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DESIGNING AN INSTRUMENT FOR EVALUATION OF A COLLABORATIVE LEARNING ENVIRONMENT

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ABSTRACT

This study proposes the design of a tool for the evaluation of a Collaborative Learning Environment. The need arises from direct observation of selected collaborative learning environments and the apparent inclusion of expert instructors in conceptual content and skills in the technological area but not in aspects of teaching and pedagogical discourse. The study is based on the conceptual approach of Collaborative Learning Environments in Content Analysis as an evaluation strategy for Collaborative Learning Environment and the theoretical visions from Educational Technology of Hassan and Martin, Pere Marques and the University of Wisconsin - Eau Claire. Du to its design, it is consistent with Holistic Research in the type of Projective Research supported by the Special Project mode that was developed in four stages: Descriptive, Comparative-Analytical, Explanatory and Technical which covered from direct observation, passing through categorization, contrasting, to the design of the instrument under study. This designed instrument is based on a Checklist comprising 63 items which cover the categories that emerged from the comments, providing a content analysis from the construction of paragraphs from a list of verbatum predefined according to the choice made in the instrument of clear and concise sentences that emerged from specific theoretical contributions, grouped into three paragraphs, one for each aspect observed (technological, discursive and didactic).

Keywords
Content Analysis - Collaborative Learning Environment - Holistic Research - Pedagogic Teaching - Educational Technology - Teaching.

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DISEÑO DE INSTRUMENTO PARA LA EVALUACIÓN DE UN ENTORNO DE APRENDIZAJE COLABORATIVO

RESUMEN

El presente estudio propone el diseño de un instrumento para la evaluación de un Entorno de Aprendizaje Colaborativo. La necesidad surge a partir de la observación directa de una selección de ambientes de aprendizaje colaborativo y de la manifiesta inclusión de instructores expertos en contenido conceptual y con competencias en el área tecnológica pero no en aspectos relacionados con la didáctica y su discurso pedagógico. El estudio se fundamenta en la aproximación conceptual de los Entornos de Aprendizaje Colaborativo, en el Análisis de Contenido como estrategia evaluativa para un Entorno de Aprendizaje Colaborativo y en las visiones teóricas que desde la Tecnología Educativa tienen Hassan y Martín, Pere Marquès y la Universidad de Wisconsin – Eau Claire. Por su diseño es congruente con la Investigación Holística en el tipo de Investigación Proyectiva con apoyo la modalidad de Proyecto Especial el cual se elaboró en cuatro estadios: Descriptivo, Comparativo-Analítico, Explicativo y Técnico lo que cubrió desde la observación directa, pasando por la categorización, contrastación hasta el diseño del instrumento objeto del estudio. Este instrumento diseñado está basado en una Lista de Cotejo 63 ítemes los cuales cubren las categorías que emergieron de las observaciones, proporcionando un análisis de contenido a partir de la construcción de párrafos desde una lista de verbatum predefinida según la elección hecha en el instrumento, de oraciones claras y concisas que surgieron de aportes teóricos específicos, agrupado en tres párrafos, uno por cada aspecto observado (tecnológico, discursivo y didáctico).

PALABRAS CLAVE
Análisis de Contenido - Entorno de Aprendizaje Colaborativo - Investigación Holística - Discurso Pedagógico - Tecnología Educativa - Didáctica

1. INTRODUCTION

The inclusion of Information and Communication Technology with Web 2.0 in education is a challenge and an innovation in the teaching processes for collaborative learning. Its application is part of the Educational Technology in the use of collaborative learning environments (EAC) for the provision of teaching situations grounded in conceptual, procedural and attitudinal contents. Teachers as learning-enabling instruments, using the benefits granted by the EAC, develop their courses with greater comfort thanks to the number of tools available on the Web to show contents. The subjects can be integrated into an EAC with the simple use of a tutorial, adapting platforms to teaching. Using a content analysis tool

can guide and refine the construction of learning environments by providing clear guidelines to provide its constructor with a suitable way for the environment to meets the purpose for which it was designed: to instruct.

1.1 Description of the subject of study

In the knowledge society, the educational process has changed in each of its forms: regular education, virtual education and distance education (Castañeda and Sanchez, 2009) due to the impact produced by the application of Information and Communication Technology (ICT).
To Dr. Julio Cabero from the University of Seville, the influence of ICT in teaching and learning is given, among other factors, by creating more flexible learning environments, enhancing and facilitating interactive environments, thus breaking up with the classical training scenarios (Fernandez and Martinez, 2009), which transitively becomes a recommendation to use Collaborative Learning Environments (EAC).
An EAC, in short, is understood as a place where students must work together, helping each other, using a variety of tools and information resources to the pursuit of learning objectives and activities for troubleshooting (Wilson 1995; Ferraté, 1997). This environment uses online tools hosted on the Web 2.0 to promote collaborative, interactive, meaningful learning and, somehow, knowledge management (Salinas, 2004).
With the availability of these interactive tools and the benefits provided by the use of Internet as regards the existence of an update to these modern learning environments, it is possible for a teacher, who is not an expert in building learning environments but who is so in conceptual content, to design, construct and operate an EAC through the use of basic tutorials from predesigned templates (Tondeur, et.al., 2007). But in this tutored mechanical implementation, one may also possibly neglect important aspects for the built environment such as: the psychological power to be applied to explain the content, the teaching strategies presented, the ideal construction of verbal and nonverbal pedagogic discourse, the reliability of the information source and the arrangement of content within the learning environment. (Yusef et.al., 2006)

That empirical construction of EAC requires a comprehensive study to determine the ideal way of preparation for its sole intended purpose: to promote learning through the proper layout of the environment, the relevant pedagogical discourse and the application of teaching strategies . (Adúriz, 2010)

By the above described, in the degree thesis, it done was intended: *To design an instrument for analyzing contents of a collaborative learning environment*, and the following questions arise: What elements constitute an EAC in their general content?, What categories theorists propose that must be present in the EAC?, What categories should form an instrument for analyzing contents of a EAC?, which leads to the main

research question: Is it possible to design an instrument allowing content analysis of an EAC?

2. OBJETIVE:

Design an instrument for analyzing contents of a collaborative learning environment.

3. METHODOLOGY

Once the theoretical and referential information supporting the construction of the instrument for Content Analysis of EAC has been collected, methodological implementation is required, to do so this chapter presents: a) the methodology for the design of the instrument, b) procedural design, c) the instrumental design and d) the application context.

3.1 Design methodology

Taking into account the overall objective of this study, it is possible to frame it in the holistic paradigm of research. To Hurtado (2000), Holistic Research "...integrates various epistemic models and is conceived as a comprehensive synergistic, evolutionary, integrative, and concatenated process with sequential and simultaneous aspects". Also:
It works on the processes having to do with the formulation of new proposals, with description and classification, it considers the creation of theories and models, inquiry about the future, implementation of solutions, and evaluation of projects, programs and social actions, among other things (Hurtado, op.cit.)

Within this Holistic Research and considering, again, the general objective of this design, it is possible to say that the study is at the comprehensive level, as it proposes the design of an instrument for analyzing contents of a collaborative learning environment.
According to the above described, according to the classification of this holistic paradigm and at the level regarding type of objective, it is located in the type of Projective Research, which according to Hurtado (2000), "…are all those pieces of research that lead to inventions, programs, designs or creations designed to meet a particular need, and based on previous knowledge "(p.323)

Furthermore, this Projective Research has the Special Project mode. This mode is understood, according to Libertador Experimental Pedagogical University (2006), as "... work leading to tangible creations capable of being used as solutions to demonstrated problems ..", it goes on to specify that "... this category includes the work of preparing textbooks and education-aiding materials, software development, prototypes and technological products in general .... " (p.14) both being consistent

with the essence of the project and the research lines of the specialization that is chosen, the proposal is then technological and inclusive of didactic and discursive categories allowing recognition of the content present in EAC and further analysis.

This mode of Special Project involves a continuous and progressive process making it compulsory to pass through other precedent stages-phases:
a. Descriptive Stage.

b. Comparative and Analytical Stage.

c. Explanatory Stage.

d. Technical and Design Stage.

3.2 Procedural design

To meet the overall objective in this design, it is necessary to parcel out the development of projective research in four stages (Hurtado, 2000), namely:
a. Descriptive Stage: it comprised the diagnosis of reality to attempt to modify, documentary review that provided the state of the art, the theoretical foundations of the categories proposed to contain an EAC, and the description of a selection of CAD.
b. Comparative and Analytical Stage: it comprised the work itself with the information collected in the descriptive stage. The triangulation method was applied. To Perez Serrano (1998; cp Ramirez, 2007), this method is to "collect information or comments from a variety of angles and perspectives and then compare and contrast them." Triangulation was applied for the testing of the proposed categories for the construction of a collaborative learning environment according to the theoretical contributions collected in chapter two and in the descriptive stage with the emerging categories, they being understood as the result of a data classification process around ideas, themes and concepts that will emerge from reading the material itself (Porta and Silva, 2003), found in the EAC by direct observation. The sources of information that allowed triangulation were observational and documentary. Having taken the categories suggested by theoretical information and the emerging categories obtained by observing the selected EAC, those common categories were obtained in both cases.

c. Explanatory Stage: the selection of common categories in triangulation and their being complemented with the theoretical support, which supports the category from which the formulation of the items that made up the instrument for Content Analysis emerged.
The categories that emerged were grouped into type dimensions: Teaching, Discursive and Technological, taking into account three criteria: a) the characteristic of the emerging category, b) the epistemic origin and, c) the academic context of the EAC.

d. Technical and Design Stage: in which, the categories having already been obtained and grouped into dimensions of study, the Table of Operationalization of Variables was derived from the purpose of the instrument and according to the found dimensions, the Table of Items which emerged from the theoretical contributions of each category in the assertion mode, and the Table of Verbatum that are based on the respective theoretical contribution taking into account the consequences of the presence or absence of the category. All this is shown in the following chapter.

As for design, two instruments were built: A) a traditional instrument and, b) a digital instrument. There are no variations between them in terms of items but, while in the traditional instrument, the verbatum should be grouped and written by the one who applies the instrument, in the digital instrument, thanks to HTML and PHP programming, the Boolean selection of items results in three paragraphs of verbatum grouped by the predefined dimensions.

3.3 Instrumental design

Humans are in constant interaction with their environment allowing them a continuous meeting with multiple types and amounts of information. In formal aspects of lie such as the academic environment, this information must be worked based on higher cognitive processes which will allow better use of their content. It is therefore advisable to apply tools to guide the collection of data and metadata such as the data collection instruments.
To Arias (2006), the data collection instruments "are the material means used to collect and store information" (p. 69). In this particular proposal, there are two groups of instruments: a) the information collection instrument known as Registration and Classification Table of the categories that was applied both in the Comparative-Analytical Stage in Chapter II and the Explanatory Stage in Chapter IV and b) the designed instrument, which was built but not applied to any population, but it is the technological product that was the object of study (other than the object of analysis). Nor was it conceived at any time as an instrumental tool that brokered the collection of information for subsequent analysis, in short, applying this designed instrument escaped this piece of research, which is explained below in detail.

3.4 Instrument in Traditional Format

The idea in choosing a type of instrument to mold it to the instrument for content analysis focused on being able to observe the presence or absence of specific and common categories in Collaborative Learning Environments. That is why the type of instrument best adapted to the ideal requirements was the Checklist.

The Checklist, also known as Checklist or Verification List, is an instrument that indicates, effectively and as required in this design, the presence or absence of

aspects, categories or conduct to be observed. (Arias, 2006)
The Checklist in the traditional format has three columns, namely: the first column to the left contains the category to be observed in the EAC, the middle column has a box to check with "*YES if the category is present* " and a third column on the right contains a box to check with "*NO*" if the category is absent.

3.5 Content analysis as a technique for the evaluation of an eac.

To address the management of information in an evaluative context, one should select the technique with which the researcher / observer expects to get higher quality in processing that information. For this study and as previously mentioned in the categorizations of the observed EAC, content analysis is applied through an instrument constructed for this purpose and the result of the analysis arises from the meeting of groups of verbatums that were made, and in turn, they arise from the observations made by the evaluator on the learning environment. To Piñuel (2002):
Content analysis is the name often given to the set of interpretive procedures of communicative products (messages, texts or discourses) that come from previously recorded unique communication processes and, based on measurement techniques, sometimes quantitative (statistics based on counting of units), sometimes qualitative (based on the combination of logical categories) are intended to prepare and process relevant data on the same conditions that have produced those texts, or conditions that may occur for later use. (P.3)
Also Hostil (1969) advocates a definition that contributes several important aspects regarding the definition by Piñuel: "*Content analysis is a research technique for making inferences by systematically and objectively identifying specific characteristics*". From the above described by the authors, it is possible to find a threefold for the application of the technique, specifically in the EAC: the analysis of messages, texts and speeches. Content analysis consists of four fundamental aspects: a) the object of analysis, b) the encoding rules, c) the system of categories and d) inferences.

a. The object of analysis: this aspect should basically be what is it?, what is to be analyzed?. In a piece of documentary research, or field research, for instance, this object becomes the subject of analysis. As in this case, the constructed instrument performs content analysis, the object of study is Collaborative Learning Environments.
b. Encoding rules: treating the material is encoding it. The coding is a transformation by precise rules of the raw data of the text. This transformation or decomposition of the text allows their representation in numerical or alphabetical indexes. (Abela, 2003). In this sense it is taken as a rule in which the frequency of repetition that could become a feature in one category is recorded.

b. The system of categories: In this regard, Bardin (1996), sees it as "... a sorting operation of constituent elements of a set by differentiation,

after grouping by analogy from pre-defined criteria". Sorting items into categories entails finding what each of them has in common with the others (Abela, op.cit). This system grouped the categories that were emerging in both the documentary research of theoretical proposals and direct observation of the EAC who were subjected to analysis.

c. Inferences: this last aspect is purely deductive. It is to seek some conclusions explicitly or implicitly "contained" in the text itself (Abela, op.cit). This process allowed close categorizations that facilitated the construction of operational tables, charts and tables of items and tables of verbatums which are shown below.

Within the content analysis that was performed on EAC through the proposed instrument, the Thematic Content Analysis is needed because it considers the presence of terms or concepts, regardless of the relations arising between them. (Abela, op cit.) Perhaps the most common technique is to search-and eventually analyze more closely, with another technique, units where there is a particular subject which confirms the rule adopted encoding for later categorization. Likewise, the Thematic Analysis was performed together with the qualitative content analysis of an inductive type, which consists of a set of systematic techniques that interpret the hidden meaning of texts with reductive procedures so it is inclusive of verbal discursive and iconographic aspects, this being relevant to this study. (Abela, op.cit)

4. DISCUSSION

Once the methodology to be followed for handling information from desk reviews and direct observations of the chosen EAC has been described, the authors proceeded to build the instrument described in this fourth chapter containing: the categorization system, the System of Operationalization of Variables, the Table of Items and the Table of Verbatums and, finally, the instrument models designed in both traditional and digital format.

4.1 Rating system

As mentioned above, this system grouped the categories that were emerging both in the documentary research of theoretical proposals and in direct observation of the EAC that were submitted to analysis.

a. Common categories among the theoretical proposals about EAC and observed EAC.

The data and information comprising the following table arise from the categories that emerged in the theoretical and direct observations.

Table 1.

Common categories among the theoretical proposals and direct observation about EAC.

Pere Marquès	**UWEC**	**Hassan Martin**	**Environment 1**	**Environment 2**	**Environment 3**	**Category**	**Coverage**
	X	X	X	X	X	Web address Loading rate	83,3
X	X	X	X	X	X	Web address Loading rate	100
	X	X	X	X	X	Self-explanatory content Navigation map	83,3
X		X		X		Self-explanatory content Navigation map	50
X		X		X	X	Help Menu Censorship	83,3
	X					Help Menu Censorship	16,6
		X			X	Help Menu Censorship	33,3
X	X	X	X	X	X	Implementation of programs and tools	100
X						Advanced technology	16,6

X				X		Information Services	33,3
X	X	X	X	X	X	Bidirectionality	100
X			X	X	X	Communication Channels	66,6
X			X	X	X	Interactive activities	66,6
X			X	X	X	Inlaid authoring tools	66,6
X		X	X	X	X	Multimedia tools	86,6
X						Recreational Tools	16,6
X	X	X	X	X	X	Hyperlinks	100
X	X	X	X	X	X	Updated information	100
	X					Extension Information	16,6
			X	X		License	33,3
			X	X		Subscription or Invitation	33,3
		X		X		Organization information	33,3
	X					Statistical data	16,6
X	X					Web searchers	33,3
X						Repositories	16,6
X	X	X	X	X	X	Screen design	100
X	X	X	X	X	X	Technical and aesthetic quality in its entirety	100

		X	X	X	X	Measures pictures	66,6
X	X	X	X	X	X	Interesting environment	100
		X	X	X	X	Images available	66,6
X	X			X	X	Advertising space	66,6
		X	X	X	X	Environmental image of the author	66,6
		X	X	X	X	Typografhy	66,6
X	X	X	X	X	X	Environmental image of the author	100
	X		X			Copyright	33,3
			X	X	X	Spelling	50
			X	X	X	Punctuation marks	50
	X	X	X	X	X	Written text readability	66,6
		X	X			References	33,3
		X	X	X	X	Coherence	66,6
		X	X	X	X	Cohesion	66,6
		X	X	X	X	Communicatio n codes	66,6
	X					Description context	16,6
	X					Historical data	16,6
			X	X	X	Confidence in the written speech	50

			X	X	X	Category written speech	50
			X	X	X	Plans of written discourse	50
X		X	X	X	X	Objectives and purpose of the DI	83,3
X		X	X	X	X	DI contents	83,3
X		X	X	X	X	Instructional strategies	83,3
X			X	X	X	Methodology	66,6
X			X	X	X	Means	66,6
X	X		X	X	X	Evaluation	83,3
X						Educational Legislation	16,6
X			X	X	X	Knowledge Management	66,6
X		X	X	X	X	Motivation to learn	83,3
	X		X	X	X	Basic cognitive processes	66,6
X	X		X	X	X	Higher cognitive processes	83,3
X		X	X	X	X	Audience characteristics	83,3
			X	X	X	Diversity activities	50
X	X		X	X	X	Advance organizers	83,3
			X	X	X	Techniques for addressing problems	50
			X	X	X	Techniques for addressing problems	50

X	X	X	X	X	Metacognition	83,3

Source: Own

From the information gathered and displayed in the table above (see Table 7), one can select the next group of categories (see Table 8) to be presented in the System of Operationalization of Variables (see Table 9). For the selection, two considerations were taken into account:
a) That the category reaches a percentage higher than or equal to 60% between theoretical observations and direct observations of EAC. With this approach, the coverage would be by a majority of repetitions.
b) That the category reached an absolute coverage (100%) called categorical saturation in any of the observations (theoretical or direct) which results in 50% of total coverage.

Based on these considerations, the categories selected were:

Table 2.

Categories selected for the Instrument for Content Analysis of EAC.

ASPECTS OBSERVED	**CATEGORY**
Technology	Web address Loading rate Self-explanatory content Navigation map Help Menu Implementation of programs and tools Bidirectionality Communication Channels Interactive activities Inlaid authoring tools Multimedia tools Hyperlinks Updated information

Discursive	Screen design Technical and aesthetic quality in its entirety Measures pictures Interesting environment Images available Advertising space Environmental image of the author Typography Author's description of the environment Spelling Punctuation marks Written text readability Coherence Cohesion Communication codes Confidence in the written speech Category written speech Plans of written discourse
Didactic	Learning objectives and purpose of the DI DI contents Instructional strategies Methodology Means Evaluation Knowledge Management Motivation to learn Basic cognitive processes Higher cognitive processes Audience characteristics Diversity activities Advance organizers Techniques for addressing problems Learning Theory Metacognition

Source: Own

4.2. System of operationalization of variables

Instrument: instrument for Content Analysis – Checklist.

Purpose of the Instrument: Analyze the content present in a Collaborative Learning Environment

Table 3.

System of Operationalization of Variables

Dimension	**Sub-dimension**	Meaning	Category	**Type of ítem**	**Ítem number**
Technology-Digital Content	Ease of Use	Allows the user to know and have access to the EVA	web address	dichotomic	1
			Loading rate		2
			Self-explanatory content		3
			Navigation map		4
			Help Menu		5
	interactivity	It allows to know the possibility of interaction between the user and the EVA	Implementation of programs and tools	dichotomic	6
			Bidirectionality		7
			Communication Channels		8, 9, 10
			Interactive activities		11, 12
			Inlaid authoring tools		13
	means	It allows to know the types of instructional resources used in EVA	Multimedia tools	dichotomic	14, 15
			Hyperlinks		16
			Updated information		17, 18
content Discourse	Iconography speech	To understand the	Screen design	dichotomic	19

	(nonverbal)	nonverbal discourse used in the construction of EVA			
			Technical and aesthetic quality in its entirety		20, 21, 22
			Measures pictures		23
			Interesting environment		24
			Images available		25, 26, 27
			Advertising space		28
			Environmental image of the author		29
			Typography		30, 31, 32
	Verbal speech	To understand the verbal discourse used in the construction of EVA	Author's description of the environment	dichotomic	33
			Spelling		34
			Punctuation marks		35
			Written text readability		36
			Coherence		37
			Coherence		38
			Communication codes		39, 40
			Confidence in the written speech		41
			Category written speech		42
			Plans of written discourse		43, 44
Educationa	Instructional	Can recognize the components of	Objectives and purpose of the	dichotomic	45

l content	Design	instructional design (ID) that supports the EVA	DI		
			DI contents		45
			Instructional strategies		46
			Methodology		46
			Means		46
			Evaluation		47
	didactic	It allows to know the didactic manner in which EVA addresses the contents presented	Knowledge Management	dichotomic	48
			Motivation to learn		49
			Basic cognitive processes básicos		50
			Higher cognitive processes		51
			Audience characteristics		52
			Diversity activities		53
			Advance organizers		54
			Techniques for addressing problems		55
			Learning Theory		56, 57, 58, 59, 60, 61, 62
			Metacognition		63

Source: Own

4.3 Table of items of the instrument for content analysis

According to the characteristics a checklist should have, the kind of instrument chosen for this study and previously justified in Chapter 3, the wording of items entailed the construction or sentences that, due to a specific category, would make it possible to answer the absence or presence of said category.

In this sense, the items constructed for the Instrument (see Table 10) were:

Table 4.

Table of Items.

Item	**Number Item**	**Category**
Web address	1	Web address of the learning environment is easy to remember
loading speed	2	loading speed lower Web page within 5 seconds
Self-explanatory content	3	Al entrar al entorno de aprendizaje su manejo se explica por si solo
Map navigation	4	The learning environment has navigation map on a specific menu
Menu Help	5	The learning environment contains a help menu
Implementation of programs and tools	6	programs and tools that run from the learning environment work properly
bidirectional	7	learning environment enables the exchange of information with users
communication channels	8	possible to send emails from the learning environment
	9	Is there the possibility of chats from the learning environment
	10	There are communication through links with at least one social network (Facebook, Twitter, Linkedin, Hi5, YouTube ...)
interactive activities	11	conducive learning environment interactive activity through Web 2.0 tools.
	12	In use interactive activities and reinforcement is done to aid the user to approximate the correct procedure

Inlaid authoring tools	13	The virtual learning environment makes use of authoring tools in developing their activities
Multimedia tools	14	The virtual environment using multimedia programs that can be attractive to the user
	15	Use of audiovisual is done to promote the association of conceptual contents
Hyperlinks	16	The learning environment makes use of hyperlinks "links" that redirect the user to other websites to increase its information on a topic raised
Update	17	The information presented in space is a credible source
	18	La información que se presenta en el espacio tiene una antigüedad menor a 2 años
display design	19	Predominant colors in the environment are high intensity
Technical and aesthetic quality in its entirety	20	The objects used in the environment are harmonious in its aesthetics
	21	shows technical quality environment in its development
	22	shows that the environment was conducted through a predesigned template
Tables measures	23	There is a proper use of the measures both inputs and fouling showing that none of these exceeds the margins of the environment
Interesting environment	24	the interest of the environment to check its contents
Layout images	25	are images predominantly on the left side of the virtual environment
	26	Images are predominantly on the right side of the virtual environment
	27	The images are randomly placed in the virtual environment
There are	28	advertising space advertising space (AdSense) that can produce a profit for the author of the virtual environment
Author environmental image	29	exists in the environment a photographic image of the author
Typography	30	The size of font used in the environment is easy to read
	31	The type of font used in the environment is from traditional sources of office tools for Windows, Mac and Linux.
	32	In the texts you use discriminators in the words becomes (highlighted with fluorescent colors, use bold, variations in size, italics and underlined that are not hyperlinks)

Author's description of the environment	33	The environment contains a biography of the author and his academic achievements are noted..
Spelling	34	The environment has no spelling errors in construction
punctuation marks	35	punctuation environment makes proper use of punctuation in construction
Readability of text written	36	written texts are easily understood by the user and makes use of a simple and clear language in texts
coherence	37	There is a consistent logical sequence in written texts in the virtual environment
Cohesion	38	There is a logical union of ideas in written texts in the virtual environment
Communication codes	39	written texts there is a proper use between meanings and signifiers
	40	In the proposed activities within the setting Frequent use of questions that contain the "what?" And it becomes "what?"
Confidence in the speech written	41	instructions and set of activities using "tuteos" becomes
category of written discourse	42	speech written explanations made in the learning environment require prior knowledge of high specialized content.
planes of written discourse	43	planes of written discourse speech used in the virtual environment promotes interaction between users
	44	The discourse used in the virtual environment promotes interaction between the user and written text
Objectives, purpose Contents of DI	45	goals, the purpose of use are specified and at least the conceptual content of the educational Web environment
Instructional strategies, Methodology and Resources	46	possible teaching strategies are proposed, the instructional methodology and instructional resources to be applied to the use of the learning environment
Rating	47	possible evaluation assessments are specified in the web learning environment either input, formative and / or summative.
Knowledge Management	48	Within the educational environment the exchange of ideas promoted through discussion forums
Motivation to learn	49	in the virtual learning environment are encouraged to learn through demonstrations, striking activities, new ideas and / or indications for effective study of contents
Basic cognitive processes	50	It stimulates perception, attention, memory, intelligence, thought and proper use of language through the activities proposed in the virtual learning environment
higher cognitive processes	51	higher cognitive processes of creativity through the proposed activities are encouraged in virtual learning

		environment
Features of the hearing	52	The learning environment takes into account the age of the audience and has activities appropriate to the level of audience development
Diversity in the work environment proposes	53	different types of activities and itineraries that allow various forms of use and approach to knowledge.
Advance organizers	54	For the presentation of a given topic the author of the environment begins with the use of advance organizers.
Techniques for addressing common problems	55	using the technique of the question is asked
Learning Theory	56	using the technique of problem-based learning is made (ABP)
	57	concept maps are used in the thematic presentation of the environment
	58	activities such allocation questionnaire and survey questions guide occurs
	59	There stimulating the development of linguistic, logical-mathematical, spatial, musical, intrapersonal, interpersonal and naturalist intelligence.
	60	The activities you are separated by chronological age.
	61	Learning is facilitated from trial and error.
	62	users actions are pregraduated synchronously or asynchronously
Metacognition	63	There stimulation for the development of metacognitive skills.

Source: Own.

CONCLUSIONS

Once the information obtained through direct observation and documentation was handled, the following conclusions based on the design of an instrument for content analysis of a Collaborative Learning Environment are presented.

As for the main categories making up an EAC, after performing the direct observation of a trio of environments, the following categories were obtained by grouping saturation in technological, discursive and didactic dimensions: Web Address, loading speed, self-explanatory content, implementation of programs and tools, bidirectionality, communication channels, multimedia tools, interactive activities, inlaid tools, hyperlinks, updated information, screen design, technical and aesthetic quality in the elements of the environment, action pictures, interesting environment, arrangement of images, identification of (the) author(s), typography,

spelling, punctuation, text readability, coherence, cohesion, communication codes, confidence, status and plans of written speech, components of instructional design, knowledge management, learning motivation, cognitive processes, characteristics of the audience, diversity of activities, advance organizers, Theories of Learning and metacognitive aspects.

When the review of the categories proposed as aspects conforming an EAC was carried out from the trio of theoreticians Hassan and Martin (2003), UWEC (2003) and Pere Marquès (2002), it was found out, with the same saturation criteria, that there is some dispersion of criteria, the following categories being obtained as common: load speed, implementation of programs and tools, bidirectionality, hyperlinks, updated information, screen design, technical and aesthetic quality in the elements of the environment, interesting environment and description of the author of the environment.

Once two subsystems of categorization were developed, the integrated categorization system was obtained by contrast. This system consisted of both theoretical observation and direct observation, which gives validity to the recommended categories. Then, by applying the selection criteria both by majority grouping of the category and by saturation in the group of information sources, the categories that made the instrument under consideration in terms of technological, discursive and didactic aspects were extracted, which were:
a) Technological aspects: Web address, speed page load, self-explanation of content, navigation map, help menu, implementation of programs and tools, Bidirectionality, communication channels, interactive activities, inlaid authoring tools, multimedia tools, links and updated information.

b) Discursive aspects: design of screens, technical and aesthetic quality in its elements, action pictures, interesting environment, provision of images, advertising space, picture of the author of the environment, typography, description of the Author of the environment, spelling, punctuation written text readability, coherence, cohesion, communication codes, confidence in the written speech, speech category, and plans of written discourse.
c) Didactic aspects: objective and purpose of DI, DI contents, instructional strategies, methods, resources, assessment, knowledge management, motivation to learn, basic cognitive processes, higher cognitive processes, characteristics of the audience, diverse activities, previous organizers, techniques for addressing problems, learning theory, metacognition.
The instrument so designed is based on a checklist in traditional and digital format, with 63 items covering the categories that emerged from the observations, which provide a content analysis from the construction of paragraphs from a predefined list of verbatum according to the choice made in the instrument, clear and concise sentences arising from specific theoretical contributions, grouped in three paragraphs, one for each aspect observed (technological, discursive and didactic). As an additional finding, we can infer that theorists do not give a higher level of importance to the issues arising from the application of learning theories, which

leaves the didactic aspects of the EAC somewhat desert, which is in contradiction to the purpose for which they are constructed. Not so with regard to technological applications and those iconographic discursive characteristics underlying improvement of the technology applied. It is possible that, for chronological reasons (the pieces of theoretical research worked here date back to 2002 and 2003) and the speed of breakthroughs in digital technology applications, what is "new" is given relevance and traditional aspects related to the educational fact like teaching go without saying.

It is from this vision that a problem addressed herein originates: the instructor who is not an expert in teaching and / or speech but is an expert in the content of his specialty and technological expertise designs, builds and puts online an EAC that is far from the ultimate purpose for which it was devised. A professional from a non-educational environment who ventures into teaching.

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