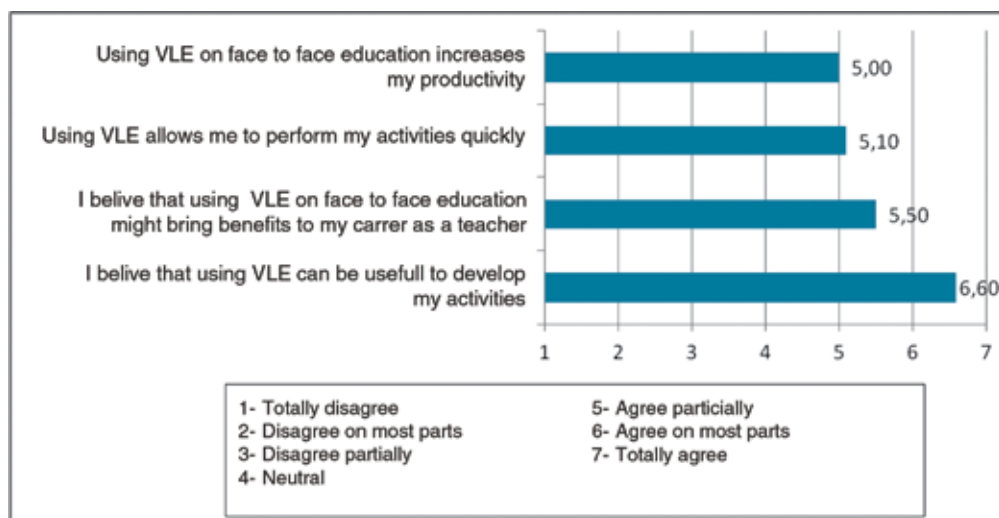


Figure 4: Average answers for Performance expectancy construct.

While the first two elements of performance (productivity and speed) does not appear with the highest average such benefits were expressed by teachers in the interviews. The answers to the interviews also reveal that the benefits to the teaching profession, which arise from the use of technologies, are understood as the ability of teachers to be better prepared to participate in distance learning courses or inter-institutional and international projects, which can translate into academic prestige and remuneration.

3.4. Effort expectancy

The Effort expectancy is defined as the perceived level of ease of use of technology. This construct is closely related to the complexity of the system. The UTAUT suggests that the simpler system, the lower the expectation of effort, then the greater the intended use of the technology.

The Figure 5 graph shows the average score of the responses to the questionnaire prepared based on UTAUT model to

construct expectation effort. The overall average of the responses is 5,83, suggesting that respondents largely agree with the ease of

use of virtual environments in the classroom teaching, that is, the expectation of teachers' efforts in relation to these technologies is low.

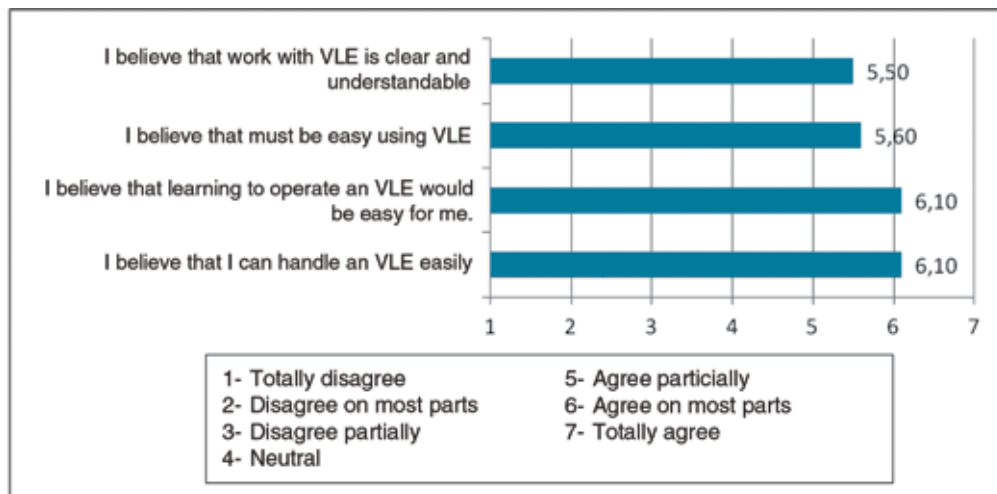


Figure 5: Average responses to construct Effort expectancy.

In the institution, the use of virtual environments NAVi, ROODA and Moodle is conditioning to the actuation of the tools from the web portal services at the university by the teacher. This procedure causes the class of the discipline is created in the chosen virtual environment and profiles of participants are loaded from the academic system. Apart from this procedure, the platforms have different configuration mechanisms and use of its resources, requiring some previous experience or time available for trial or consultation of user manuals.

In this sense, it was expected that there would be strong expectation effort related to these activities intrinsic to the use of virtual environments. However, the respondents' answers do not point to difficulties related to such transactions, but for the expectation of effort with regard to the attendance of the most intense interaction between students that may

result from the use of virtual environments.

[...] this ease of communication by e-mail, messages, per forum, causes students to contact me harder, which requires me greater monitoring of interactions and quick responses. If I want to use a forum, for example, will have to be prepared to account for the interactions that come there, if not students can become frustrated (Interviewed 2).

The expectation effort seems that is then related to the demand for new pedagogical practices as a result of the adoption of technology in education. In line with the answers raised for Performance expectancy construct, it can be inferred that the massive use of virtual environments as a file repository and exchange of messages is given especially by the perception of effort required to modify, adapt or enhance the pedagogical method.

3.5. Social influence

The perception of how much the use of the system can be influenced by social interaction is an important factor for system use. This construct aims to capture the individual's perception about the opinion of others regarding the use of technology, culture internalized from the social group agreements and also improving the image itself against the group from the use of technology. The UTAUT hypothesizes that social influence to use of technology has a positive impact on the intended use.

The culture of the university in question values the pluralism and freedom of academic units and teachers in relation to attitudes and pedagogical solutions. In the classroom teaching, the teacher responsible for a discipline or class is the one who chooses the adoption of virtual environment for support, and have free decision which one to use. Still,

inside the units and departments, it is expected some kind of social pressure around the use of such technologies. This pressure can manifest itself even indirectly, by the students themselves, to comment that other teachers, even from other academic units, regularly use these technologies.

The Figure 6 graph shows the average score of the responses to the questionnaire prepared based on UTAUT model to construct social influence. The overall average of the answers is 4.00, suggesting that respondents understand how neutral the possible effect of social influence on their intention to use technology. That is, the results suggest little effect social influence (for faculty colleagues, management and students) in the use of decision of virtual environments in the classroom teaching. However, there seems to be the perception of a positive gain front image to the students, by mastering the technologies.

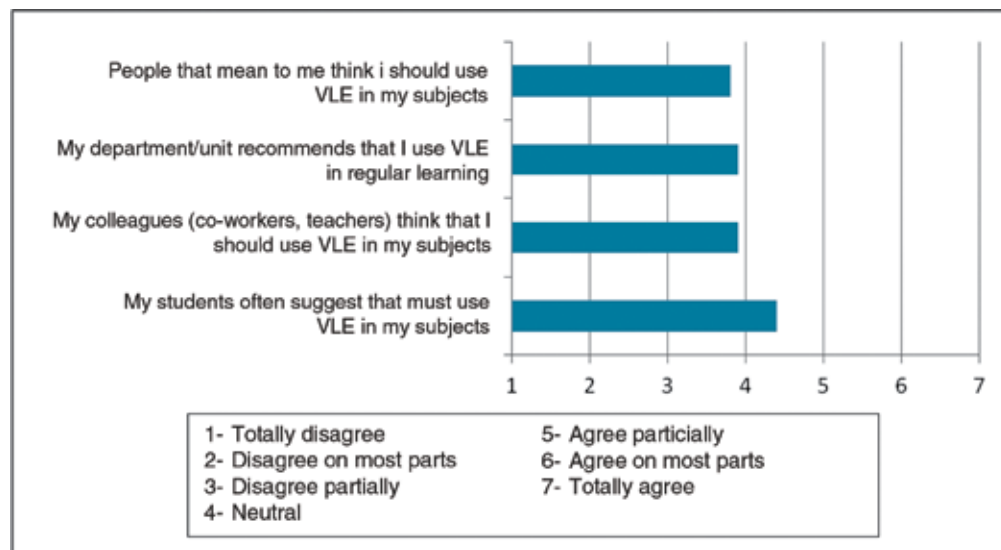


Figure 6: Averaging the responses to construct Social Influence.

The answers to the interviews corroborate these results. Perceptions of social influence can be seen in the interviewed 3 speaking.

The department says nothing about whether to use assistive technologies. Really they never even recommended to do some training or mentioned the

potential benefits of using them. [...]We also talked, among colleagues a little bit about it and I personally do not understand how pressure or influence know that a teaching colleague uses a virtual environment. [...]sometimes a student says “put the material in the Moodle” or something, but if I say I use a network folder or Xerox to do so, they’re satisfied. I do not see this as pressure to use.” (Interviewed 3).

3.6. Facilitating Conditions

Facilitating conditions are defined as the level at which the individual believes that the organization and the existing infrastructure support or facilitate the use of technology. The model UTAUT prescribes that the better the facilitating conditions, the higher the intended use of the technology. In the investigated

institution, the facilitating conditions for the use of virtual classroom learning environments include training courses for virtual environments, technical manuals, FAQs and use of platforms guides, technical support teams, besides the monitoring program (for which a student previously qualified scholarship helps teachers to use technology in education).

The Figure 7 graph shows the average score of the responses to the questionnaire prepared based on UTAUT model to construct facilitating conditions. The overall average of the answers is 5.13, suggesting that respondents agree (somewhere between half and largely) that have the necessary knowledge for the use of virtual environments, as well as access to support appropriate mechanisms offered by the institution for both .

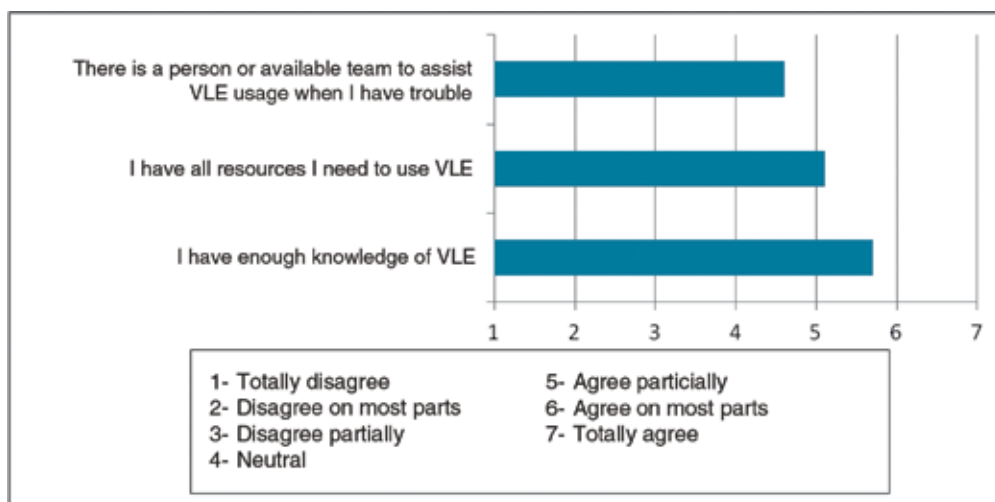


Figure 7: Average of the responses to construct Facilitating Conditions

From the interviews, it became clear that teachers know of the existence of the monitoring program and periodic trainings organized by SEAD, from the institutional publicity in the communication channels of academic units. Also aware of the technical support

team to virtual environments, as well as the manuals for use.

However, all respondents revealed not yet used any of these mechanisms, having learned to use technology through trial and error. In

this manner, although they do not enjoy any support infrastructure provided by the institution for the use of technologies in education, teachers agree that lack the resources and knowledge necessary to do so.

4. DISCUSSION AND FINAL CONSIDERATIONS

In this work we used the constructs of UTAUT to investigate the adoption of conditions on the part of teachers, virtual environments to support blended learning in a federal university in southern Brazil. The combination of a closed questionnaire with contextual issues to environmental reality investigated, along with semi-structured interviews with users with the adoption of different profiles, illustrates not only the average behavior of teachers about the technologies in question, but also the meaning behind such determinants in the adoption process.

The resources of the most used virtual environments are (1) the availability of materials for students, (2) communication by e-mail, and (3) the availability of jobs for students. Already the tools of interaction, such as forum and chat are virtually expressionless use in this scenario. Thus, the adoption of technology seems to be linked to the possibility of facilitating the teaching practices already applied in classroom teaching, with no intention on the part of teachers, to exploit the technology in order to enrich the educational proposal.

To construct expectation of performance UATUT, the results of the interviews show precisely the perception of teachers as the productivity gain from the reduction of time in the maintenance and updating of materials, ease of communication by e-mails and improved efficiency in controlling the delivery of the activities. In relation to social influence, the results suggest little significance of peer opinion or pressure from the institution and students intending to use of technology by teachers.

As Godwin et al. (2008), there is a danger that a technology can evolve faster than its pedagogical adaptation by teachers and students, as well as by the managers of the courses. The results listed here may suggest a phase of experimentation in technology, with initial emphasis on self-management, but that can lead to a broader understanding of its potential benefits and educational consequences.

Interestingly, the results of this research suggest that teachers recognize that the institution offers all the information and infrastructure necessary for the use of virtual environments (facilitating conditions), although they have revealed that not make use of it. The expectation effort translates into the requirement for adapting the teaching method is used the interactive tools of virtual environments (forum and chat), and not necessarily the difficulties of using the technology itself.

Other studies have found little significance of facilitating conditions or ease of use in the adoption of technology in education (Maet et al., 2005; Raaij & Schepers, 2008), which can be explained by the dominance of computer basic skills (send email, search the internet and use text applications, for example) by the higher education teachers. At the same time, Straub (2009) draws attention to the natural resistance of teachers with respect to changes in its methods or teaching style, supporting the idea that the expected effort is more related to the pedagogical adaptation necessary for the use of environments virtual than the practical aspects or attributes own technology.

Although the UTAUT consider the constructs first order independent from each other in the investigation of intended use, we consider important to understand how these elements fit together, setting up technology adoption regime. The environment investigated, usage behavior of by teachers technology is oriented to self-efficacy, in which the objective is to use tools of virtual environments

that facilitate teaching activities, such as correction of tests and exercises, delivery control work, providing teaching materials and asynchronous communication with students. This usage guidance translates into a more individual experience of teaching, reducing its interest in the social context about the technology. At the same time, the domain of basic knowledge of internet and web applications minimize the need for technical support.

The results listed here can guide the efforts of leaders and university administrators involved in promoting the dissemination of Virtual Learning Environments in higher education classroom. Apparently, investment in major supporting structures (training, manuals, 24x7 technical support, for example) can not bring much return as the development of simple tools of communication and delivery of content to facilitate the teaching activities. In contrast, if the goal of the institution is to stimulate the use of technology in a more constructivist perspective, focused on the educational and based improvement in using more interactive tools, so the pedagogical support efforts must be redoubled in order to assist teachers to explore more enriching way the possibilities for use of technology.

We must consider, however, the wide range in the incidence of use of virtual environments in different university departments, suggesting the need for longitudinal research of the phenomenon of the diffusion of technologies, considering the history of each unit. In addition, the sample used teachers (40 respondents) is very low against the university teachers of the universe and not representative of the average behavior of using technology as the use of the sample rate is substantially higher than the overall average of the university. Given this limitation of this study, we suggest further research, focusing more on the investigation of the behavior of teachers who do not use the technology. The initial exploratory research performed here gives grants for a broader and deeper research theme.

This study has its significance in that it investigates the environmental conditions that influence the adoption of virtual learning environments in a relatively unexplored context: the classroom teaching. Moreover, it should be noted the low occurrence of this kind of study on the teacher's perspective. The results provide important guidelines about the behavior of teachers in the use of virtual environments. They can guide a more holistic investigation of the diffusion phenomenon, in addition to supporting institutional strategic decisions of promotion and support of technologies at the university in question. For leaders and managers of other educational institutions, the research framework used here can serve as a starting point to investigate the conditions of adoption and stage of diffusion of technology.

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