

Pedagogical Standard for the Analysis of Virtual Learning Environments

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Abstract—This article aims to describe, in brief, the formation process of the Pedagogical Standard for the Analysis of Virtual Learning Environments. This Standard is a tool that is intended to aid subjects in the process of choosing a particular Virtual Learning Environment through an analysis including the pedagogical aspects of these environments. The qualitative approach was adopted in the methodological procedures, tied to the descriptive exploratory method and bibliographic review. The research was consolidated as a part of the Federal University of Mato Grosso's Master's degree in Education, as a finalized study that culminated in the composition of the referred tool.

Keywords—Virtual Environments; Analysis; Pedagogical.

I. INTRODUCTION

The current conjuncture is permeated by a scenario in which Information and Communications Technology is increasingly present in everyday life and human activities. This, in a way, represents a change of outlook and alternation within society, especially in the educational sphere, which is gradually moving in an attempt to break with massive models and education traditionalists, to an innovative context and with propositions analogous to the needs of their subject today, being the technologies' strongly allied to this vicissitude.

In this scenario, the use of technologies such as Virtual Learning Environments (VLE) is emerging as a possible resource to be used in the educational setting, in a diverse number of areas, including engineering, be it to support and innovate educational procedures, disseminate content, promote interaction between subjects, and stimulate the process of teaching and learning in a collaborative and mediative perspective.

Faced with this, this study reflects on the importance and pertinence of considering the pedagogical aspects of proceeding with the evaluation or analysis of a VLE, since these aspects are closely correlated with the development of learning, and, from the initial perceptions of the study, it was inferred that VLEs are generally implemented in a fragmented or incomplete manner, addressing more technical/computational questions than didactic/pedagogical, which became the target of this research.

Thus, the overall objective of the study was to identify pedagogical aspects from the VLE, to form the Framework for Pedagogical Evaluation of Virtual Learning Environments (PSA-VLE) that is intended to support the process of analysis, understanding and choice of a particular Virtual Environment². To accomplish this, we highlight the following specific objectives:

1. Analyze literature that addresses themes relating to the evaluation of VLEs, collect and analyze research of a scientific academic nature, originating from referenced portals and databases and that addresses themes relating to pedagogical aspects of VLE and evaluation models;
2. Describe the located pedagogical aspects;
3. Study a few Virtual Learning Environments, their documentation, and their official websites;
4. Organize the located pedagogical aspects, for the creation of the Framework for Pedagogical Evaluation of VLEs;
5. Draw up a proposal for pedagogical comprehension of VLEs, based on the Framework for Pedagogical Evaluation of VLEs and a guiding model for systematic use of the PSA-VLE.

In terms of methodology, we adopted a qualitative approach [1], bibliographic research [2], and adhered to the exploratory

and descriptive approach [3] which allowed the revealing of the pedagogical aspects contained in the VLE, sourced from the data analyzed in this study.

The relevance of this work is due to the scarcity of research and models that make it possible to analyze VLEs, considering and highlighting their pedagogical aspects, which does not mean the invalidation of a technical evaluation. In this sense, the study contributes to the development of new ideas and research in educational innovation.

II. VIRTUAL LEARNING ENVIRONMENTS: APPROACHES AND STUDIES

The designation VLE is given to content and learning management systems and includes other names such as LMS (Learning Management System), CMS (Course Management System or Content Management System), LCMS (Learning Content and Management System) or IMS (Instructional Management Systems). However, "[...] independent of the name employed the, generally *web*-based, environments which are intended for the digital management of courses and virtual learning activities [...]" [4].

Conceptually, VLEs consist of media that use cyberspace to serve content and allow interaction between actors of the educational process. However, the quality of the educational process depends on the learner's involvement, the pedagogical proposal, the material served, the structure of teachers, tutors, monitors and technical staff, as well as the technological tools and resources used in the environment [5].

In general, when dealing with educational processes established and formalized in VLEs, it is common to primarily consider the teacher and student figure, independent of educational styles, as well as the teacher's figure, which is usually linked to the type of distance learning courses. These individuals participate directly in the teaching and learning processes in the VLE and drive this space through adjusted social practices.

Faced from a technical perspective, VLEs aggregate various resources and are usually designed as tools. This tool set makes it possible for educational practices to occur within the environment, be it through the activities made available, the content at disposal, or even the establishment of interactive processes, which can happen synchronously, ie. in real time or asynchronously, at a time posterior to the present.

Currently, there is a diversity of platforms of this nature, and the majority converge similar features between each other and those existing on the Internet such as e-mail, forums, chat, and databases, among others, and they fall into the categories of open, free or proprietary software.

Given the abundance of these environments today, for convenience some VLEs were selected that are representative of educational scenarios, that being the wide occurrence of their use and incorporation into the education system, and by bringing innovative solutions that aim to achieve the pursuit of *online* courses, like: Moodle [6], e-ProInfo [7], Claroline [8], TelEduc [9], Sakai [10] and ATutor [11].

In this regard, to better assimilate these VLEs, beyond consulting the official websites and other documents, it was necessary to install the environments listed, with the exception of e-ProInfo due to instabilities in the Brazilian public software portal. Moreover, this procedure allowed for the usage, navigation and moderate familiarization of the listed VLEs features and resources.

It should be stressed that, in a way, these VLEs represent the understanding of what a 'Virtual Learning Environment' is, and were considered in this study for being free and open, two-dimensional *software*, with similar activities between them such as forums, chat, tasks, quizzes, collaborative activities and, above all, are organized and convergent spaces of resources that provide learning through the elements of information, communication, interaction, interactivity and mediation between subjects.

Figure 1, illustrates the understanding of VLEs postulated in research.

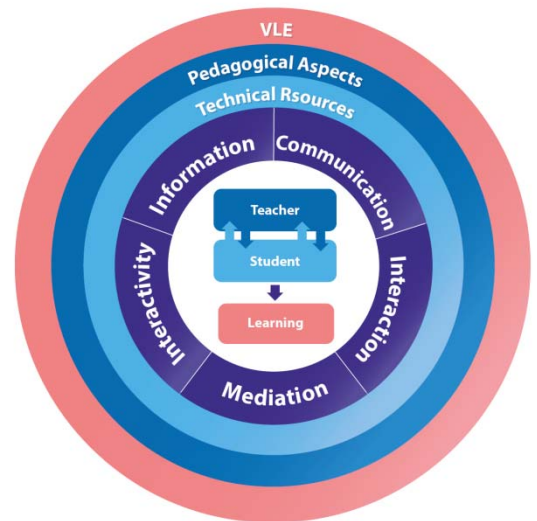


Fig. 1. Understanding of VLEs

III. DATA COLLECTION TO ANALYSIS

The process of data collection and analysis followed a pre-established logic, by setting criteria and standards, and will be treated in this article succinctly.

With this, the initial concern adheres to collecting works whose database was reliable and referenced in the Brazilian scientific and educational landscape, and with affinities in discussions about Technologies in Education. Thus, it defines that the platforms that support the process of research and data collection, would be: Portal de Periódicos da CAPES (Improvement Coordination of Higher Education Personnel) [12], RENOTE (Journal of New Technologies in Education) [13] and RBE (Brazilian Journal of Education) [14].

The collection period occurred between the years 2010 to 2013, and used the descriptor Virtual Learning Environments

in the above databases. With respect to the specific type of work, article, dissertation or thesis, we opted again for general search, considering any categories of work, which resulted in the collection of 225 works.

From this total, there was an ascertained process of reading, in order to select or exclude, by defined criteria, research close to the subject of this study, or to say, matters relating to the VLE and in a more refined way, evaluation and pedagogical aspects or intermediaries of this nature. Thus, 09 works were selected for analysis.

It must be said that in addition to these selected works, the collection was expanded through search engines on the network/Internet, where it was possible to locate other studies whose topics were favorable for the complementary study.

The collection was made in an alternating fashion, without establishing a specific database, type of work or publication year, however, with the criterion that the selected research would be from reliable sources, and for this, we selected 03 works from Universities referenced in the academic/scientific community, between 01/05 to 02/06/2014.

Thus, in total 12 works were selected, and the analysis consisted of readings, raising issues addressed in the study, verification and exploration of evaluative instruments for VLEs, as presented in Table 1.

TABLE 1 – WORKS SELECTED FOR ANALYSIS

RENOTE			
Nº	Title	Year	Author
01	Virtual Learning Environments as support tools in classroom courses and distance.	2013	BRITO, Lélis Maia. et al.
RBE			
-	Title	Year	Author
02	Virtual learning environments to Paradigm Light Complexity: Interface, Affordances and equifinality.	2013	SOUZA, Valeska V. Soares.
03	Virtual Learning Environments: epistemological implications.	2010	PAIVA, Vera Menezes.
CAPES			
-	Title	Year	Author
04	Virtual learning environments as a complex entity.	2012	BURNHAM, Teresinha F.; PINHEIRO Marcus T.; SANCHES Marise O.
05	Analysis of the Didactic-Pedagogical Dimension in Virtual Learning Environments.	2013	GALVÃO, Maria C. Alves. et al.
06	Evaluation in virtual learning environments: challenges for a collaborative approach.	2013	DANTAS, Eugênia Maria.; ARAÚJO, Célia Maria de.
07	Distance education: a methodological and didactic approach from virtual environments.	2011	AMARILLA FILHO, Porfirio.
08	Pedagogical dimensions of the virtual classroom: theory and practice.	2013	RODRIGUES, Ana Paula.; MONTEIRO, Angélica.; MOREIRA, J. António.
09	A comparative study of teaching and learning platforms.	2010	GABARDO, Patrícia.; QUEVEDO, Silvia R. P.; ULBRICHT, Vânia R

Searches - Internet			
-	Title	Year	Author
10	An approach to Virtual Environments Assessment Learning.	2014	JESUS, Ângelo.
11	The Icarus Wings: the pedagogical mode. Building a taxonomy for choice Virtual Environment of Teaching and Learning - VLET.	2007	RONCARELLI, Dóris.
12	Virtual Environments Analysis built Learning by university professors from the area of Science and Health.	2009	ESPINDOLA, Marina Bazzo; GIANNELLA, Tais R.; STRUCHINER, Miriam.

Briefly, considering the numbers corresponding to the work listed in Table 1, it was evident that in the works 01, 02, 03, 04, 06, 7 and 09, pedagogical issues in VLEs were discussed in a broader perspective, without listing components to be constituted as pedagogical aspects and would allow any process of analysis and choice of a particular VLE, however the work signaled concerns about pedagogical approaches in VLEs, which are configured as insipient in the current scenario.

Following this, the works 05, 08, 10, 11 and 12 presented evident VLE evaluative instruments, contemplating in these models the pedagogical aspects related to the VLE. This finding, which was due to the junction and assimilation between the located instruments, was of paramount importance to identify educational aspects that make up the Framework for Pedagogical Evaluation of VLEs.

Before this, it is reasonable to infer that from the VLE assessment tools found and analyzed in this research, in its statement, all encompassing technical and pedagogical evaluation of VLEs, however, the accurate analysis of these models revealed that while contemplating categories or pedagogical dimensions, the evaluation of the environments are detailed with regard to their technical resources and tooling, there is a prominent research of these elements, and the evaluation of pedagogical aspects in VLEs was little evidenced among the instruments analyzed.

III CONSTITUTION OF THE FRAMEWORK FOR PEDAGOGICAL EVALUATION OF VIRTUAL LEARNING ENVIRONMENTS

Based on the works analyzed, as well as in the evaluation instruments located, an investigation was conducted to identify the pedagogical aspects pertaining to VLEs contained in their studies.

Thus, from this analysis and conjunction of instruments, it was possible to infer that in the works 01 to 12, the following educational aspects for VLE analysis were evidenced: *education*, mention of the teacher's actions, covering all aspects of information, communication, interaction and mediation; learning correlated with the privileges of the student in communication, interaction and intervention; *assessment* also constituted in the perspective of accompaniment between student and teacher; *content* of an informative and interventionist character as well as the *activities/resources* from the VLE as learning facilitators.

Considering still the reviewed literature that deals in the evaluation of VLEs, it is worth highlighting the types of

quantitative and qualitative evaluation, in which it advocates the qualitative assessment for processes of learning and pedagogical aspects. In this sense, this research considers that this model of evaluative organization resembles the VLE analysis process, considering the observation, examination, interpretation and confrontation, as presuppositions for pedagogical understanding of a VLE [15].

Once the pedagogical aspects were identified, from the works analyzed, it is necessary to understand their aims and purposes, understanding them in context with the education assumptions in the VLE.

A. Elements for Learning in VLEs

It should be noted also that the *elements for learning in VLEs*, contributed to the organization of the referenced instrument, since these elements are present in the VLE, and favor the occurrence of actions and educational relations between the subjects in this virtual space, being as it follows:

a) Information: with regard to teaching materials and documents available in the Environment. The informational element in a VLE is basically established by available and provided content which generally include texts, animations, videos, images, and consultation documents, among others.

However, it is necessary to differentiate the types of such content, ie. there is content in the VLE that will only provide instruction, such as a statement or letter of coordination, and don't necessarily have a direct link with the process of learning, informational content and tally directly to learning, which in general, are treated as learning materials, such as text and hypertext, much used and explored in VLEs [16];

b) Communication: The pragmatics of communication can be considered in three poles a) orally, marked by partners diving into the same circumstances and sharing close hypertexts; b) the write pole, in which there is a distancing between the hypertext author to the reader, resulting in objectivity and universalisation of the sender and interperative necessity of the receiver; c) and the computer media pole, in which actors are connected to the network, and these increasingly in the same hypertext, the pressure toward objectivity and universality decreases, the messages each time becoming less produced in order to last. Thus, the communication encompasses the communication between subjects in cyberspace [17];

c) Interaction: as reciprocal action between two or more actors, it occurs inter subjectivity, which can be direct or indirect. [9] In VLEs, one must consider the mutual interaction, characterized by interdependent relations and negotiation processes, where each interacting part of the inventive construction of the interaction, mutually affects the other. And, the reactive interaction which is linear, limited by deterministic relations stimulus and response [18];

d) Interactivity: establishing new conditions for participation, involvement and cooperation by the students in the learning stages and is related to their own relationship with the machine,

as well as with artifacts and technology devices, however from a "conversational" perspective, it is worth noting that these devices are not without a larger context that orients them and they attribute to pedagogical meanings [19];

e) Mediation: as the process of intervention of an intermediate element in a relationship; the relationship ceases then, to be direct and goes on to be mediated by this element. Thus, mediation is characterized by a relational perspective, from the exchange of man with the world and with other men, in which language plays the basic function for this social reciprocity [20]. In VLEs, mediation is implicit both in available materials, such as in text and hypertext, video lessons and collaborative activities, but above all, the very teacher who also configures himself as a subject mediator, able to create opportunities for the students to build their knowledge through the displacement of the real level of development to the level of development potential.

Such elements are present in the core of the pedagogical aspects, and the instruments analyzed demonstrated the importance of the elements described, by facilitating the process of teaching and learning in the Virtual Environments.

Thus, Table 2 shows the structure of those located pedagogical aspects and evidences their definitions and objectives in conjunction with the elements for learning in VLEs, which aims to promote a qualitative analysis of the Virtual Environment.

TABLE 2 - PEDAGOGICAL ASPECTS, DEFINITIONS AND OBJECTIVES IN VLES

QUALITATIVE ANALYSIS	Pedagogical aspects	Settings	Objectives
	1. Didactic	1.1 Relative to teaching, experience of the teacher. ³	1.1.1 To analyze the possibilities of action and teacher intervention prerogatives in the VLE, considering the elements of information, communication, interaction and mediation.
	2. Learning	2.1 In this research, with relation to student learning, their actions and interventions for knowledge.	2.1.1 To analyze the possibilities of action and teacher intervention prerogatives ¹ in the VLE, considering the elements of information, communication, interaction and mediation.
	3. Activities / Resources	3.1 Activities relate to the artifacts accruing from the VLE, which foster participation and intervention of individuals in the Environment, such as forums, chat, electronic questionnaires, database, online tasks etc.	3.1.1 Analyze the VLE's activities and resources, considering the elements of communication, interaction and interactivity.

³ Didactic guides the teacher to teach, is synonymous with education. Teaching is a function of the teacher, this teaching does not mean transmit, pass on content. And much more. Means mediate the learning process. [21]

	3. Activities / Resources	Resources refer to features that the VLE has, and that enable, for example, provisioning and incorporation of materials, communication channels, web page creation, customization and configuration of the VLE.	
	4. Content	4.1 With relation to the materials available in the VLE in various formats (written text, video, audio, learning objects, animations etc.).	4.1.1 Analyze the possibilities of making content available in the VLE in various formats and intervention of the subjects before the content, considering the elements of information and interactivity.
	5. Monitoring /Evaluation⁴	5.1 Relating to the resources that enable students to participate in the evaluation process, and to the teacher making use of various models to assess/monitor their students.	5.1.1 Examine the possibilities for assessment/monitoring in the VLE without procedural, automatic, individual, collective and feedback, considering the interaction and mediation elements.

However, although pedagogical aspects are listed, and their definitions and objectives described, to proceed with the analysis of a specific VLE, a more objective direction is preferred, defining principles and guidelines that aim to lead to practical analysis and subsequent interpretation and confronting of the VLE with a course or education situation's pedagogical project.

In this sense, the *Pedagogical Standard for Evaluation of VLEs (PSA-VLE)* was established, from the analyzed studies, the revised literature, and taking into consideration the elements for learning in VLEs, as presented in Table 3.

TABLE 3- PEDAGOGICAL STANDARD FOR EVALUATION OF VIRTUAL LEARNING ENVIRONMENTS

QUALITATIVE ANALYSIS	Pedagogical aspects	Elements for learning	Descriptors / analysis
	1. Didactic	1.1 Information	1.1.1 Allows the teacher to insert and edit content.
		1.2 Communication	1.2.1 Allows communication between teacher and student is established in a bidirectional manner. 1.2.2 Allows the teacher to communicate with the student in a synchronous and asynchronous form. 1.2.3 Allows the teacher to communicate with the collective in a synchronous and asynchronous form.

		1.3 Interaction	1.3.1 Allows active and autonomous presence of the teacher, with intervening prerogatives. 1.3.2 Allows the teacher to interact, guide and lead discussions with the student in an individualized way. 1.3.3 Allows the teacher to interact, guide and conduct discussions with groups of students collectively.
		1.4 Mediation	1.4.1 Allows the teacher to perform pedagogical mediation through available activities and resources. 1.4.2 Allows the teacher to perform pedagogical mediation in the process of evaluation/monitoring, helping students in the establishment of relationships between the feedback of their actions and objectives.
	2. Learning	2.1 Information	2.1.1 Allows the student access to content in an unconstrained, nonlinear way. 2.1.2 Allows the student autonomy to find the content and extend their learning. 2.1.3 Allows the student to intervene in the available content, for example, including comments and expressing their opinion on the content.
		2.2 Communication	2.2.1 Allows bidirectional communication between the student and their teacher and/or colleague/groups. 2.2.2 Allows the student to communicate with the teacher and/or colleague/groups in a synchronous and asynchronous form. 2.2.3 Allows the student to participate and intervene in the processes of communication.
		2.3 Interaction	2.3.1 Allows the student to interact with the teacher and/or colleague in an individualized manner. 2.3.2 Allows mutual interaction between groups of students and the teacher. 2.3.3 Allows the student to act in a collaborative and interventional way in the processes of interaction.
		2.4 Mediation	2.4.1 Allows the student to mediate knowledge with another colleague. 2.4.2 Allows mediation of knowledge between groups of students.

⁴ The evaluation is a necessary and permanent didactic task of teaching, which should follow step by step the process of teaching and learning. Through it the results that will be obtained in the course

of the teacher work together and students are compared with the proposed objectives in order to determine progress, difficulties, and reorient the work for the necessary corrections [22].

	3. Activities / Resources	3.1 Communication	3.1.1 Delivers features that promote communication between subjects, in the form of messages and so forth.
		3.2 Information	3.2.1 Delivers features that make it possible to incorporate information in activities with, for example, attached files or external links. 3.2.2 Allows the editing and/or deletion of information contained in the available activities.
		3.3 Interaction	3.3.1 Provides activities that favor interaction between subjects, of the likes of forum and chat. 3.3.2 Provides activities that favor individual production by the student, but interaction with the teacher. 3.3.3 Delivers activities that encourage collaborative action between subjects, with spaces of collective production. 3.3.4 Delivers objective activities, such as electronic questionnaires with reactive interaction. 3.3.5 Delivers non-linear activities in which students can participate and interact, not in a fixed order, but according to their learning needs.
		3.4 Interactivity	3.4.1 Delivers interactive activities, by default, without the necessity of incorporating external modules. 3.4.2 Delivers activities with interactive features from the perspective of participation, involvement and cooperation on the part of the students during the learning stages. 3.4.3 Delivers features that enable the incorporation of external interactive activities such as inserting games, simulations and Learning Objects.
	4. Content	4.1 Information	4.1.1 Enables the provision of content in written text, hypertext, and web page formats. 4.1.2 Enables the provision of content in audio and video formats. 4.1.3 Enables the provision of image content in fixed and dynamic (animated) formats. 4.1.4 Enables individuals to download and upload content. 4.1.5 Enables intervention and/or changes to the contents available
		4.2 Interactivity	4.2.1 Enables the incorporation and delivery of interactive content. 4.2.2 Allows the student and/or or groups of students to intervene and manipulate the

			interactive content, for example, Learning Objects.
	5. Monitoring /Evaluation	5.1 Interaction	5.1.1 Enables the student and groups of students to complement and intervene in evaluation criteria. 5.1.2 Enables the students and groups of students to respond to teacher comments/feedback. 5.1.3 Enables recording and consulting reports on the process of community learning as a whole, according to pre-established criteria. 5.1.4 Enables automatic evaluation, with results in grades and feedback, from predefined criteria. 5.1.5 Enables storing, consulting and monitoring access to the Environment, registering participation in activities and interactions carried out.
		5.2 Mediation	5.2.1 Enables the teacher to conduct a process evaluation based on observation, track record and consultation of reports of the learning process. 5.2.2 Enables the teacher to register, query and change reports on the learning process for students and groups of students and the community in general. 5.2.3 Enables the teacher to provide comments/feedback in activities produced by students, student groups and the community in general. 5.2.4 Enables the teacher to manage (collectively define, insert, query, change, and delete) modalities, instruments and evaluation criteria.

With regards to the PSA-VLE and its descriptors, the didactic aspect focuses on analyzing the teacher and their exercise possibilities in the VLE, that is, if the Environment guarantees the teacher forms of individual and collective communication and interaction with their students, in a synchronous and asynchronous manner, if the VLE enables the teacher to perform pedagogic mediation by the activities envisaged as well as the evaluations undertaken.

In terms of learning, the student and their prerogatives are analyzed, considering not only access to content and activities, but above all the interventions it deserves, as the autonomy to pursue their learning individually and collaboratively, including comments and opinion of exposure before contents and activities, two-way communication with the subjects in the VLE, intervention in the processes of communication and interaction between teacher and classmates.

With regard to the activities/resources, the PSA-VLE aims to analyze the Environment not only by the computation of its tools or formatting models and availability of activities, but also to analyze the pedagogical context to which they belong, that is, see whether the activities/resources favor the interaction/communication between the subjects of the educational process, as well as interactivity and collaborative actions, and still cover the incorporation of new modules that enable the expansion of new scenarios for learning.

Regarding the content, the axis of analysis ascertains if the Environment offers conditions to provide information to consider multiple learning styles, with the insertion of content in the form of audio, video, text and hypertext, and the intervention of the subjects on the interactive content.

Regarding the evaluation/monitoring, as well as examining the possibilities and evaluative forms in VLEs, there is concern in understanding the role of the student and the teacher in this process. In the case of the student, determine their prerogatives in clear evaluation criteria and comment on feedback received, that is, to analyze how students can actively participate in this process. And the teacher, as a subject that monitors and evaluates the student or groups of students, observes if the VLE provides a means for effecting this mediation practice, understanding the procedural and dialogical activity.

Thus, the analysis conducted by PSA-VLE can provide some pedagogical VLE insights like: a more individualized environment, closed without possibility of interactions between subjects, as well as an open and participatory environment and enables interactions and social interactive actions and mediating between subjects. That is to say that such understandings, in general, closely link to the theories of learning, and in a way, refer to the understanding of VLEs in referring to their epistemological basis, as shown in Table 4.

Partner participatory - Mutual	Interactionist (Constructivism/ Socio-constructivism)	Didactic	Teacher participation considering the elements of communication, interaction and mediation.
		Learning	Participatory partner, considering the information, communication and interaction.
		Activities / Resources	Calls in its entirety the elements of communication, interaction and interactivity.
		Content	Alineares, different formats with the use of privileges.
		Monitoring/ Evaluation	Procedural character with the use of possibilities of the students and teacher, considering the interaction and mediation elements.

The pedagogical understanding of VLEs in the individual aspect - reactive, shows a space of closed character, in which the student enters, conducts educational activities without advocating interaction processes, in this space it is evaluated by the system's tools, which approximate behavioral theory in which learning takes place through a conditioning type of stimulus-response, the student performs the activities and receives their grade, still near the perspective of reactive interaction [23].

The VLE Social-Participatory Mutual advocates interactive actions, made possible by an Environment offer ways for individuals to participate actively in the educational process, communicating and establishing interdependent, open and procedural relations, or say the VLE allows subjects to learn a collaborative approach in which the individual discovery of principles is supported by the social environment, colleagues and teachers play an important role in student development, learning is a shared action, something equivalent to cognitive theory. Thus, the teacher's role is evidenced and the VLE provides an opportunity for pedagogical mediation, be it through activities and/or monitoring processes/existing evaluation.

The referred tables and its understandings, far from being a ready answer, or an absolute ideology to represent and pedagogically means the VLE is rather a panorama of possibilities and approaches, and is configured as something to be interpreted and also reconfigured from different educational situations.

IV FINAL CONSIDERATIONS

The study made it possible to unveil some existing tools to evaluate VLE, dwell on research undertaken in scientific academia concerning the pedagogical aspects contained in the VLE and evaluation processes, as well as exploring literature and their talks about the Technology in Education, Virtual

TABLE 4 - PEDAGOGICAL UNDERSTANDING OF VLEs BASED ON PSA-VLE

Pedagogical understanding of VLEs	Learning Theories	Pedagogical Aspects - VLE	Post-analysis assimilation
Individual - reactive -	Behavior	Didactic	Teacher absence
		Learning	Guy with lack of communication and interaction between individuals.
		Activities / Resources	Calls for objective and individualized activities. Excludes interactive elements.
		Content	Linear character, varied formats without intervention powers.
		Monitoring/ Evaluation	Enables an evaluation of the summative type as external evidence (behavior), what was learned.

Environments and evaluation VLE, and these theoretical approaches supported the establishment of the PSA-VLE.

Similarly, in the works collected and analyzed, a subdivision was found, between assessing pedagogical issues and technical issues of the VLE. And, among the twelve studies analyzed, five of them (n°5, n° 8, n° 10, n° 11 and n° 12) had made models for evaluating VLEs, highlighting educational aspects coming from Virtual Environments. The other seven studies (n° 1, n° 2, n° 3, n° 4, n° 6, n° 7 and n° 9) highlighted only the pedagogical aspects of the AVA in a broader and more general perspective, addressing the issue without pointing to the aspects in a specific manner.

It is worth mentioning that the instruments or evaluative models analyzed, show the technical and pedagogical linked concern of VLE evaluation, however the space belonging to the educational evaluation in these instruments is tiny against the evaluation of tooling scope of technical resources of communication tools available for management and coordination, or to say, before the evaluative aspects, pedagogy is not noted as guiding and conducting other VLE analysis procedures.

Thus, it is believed that the PSA-VLE can fill this gap by providing the understanding and educational understanding of VLE from the analysis undertaken, and this can be considered a differential among the instruments examined in this study, the Pedagogical Standard recommends the reverse process, and seeks to find the subject which evaluates information on pedagogical principles guiding the VLE.

In future work, with the PSA-VLE, it will be possible to envisage the introduction of new perspectives that can improve and enhance their implementation and use, such as the development of a methodology that supports and methodically organizes how to use the PSA-VLE, based on guiding principals in the area of education, and later, in the area of computing, a glimpse of the implementation of all this methodological theoretical standard in a web-based system format, able to coalesce this methodology, data collection and generate qualitative results.

ACKNOWLEDGMENT

The Federal University of Mato Grosso, the Institute of Education and the graduate program in education at the Federal University of Mato Grosso-Brazil.

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