

Institutional Integration Of An Ict In Education Solution In A Brazilian University

José Renato Gaziero Cella [\[1\]](#)

Claude René Tarrit [\[2\]](#)

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Abstract

The present work shows the changes that have been happening in the learning process, where the relation professor/student stops being hierarchized vertically as it used to be in the past, where the professor spoke *ex cathedra*; focusing on the aptitudes that the students should be capable of acquiring, so that the professor becomes a guide in charge of conducting the student through the appropriate ways amid the big entanglement of asystematic information supplied by the so-called Information Society. Thus, the appropriate use of the new technologies has capital importance in the learning process. It is in this context that PUCPR developed the system called EUREKA, which has been improved each day, with the intention of providing its professors and students, among which the law course is included, an instrument capable to decisively contribute to the attainment of that new teaching paradigm. In order to achieve that, the mere adhesion of the learning process participants to the system is not enough, as this phase has already been achieved by PUCPR; above all it is important to have an appropriate and efficient use, what demands training and continuous formation of professors, being that the current challenge of the institution, especially in the case of the Law School, where the professors have predominantly been using the traditional methods of teaching, underutilizing the technological instruments that are already available.

1. Introduction

The virtualization of teaching/learning spaces was born from the computer instrumentalization. It takes part in the circulation (mediation) of information, knowledge, teaching and learning. The modalities that include the Information and Communication Technologies are part of two big families: the complement or support to on-site courses (*blended learning*) and the distance courses (*e-learning*) (Cf. LEBRUN, 2005). The structure and offer of those courses is narrowly linked to the available technologies, where two families can stand out where the teaching of Law, among many others, can be accomplished.

The first family, support to the on-site teaching, can have two forms in our context, integrated in the strategy of the courses as an auxiliary media device, or as complete subjects that adopt the distance modality in a course predominantly on-site (this last one with or without complements or course support using ICT). The second family is constituted by the so-called "distance" courses that form groups in Brazil in function of the laws that rule the modalities of offers.

This present article will specifically treat of the experiences lived in the Pontifical Catholic University of Paraná - PUCPR in consonance with the Brazilian legislation on the theme.

2. Higher education and ICT in education

Schools, universities and university centers compose what, in Brazil, we denominate Institutions of Higher Education (IES). The concept of university [3] was progressively formed, and the modern format was developed starting from the century XII, impelled by the episcopacy and the kings. It quickly got fame, immunity and privileges. The universities had special jurisdictions and got to control the productive chain of books (CHARVENAC, 1998, p. 34-35), that form the first Information and Communication Technologies (ICT). Little by little they became emancipated of the central powers to get to the current format. Nowadays, there is a higher education free of the private initiative in Brazil, being observed the general rules for education defined by the Ministry of Education - MEC [4]. Respecting those evaluative and quality rules, the institution has to propose its mission, in other words, operationalize the IES within a strategic planning that will be evaluated by MEC and whose project should respect the planned parameters. The education format in higher education more centered in Information and Communication Technologies in Education (ICT in education) is the one denominated Distance Education - EaD, whose following definition is extracted from the article 1st of the Decree n. 5.622/2005 [5]:

Art. 1st. For the ends of this Decree, distance education is characterized as education modality in which the didactic-pedagogic mediation in the teaching and learning processes happens with the use of means and technologies of information and communication, with students and professors developing educational activities in several places or times.

The rules, above all when they refer to EaD or its variations, are constantly altered in Brazil, as they try to accompany a society impregnated of technocentrism (SILVA, 2007, p. 119). Unstable normatizations make the implementation of innovative solutions be constantly accompanied of caution and researches on viability and perennality.

For managers in IES, the technologies have as main attractions: a) help the on-site teaching (learning and infrastructures); and b) extend the class space and extend geographically the offer of courses. Not only internal causes exist in the integration of technologies in IES, but, also, they suffer the social pressure in the inclusion of education technologies and more specifically of ICT in education.

3. A mutating world

The students in general, including those that study at the Pontifical Catholic University of Paraná - PUCPR, grow and mature in and with the digital world. Their expectation is of an active and social learning that goes along with the technological changes.

The access to fragmented information favors the new abilities and the new types of interpersonal interaction with the technologies. The technological vectors of communication/study are diversified (computers, iphones, cellular phones, notebooks, etc.), the social network is being spread, what makes the student a "manager" and generator of knowledge, putting him actively in the center of the knowledge device (*dispositive*) [6] (CARON, 2007, p. 457).

The web tendency (web 2.0) is to privilege the collective intelligence, with active participants in its construction, in other words, a global brain (Cf. O'REILLY, 2005). Like this, the new styles of interaction with the world are influencing the students' behavior, what makes them develop more "anthropocentric" and less "technocentric" devices (Cf. RABARDEL, 1995).

Flynn demonstrated that the increase of intellectual stimulation [7] is largely due to the intensive exposition to ICT (Cf. FLYNN, 1987). The information era is in progress; so that IES should keep up to those changes the most possible, implementing strategies of inclusion of ICT in the classes, in the *campus* and in their virtual extensions.

ICT in education have favorable characteristics to the paradigmatic change. They motivate participative and active forms of studying and working, but, in order to be effective, the implantation strategies should include the professors in the administration of the projects, in the appropriation and in the application, and like this win more support creating a co-evolution between the teaching methodologies and the inclusion of technologies.

It is visible that planning in all the levels is indispensable for probative results. It is important that the managers, the infrastructure sector, the continuous formation sector and the financial sector get also involved in that process, besides the professors and the students (Cf. BARONE & HAGNER, 2001). The solutions presented by ICT in education modify the institutions deeply; for that reason, an amicable adhesion will draw objective and harmonious changes.

4. Teaching in higher education

The university forms the student socially and technically, and that formation aims at supplying applicability of the knowledge in the market and, consequently, employment, what means capacity of corresponding in a technological and/or behavioral demand. The social transformations also make the focus of the academical formation be characterized by the construction of the student's autonomy in the acquisition of knowledge, of knowing to be and knowing to learn (BARBOT, 2003, p. 174). Consequently, besides theorist, the professor transforms that knowledge in a production that is compatible with the reality and their students' experience.

Didactically, the education technologies assume a catalytic function, as they present

opportunities to include an active pedagogy that provides autonomy in higher education, and for that, it is necessary to invest in time and continuous formation on the part of the professors and IES.

So, the information and knowledge society tends to affect the professor's role in relation to the mediation between the student and the knowledge, what is also seen in the Bologna Process, now in course in the European Union.

The market aspect influences more and more the pragmatical contents of the courses and the ways they are taught. Like this, there are strong relations between knowledge and the competitive business world. The changes are fast and the areas of performance develop and are instituted in reduced time. Professions disappear, others are created, the probability of having only one profession along the life became unlikely; then the student's need to have autonomy, central justification for the change of paradigm in the academical formation.

Another justification for change comes from the fact that the student is permanently stimulated by the information generated by the media diffusion society. So, the access to knowledge is facilitated; but a perverse effect is the pollution generated by this informative mass and, with that, an informative over exposition.

Then, it becomes necessary the aid of a guide to help in the selection and in the objective organization of the collected information in an anarchical way. That paper is objectively the one assumed by the professor in the virtual space.

5. Challenges of the teaching body formation for the use of ICT in education

The domain of the ICT integrates in the education sciences the psychology of learning, the pedagogy based on the audiovisual, the education to the medias, the technology of the instruction, the computer science and the educational software, and the management of the Virtual Learning Environments for a mediatized education (Cf. KARSENTI, 2005).

The problem of the creation and the diffusion of increasingly multimedia and multimodal didactic material and their corollary for the professors should be added to this list: the loss of power on the knowledge, real or resentful, that implicates a posture change, and the complexity of the copyright management that is someone else's or personal.

Therefore, the competences demanded from the professors become transversal, the technologies instigate to rethink the practices, what arise tensions, misunderstandings, excitement, but, above all, innovations.

The causes of the adhesion in that inclusion of technologies by the professors are several: the opportunity of change, the pragmatism (when the technologies are solutions), the minimization of problems when the students need help, or even so that they are not excluded from the current tendencies. It does not matter the cause of adhesion, it is necessary to be conscious of the size of the implicit reorganization, of the current choices and of the degree of complexity of the processes involving a lot of knowledge areas (BARBOT, 2003, p. 175).

So, teaching demands high levels of knowledge and competences in several domains. It also demands aptitudes and attitudes that facilitate the learning process and that allow the students' development in an ethical and systemic environment. It is the professor's responsibility to choose and apply the adaptation solutions with their students' specificities and the aimed results, being attentive to the work load provided, so much for the retroactions as for the cognitive and metacognitive requirements resulting from the necessary understanding of the phenomena unchained by the use of technologies.

The identification of those choices needs the pedagogic models and the indispensable technical solutions for the operationalization of the activities in that education context (TCHOOUNIKINE, 2009, p. 83).

6. Teaching and learning with ICT

In the case of the use of technology focused on space and time distribution, planning is essential in the offer and in the implementation of ICT in education. The most important is to have the goals clearly enunciated, to make the student aware of the methodology to be used and of the structure of the activity, to privilege incentives using group work, collaboration and cooperation, formative and procedural evaluation, to define tasks with deadlines, to be attentive to the retroaction and to take care so that the technology is integrated by the student (HILU, 2006, p.148).

The professor organizes the learning, guides the course, establishes the timetable and encourages work (on-site and distance - synchronous or asynchronous - individual or collective). He accompanies the students in the progression of the course answering questions, motivating, dealing with particular points when necessary, helping in the definition of the personal project, of the validation of the student's profit in the different key points of the pedagogic itinerary. In that scenery, similar in general lines to the one that has been used without the use technology, ICT in education enlarge the pedagogic possibilities and the space, so that those dimensions implicate new behaviors.

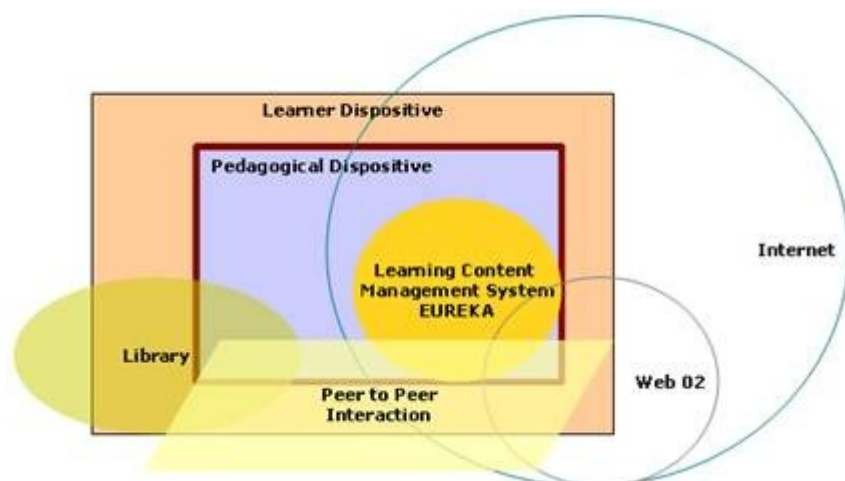


Illustration 1: Eureka is part of the pedagogic device, corresponding in the institutional level to the structure artifact in the collaborative process. The practice shows that the pedagogic device tends to extend to other tools or environments.

To reach the relational harmony it is necessary a clear and structured statement of the attendance conditions, of the rules relative to interpersonal changes, of individual discipline, of the definition of limit and of respect to the space (time) of the professors, so that nobody invades nobody's space.

The diffusion of information in the digital world has an adversary party, because the easiness of appropriation of information motivates inadequate behaviors, such as plagiarism, copy of contents, etc. On the part of the professor it is necessary a formation on copyrights and a sensitization to the consequences in case they are not respected; on the value of their own scientific and educational productions. In the evaluation process the professor has at his disposal strategies of detection of plagiarisms or of works not accomplished by the students. Such tasks make the professors know their students, what favors the detection of distortions between the participative performance and the evaluative results.

7. Use possibilities of ICT in education

The use of ICT varies in function of the type, of the academic objectives and of the disciplines. The choices of the medias and of the supports, of modality and of organization depend on the context of its application. Erica de Vries defines a typology of pedagogic functions for educational software (OF VRIES, 2001, p. 112) that can be extended to the use of ICT in general, according to the table here complemented for the theme in examination, where the eight pedagogic functions and their characteristics are defined:

Table 1. Pedagogic functions and type of tool using ICT in education

<i>Pedagogic Function</i>	<i>Type of TICE / support</i>	<i>Theory</i>	<i>Task</i>
Present information	Electronic book	Cognitivism	Read
Propose Exercises	On-line questionnaire / software	Behaviorist	Solve
Teach	AI** Tutor	Cognitivist	Dialogue
Catch attention and motivate	Games, RPG virtual	Mostly Behaviorist	Play Solve
Provide exploration spaces	Hipermedia (Internet)	Cognitivist Constructivist	Explore
Provide test environment	Simulator	Construtivist	Model

		Situated cognition	
Provide environment for discovering abstract domains	Micro-world Metaverse (virtual world)	Constructivist	Materialization
Provide space for collaboration	Virtual learning environment, discussion groups, blog...	Constructivist Situated cognition	Dialogue Write Communicate

*AI: Artificial Intelligence

8. EUREKA at PUCPR

To assist the pedagogic categories mentioned above, since 1997 PUCPR works in the development of a *Learning Management System* EUREKA and soon afterwards in a *Learning Content Management System* SAAW (Student Support System via web). Eureka is a particularly appropriate virtual learning environment for mass and simple use. It is adapted to the didacticism. The development team can assist the specific demands of the courses and also institutional demands. The environment stood out in the last evaluation of PUCPR by MEC.



Illustration 2: Example of work plan and of on-line material (web video, recorded directly by the professor with his webcam.)

It is the vector of the institutional implementation of ICT at PUCPR. The institution has the particularity of having noticed the potential of the virtual environment quickly, so that EUREKA was thought to be used by all the students, in any knowledge areas, with emphasis in the collaboration. At the beginning the habilitation in the system was based

on demand, but since 2006 the academic EUREKA is linked to the academic system with the philosophy: a classroom/ a virtual room. The *Learning Object* was parallelly developed, being available for all the professors of the institution in a functional module: EUREKA SAAW.

That functionality makes it available for the students of PUCPR to access study themes (60) that in the most varied areas of knowledge (15), counting with more than 500 study modules.



Illustration 3: Examples of interactive on-line didactic material about the legislation of EAD in Brazil: the didactic material is multimedia and multimodal, depending on the objectives and the complexity degree it can be from a simple text to a simulation.

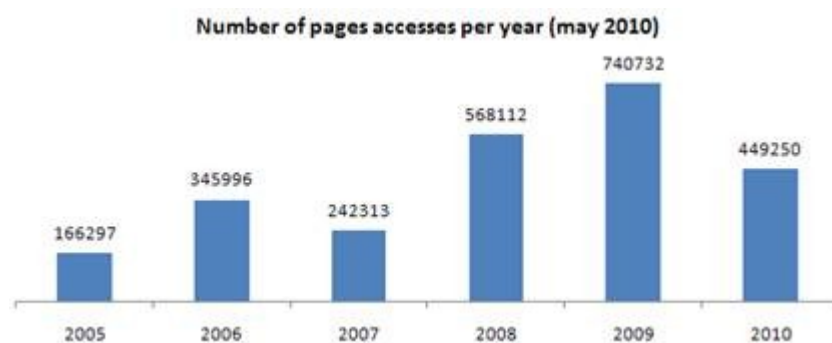


Illustration 4: Evolution of access in number of pages (Learning Object).

The access to those contents is in growing evolution due to a larger accessibility promoted by the friendly interface of Eureka and to make study themes available, that are pertinent and culturally appropriate to their target public.

Presence / Eureka Virtual class

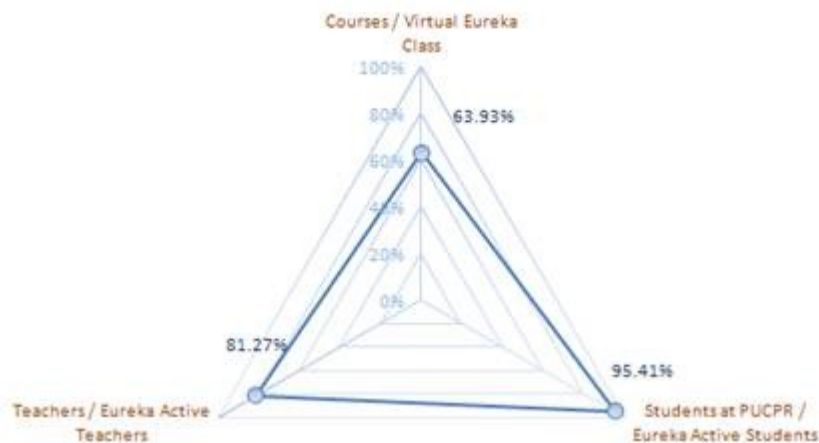


Illustration 5: the visualized use is of all the courses offered at PUCPR, from technologist to doctorate, of all areas of knowledge: from computer science to medicine, law and philosophy. (Data: June, 2010).

Nowadays the use of the system by the students and professors is almost generalized in the institution: from the 35,792 enrolled students at PUCPR, 34,148 are active in the environment.



Illustration 6: the number of accesses, any day of the week, overcomes 5.000, this year the average has been of 9.000/day and every year the traffic in Eureka increases by 20% at least - Data by Google Analytics.

The solid access to the environment does not guarantee that the use is in the ideal (expected) way for their formulators. Every system goes through an appropriation phase and also of functional feedback and EUREKA went through the same rule. Such phase was accompanied by groups of research linked to the project EUREKA, and the works accomplished show that the initial instrumental characteristics of the environment and the first punctual accomplishments influenced the institutional pedagogic practices.

A significant example is the "micro-project" related to the editorial room of the newspaper *Comunicare* (2002/today). That newspaper is managed and written by students of the journalism course. The initial project lacked continuity, but the use of EUREKA allowed the recording of the interchanges and its dynamization out of the space and temporal frame of the course. A new form of didacticism in the teaching of journalism was born from this

experiment (BARCELLOS, 2006, p. 187).

Those "micro-projects" allowed evidencing the divergences and convergences of the actors around the pedagogic practices. The several experimentations revealed the administrative and legal brakes, such as the way of quantifying the physical presence and the virtual work (for the professors and for the students).

The group of analyses engaged allowed the determination of the needs in infrastructures (MENDES, 2006, p. 39) and created the recommendations in terms of process, MATICE: Methodology of Learning through Information and Communication Technologies in Education. The structure of the system makes it clear that the user is free to act in the virtual space to collaborate among pairs and to share knowledge. That freedom allows, little by little, professors and students to get appropriated of the space to change its purpose using the environment for the operationalization of a newspaper virtual "editorial room" or creating a fictitious virtual company.

In that phase of the institutionalization we are experiencing an important increase of the use of the system in a more sophisticated way (not only the e-mail, the repository and sending works).

A new generation of professors who learned how to take advantage of the system appears and, with that, they get free of the impediments of the traditional methodologies to innovate and to assume the role of a guide and reference.

A research on the system accomplished in June of 2010 had as object the universe of 1,927 professors, of which 1,566 are active in EUREKA (independently of the work system, that can be full time, paid by the hour or visitor), of which 756 answered the questionnaire, what represents 48.2% of the users with the profile "professor" in the system. Two points demonstrate the evolution in the perception of the system and in its use:

- About the *usefulness of the system*: the ones who answered "no doubt about the benefits the system brings", it should be contrasted that 35.6% use it daily and 48.6% weekly, and also that there is no institutional obligation and control as for the amount and quality of the use.
- About the *working plan*: in this topic it is important to comment about the evaluation of that functionality for the fact of being in the center of the planning and in the structuring of a virtual class, because it organizes the access to all the other functionalities without being of obligatory use. 60.3% qualified it as very good or good and only 15.6% never used it. That number corroborates the increase of use registered by the tracking system. The use of a virtual space is not improvised to be fully and satisfactorily explored from the point of view of the learning process as from the teaching quality noticed and certainly effective on the professors side.

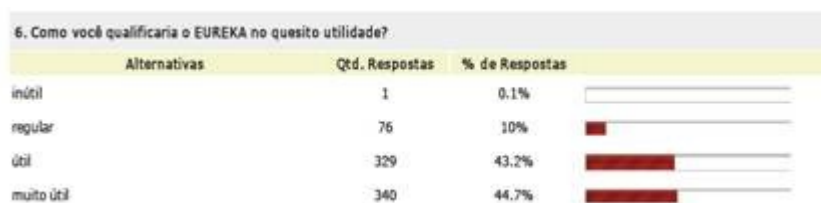


Illustration 7: questionnaire accomplished in May/June 2010, using Eureka

13. Quanto à funcionalidade plano de trabalho, você considera:			
Alternativas	Qtd. Respostas	% de Respostas	
Muito Bom	172	22.6%	
Bom	287	37.7%	
Regular	116	15.2%	
Ruim	33	4.3%	
Muito Ruim	21	2.8%	
Nunca utilizei	119	15.6%	

Illustration 8: questionnaire accomplished in May/June 2010, using Eureka.

Specifically as for the graduation course in Law, it has also been having a growing use of the system (see illustration 9, below). However, the predominant use is limited to the supply of bibliographies, communication of certain notifications to the students and other uses that are not strictly linked with the learning process, in a way that the tools available in EUREKA remain extremely underused by the majority of the professors, who remain attached to the traditional methods of teaching without using the technology available satisfactorily, what makes it necessary, in a second phase that follows the solid adhesion already in course, to have those professors trained so that they can pay more attention and make better use of the technological instruments available for them.

Presence / Eureka Virtual class/CCJS/Direito



Illustration 9: data that demonstrate the high percentage of use of the system by the professors and students of the Law course.

9. Conclusion

It has been seen that EUREKA supplies full subsidies in a geographical and temporary distribution of the teaching/learning process. The conditions for that to happen are important in the conjunction of an institutional will, the professors' continuous formation and the recognition of the necessary effort to accomplish the "paradigmatic jump" from the on-site class to the virtual community relation.

Each institutional formation campaign leads more professors to use the system in its fullness (or exploring its educational potential). There should also be an institutional recognition of the work (not always noticed and quantified, so much for the managers as

for the professors themselves) that involves the use of such system. Also, the professor should be aware of the irreversibility of the introduction of ICT in the society and, consequently, in the University, need that is revealed in the case of PUCPR in a quite strong way in the case of the Law school professors.

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[1] PhD at Law, UFSC - Federal University of Santa Catarina, Brazil (2008), doctoral thesis on "Logic, Artificial Intelligence and Law"; Master at Law, UFPR - Federal University of Paraná (2001), master dissertation on "Theory of Legal Argumentation"; Graduated in Law, Law School of Curitiba (1997); Graduated in Philosophy, Federal University of Paraná, Brazil (1995); and Law Professor and researcher at PUCPR - Pontifical Catholic University of Paraná (since 1999).

[2] Doctoral student - Computer Environment for Human Learning, University of Lille 1, Laboratory Trigone, France. Master II - Instructional Engineering Multimedia, University of Lille 1, France (2009). Master I - ICT Project, University of Limoges, France (2006). Multimedia Communications Engineering, University Paul Sabatier, Toulouse, France (1993). Coordinator of the Sector of New Educational Technologies (NTE) at Directorate of Distance Education - PUCPR. At PUCPR, Brazil (since 1997).

[3] The word *Universi* and later *Universitas* denominated the totality of professors and students before denominating the university of Paris and the others, by extension.

[4] Cf. article 9 of the [Decree n. 5.773 of May 09, 2006](#).

[5] [Decree n. 5622 of December 19, 2005](#), that regulates the article 80 of the [Federal Law n. 9394 of December 20, 1996](#), that establishes the guidelines and bases of national education.

[6] The word "dispositive" is used in French to describe a system set up for a specific purpose. According to Michel Foucault a "dispositive" is a "*decidedly heterogeneous ensemble*", "*a resolutely heterogeneous assemblage, containing discourses, institutions, architectural buildings, regulatory decisions, scientific statements, philosophical, moral, philanthropic propositions, in one word: said as well as non-said, those are the dispositif's elements. The dispositif in itself is the network that we can establish between those elements*" (FOUCAULT, M., *Discipline and Punish: the Birth of the Prison*. 1975, New York Random House. Caron P-A., p. 458).

[7] The IQ of the population has sensibly increased.