On the wings of icarus: rheomodus of pedagogical work

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Abstract: The Distance Education (DE) has achieved greater importance in Brazil due to current government policies. It is a new area of research with many issues to be studied. One is the choice of Virtual Teaching-Learning Environment (VTLE). The VTLE is an organized space that supports the pedagogical management of a DE process. To conceive, organize, monitor and evaluate the movement of an educational process requires tools that address the dimensions of academic and educational management. In summary, this article presents the results of a survey conducted in the process of choice of a VTLE to meet a specific demand. The enhancement of a teaching-learning process in distance education requires a proper coherence between Technology, Ergonomics and Pedagogy. Researchers examine the process and from the observed motion propose a taxonomy for choice and qualification of a VTLE. The chosen methodology is action research, because when it comes to testing it answers satisfactorily, in relation to analysis, interference and proposition processes that occur in real time. And from this process and the rescue of some already developed experiences, a tool is produced called DEList. The DEList is organized in a taxonomy that unfolds into criteria, indicators and descriptors construction, based on conceptual categories, such as interaction, independence, cooperation and mediation. A part of this study is a team of evaluators in the application of DEList for the choice of a VTLE. The outcome of the process is the election of a platform in evolutionary development: the Moodle. The use of this VTLE announces a rheomodus in the teaching-learning process in DE. This scenario requires other steps in research that can be developed in the ballast of these results.

Keywords: Virtual Teaching-Learning Environment, Distance Education, Pedagogy, Technology, Ergonomy
1. Rheomodus of pedagogical work

This article presents a synthesis of the results of a research, called "On The Wings of Icarus: The Rheomodus of Pedagogical Work" carried out in the process of choosing a VTLE to meet a specific demand for a DE project. This research was realized at the Federal University of Santa Catarina by the Post-Graduation Program in Education, thesis defended in 2007. (Roncarelli, 2007).

This study is developed in Distance Education (DE), mediated by the Digital Communication Technology (DCT) in virtual environment. The title shows the metaphor of "Icarus" of Greek mythology. It refers to flights that are mediated in the TCD and are possible as though by the wings of Icarus objectified in bits and bytes. The conventional pedagogical work faces unpublished errors when simply transposed to the DE process. The virtual Mediation is another doing, a fluidic work that in DE mode promotes the rheomodus of pedagogical work. Electing the environment for this process is to choose the flight plan that will sustain the success of the project.

The Distance Education (DE) in Brazil has been broadened into several national programs. The regulations and government policies are factors of motivation in the development of this modality.

The DE is characterized by pedagogical mediation in the teaching-learning processes developed in different spaces and times. The means and technologies help to make the educational activities available for students and teachers.

It is fundamental to analyze and assess the adequacy of technology in accordance with the purpose of pedagogical assumptions so that the virtual environments in their methodologies and tools meet the necessary requirements.

2. DE and VTLE: spaces and times

Some demands are evident in Distance Education (DE) such as: the training of teachers and tutors, expansion of the physical network and installation of poles, provision of tools that facilitate the processes of monitoring and evaluation of courses, and conditions and financial resources.

In this regard the disposition of taxonomy for the selection of a virtual environment is differential for the institutions that plan to offer Distance Education. In distance mode the virtual environment is a resource that is increasingly required.

This research responds to this demand in one of its basic elements, that is, developing an instrument of choice of Virtual Teaching-Learning Environment.

Considering the broad spectrum of Virtual Environments for Distance Learning, or support to the people present, it becomes necessary to differentiate Virtual Learning Environment (VLE) and Virtual Teaching-Learning Environment (VTLE) because VLE and VTLE have different natures which are
not clarified only by the description of the operational, technological and ergonomic features of the vast amount of virtual environments currently available.

VLE - Virtual Learning Environment - is defined here as any environment mediated by the Digital Communication Technology (TCD) which is widely used by communities in cyberspace.

VTLE - Virtual Teaching-Learning Environment, mediated by TCD, consists of a definitely systematic, organized, and intentional formal process. It must meet the entire educational process, in its legal, functional, academic and educational issues.

DCT - Digital Communication Technology - (Catapan, 2001) specifically defines the modes of communication based on digital code, which refers to environments decoded into bits and bytes, i.e., areas where communication is connected to what is a digital and not analogical nature.

The creation of a VTLE fundamentally comprises a system that supports the development of a course project that by nature has the training and certification. Thus, it requires conditions for the teaching-learning process, in a movement systematized by a didactic definition, organized with access to records and academic monitoring of those involved and with an outlined pedagogical intentionality. (Catapan; Mallmann; Roncarelli, 2006a and 2006b).

This research announces a rheomodus of pedagogical work. Rheomodus is used as metaphor, the Greek word *rheo* that means "flow" attached to the mode. A fluidic mode of doing, being, learning and knowing in the teaching-learning process of the DE modality.

To conceive, organize, monitor and evaluate the teaching-learning DE process, bringing the experiences and what is taught in school, based on practice guided by flexibility, transversality and concern about the context, can all be enhanced with methodologies that allow the insertion of pleasurable and meaningful interactive systems. To achieve this, the instruments chosen must include dimensions of academic and pedagogical management. (Catapan, 2001).

When the VTLE includes intersections between technology, ergonomics and education, the theoretical-methodological challenges of the teaching-learning process in the distance mode can be enhanced.

### 3. Research: observer and observed

The study was conducted according to the precepts of action-research (Thiollent, 2004) and according to analysis, interference, proposition and anticipation of results. In this research the observer played an active role in the reality of the facts observed. Faced with this prospect, the following was defined with precision: the action, the agents, the goals and obstacles, as well as the knowledge to be produced in light of the problems encountered in the action or between the actors involved to fulfill the specific demand.
It occurred in a time-space permeated by a request which was directed by the offer of Pro-degree courses at the Federal University of Santa Catarina (UFSC).

The organization of the research, development and its presentation had the structuring referenced and adapted from Gowin’s Vee (GOWIN, 1981).

“Gowin’s Vee” or “The Epistemological Vee” is a heuristic instrument developed by Gowin to analyze the structure of the process of knowledge production or "unpack" documented knowledge. (Moreira, 1999).

![Gowin's Vee adapted by Araci Hack Catapan for research.](image)

Catapan makes an adaptation of Gowin’s Vee Heuristic Diagram, developed to view the systematization of the teaching process and for implementation in research guidelines.

Following Figure 1 and its developments, which act as links to each of the above, the research is focused along the propositions displayed in the Vee Diagram.

The remark was accurate, systematic and referenced in a number of categories, in the regard that it is understood that the observer and observed are the other in the relationship, as Bhom (1980) says: "... both the observer and the observed are aspects of a total reality that fuse and interpenetrate, which is indivisible and not analyzable."

The scope of research started from the questions provoked by Catapan (2001) and other studies such as Bastien and Scapin (1993), Nielsen and Tahir, (2002) and Cybis (2003). In particular, the experiment of Catapan et al (1999) realized in
the Post-Graduation Program of Production Engineering of UFSC pointed to the need for an intersection between pedagogy and ergonomics when applying the checklist to validate the use of Aurelinho.

The redemption of such studies, combined with a review of tools and extended discussions with researchers from the Atelier Project (Catapan et al, 2004), create the challenge of defining criterions and indicators to ensure the internal consistency of a VTLE that potentiates the teaching-learning DE mode, building upon the intersection of the areas of technology, education and ergonomics.

4. DEList

The taxonomy for choice and qualification of a VTLE proposed in the research was called DEList (Distance Education List). The organization of this instrument is composed of thirteen criterions: 1) Installation, 2) System Requirements, 3) Accessibility, 4) Compatibility, 5) Interface, 6) Communication Tools, 7) Operation Reliability, 8) Search Ability, 9) Customization, 10) Materials, 11) Monitoring / evaluation system, 12) Pedagogical Design and 13) Credibility. These thirteen criteria unfold into eighty-one indicators.

The DEList provided the opportunity for a vertical analysis in the exploration of technological, ergonomic and educational attributes, and was implemented in the choice of virtual environments. The environments contained resources for the development and structuring of the DE courses focusing on analysis of platforms developed with free software. The recognition involved ten platforms and three were selected for evaluation: e-Proinfo, TelEduc and Moodle. The group responsible for the DEList was composed of evaluators and constituted according to Figure 2:

![Evaluators Group](image)

**Figura 2** Group of Evaluators who applied the DEList for choice of VTLE
The team responsible for the evaluation sent a file with the email addresses of environments, IDs and passwords to allow access for the evaluators. The request for the completion of the DEList could be done in digital or analog mode.

Each assessor was asked a descriptive assessment indicating the name of the environment that they considered most appropriate for the project.

The development of research had interference procedures in the process that unfolded in seven distinct moments that intermingled.

The first moment from studies can rescue possible environments for a DE process. The second moment is the exploratory phase of the choices. In the third moment a verticalization for choice and a qualification of environments become necessary. In the fourth moment an instrument is elaborated for a virtual environment choice, called DEList. In the fifth time the evaluators apply the DEList for the VTLE choice. In the sixth moment the process was carefully explained to each indicator, facilitating the understanding and appropriateness of language by the team of evaluators. The disclosure of results requires a movement of weights attribution for selection, qualification and definition of VTLE. The evaluators did not suggest other criteria and indicators to the DEList. The seventh moment is the result of reflection by the process that they experienced. Thus, from the unfolding of the thirteen criterions, which are subdivided into eighty-one indicators, it is proposed the unfolding of the one hundred and sixty-seven descriptors.

5. Results

The development of the instrument called DEList, was based on the conceptual categories of interaction, independence, cooperation and mediation, and was unfolded in thirteen criterions, eighty-one indicators and one hundred sixty-seven descriptors.

The construction of the DEList had the purpose of being a VTLE choice instrument and was used by the evaluators. The movement of learning when building and validating the DEList needs much more maps than route and tracing, and for this reason we found unfolding of seams at times when the search was developed.

The development of this instrument was in communication with the theoretical assumptions of the area of ergonomics, technology and education and in some past experiences already realized. Figure 3 represents the first page of DEList.
DEList - Fourth Plan: Result II

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicators</th>
<th>Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 Installation</td>
<td>Requirements and basic requirements for the installation of the platform.</td>
<td>Does the platform describe a minimum need of configuration to the server?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does it describe the quantity ofInfo?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>And what is the category of processes?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum Configuration Client</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does the platform describe a minimal need for the hardware configuration to be used by the Professor, Tutor, Student?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is there any requirement by configure?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Restrictions/Licenses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does the platform have some installation restrictions?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What is the need to change the password?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is it necessary to play any browser?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is there any subordination to a particular structure?</td>
</tr>
<tr>
<td>02 System Requirements</td>
<td>Need if software to run the platform</td>
<td>Web Server</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What is the type of server?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is within the standards for Free software?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does it offer efficient performance and robustness to Viral and external communication?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can for data and services be provided in a secure Internet and relevant?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does the solution support high volumes of traffic?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What are the system requirements for installation?</td>
</tr>
</tbody>
</table>

1 This form is organized by Emile Beek Verspasen, Dick Reusen and Maria Elisa Millan, reformulated and adopted by prepared Basex. Scopes (1991); Clyde (2003); Compan et al (1999). This is a simple procedure of the platforms for DE evaluation. The evaluators may suggest other criteria and indicators.

Figura 3 First Page of the DEList

6. Anticipation

The result of the implementation of the DEList led to the choice of a platform in evolutionary development: the Moodle. It is believed that the use of this system for the organization of a VTLE signifies a rheomodus in the DE teaching-learning process.

For the idealizer Martin Dougiamas (2005), the development of this evolving environment is a collaborative culture and is exercised by educational pillars. The improvement of Moodle and its rapid development are due to the world community that uses and helps in its development.

In September 2005 the enrolment of users registered in Moodle.org was sixty thousand. In June 2006 the number reached to one hundred thousand registered users and in February 2007 there were one hundred and fifty thousand registered users. In January 2009 that number was almost six hundred thousand registered users. Note in Figure 4:
In Figure 5 we can see the translation of Moodle into other languages: in September 2005 it was translated into sixty languages, in June 2006 it goes onto seventy languages, in February 2007 that figure rose to seventy-five languages. In January 2009 Moodle is already translated into 78 languages.

It is observed in Figure 6 the use of Moodle in other countries. In September 2005 Moodle was present in one hundred and twenty countries. In June 2006 Moodle marked presence in one hundred and fifty countries. In February 2007 its presence was demarcated in one hundred and sixty countries. In January 2009 Moodle continues expanding its territoriality and is present in 202 countries.
Figure 6 Countries where Moodle is utilized

Figure 7 represents the vertiginous growth of the Moodle since 2003 for Registered Sites. Note that in December 2008 it was almost 50 thousand.

This platform with such scalability, portability, modularity, extensive documentation and support for multiple languages, can be customized to meet the requirements of a systematic, organized, intentional and formal character environment, becoming, in the understanding of this research, the same as VTLE.

The contribution of the DEList for the choice of Moodle is highlighted, among other tools, for being a platform that continues to evolve. The research has not only contributed to the development of the instrument of choice, but also contributed for making a good choice, because Moodle became the virtual environment used in the Graduate Program in UFSC. The research also served as
an environment for the training of teachers and tutors, as well as being a contribution to the offer of courses of the Distance Education Program of the UFSC.

However, the use of Moodle in itself does not guarantee the success of a VTLE. To announce a rheomodus in the teaching-learning process in the distance education modality requires the proper intersection between Pedagogy, Technology and Ergonomics. This research does not end here, on the contrary, it indicates a range of challenges for further studies.

References


