DESIGN AND VALIDATION OF AN ANALYSIS GRID OF SOCIAL NETWORKS (VIRTUAL COMMUNITIES)

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ABSTRACT: The Internet and communication technologies have caused profound changes in the circulation of information, and consequently in the ways we teach, learn, and interact with each other. A research project was initiated in the year 2009 in order to investigate whether virtual communities, created from the existing social software on the web, provide the development of meaningful learning, the result of interactions, and knowledge sharing among its members. The first phase of the presented project assumed the design, development, and validation of an analysis and evaluation grid of virtual communities, which in the social web developed around the central theme Education-Training-Technologies.

Keywords: analysis grid, communities, software, social networks, e-moderation.

1. Introduction

The Internet and communication technologies have caused profound changes in how information and ideas circulate in the way people communicate and relate, and, consequently, also in the way we teach, learn, and interact with each other. Today we are all consumers and at the same time producers of information and knowledge. The school is no longer the exclusive place where one acquires knowledge, and education is a process that occurs throughout life in which each individual will learn new contents as needed, as suggested by Einstein in his famous words: "Wisdom is not a product of schooling but of the lifelong attempt to acquire it."

In the process of democratization of information and knowledge that the Internet has enabled, new spaces have emerged for searching and sharing information and learning, an approach which Levy (1999) calls collective intelligence in a globalized world. The important thing in this new society is not the technology itself, but the possibilities of interaction that it provides through a digital culture.

It is in this context that virtual communities emerge as informal learning spaces resulted from the various interactions between members who are connected to each other, they contribute to the social construction of meaning and its application in various social contexts. In order to learn more about how we process the interactions and dynamics of construction and knowledge sharing in a social network to assess whether those environments may (or may not) function as places of learning, we began a longitudinal study which first step will be presented in this article. The aim was to develop and validate an analysis grid that enables a scientific approach to the various virtual communities developed from the existing social software on the Web. In this article, we will start by presenting the theoretical framework that underpinned the design of a first version of the grid; in the next phase, we present the validation of the scale involving two separate, more complementary procedures: a) Content validity consulted by three experts in the field of Educational Technology, and b) empirical validation involving the analysis of a random sample of virtual communities by three competent and trained teachers for this purpose.

2. Virtual Social Networks

Based on the studies of Castells (2002), Levy (2003), Capra (2002) Barabási (2002) and Franco (2008a), we can characterize social networks as a set of relationships or connections through which the message travels (nodes). Graphically, we can say that these connections can be represented by edges, and nodes by vertices. Thus, from the existing connections in relation to the nodes, we can identify whether an organization can be considered or not a network.

In them, people are interconnected without having predominantly the figure of a coordinator. Each node is connected to several of its neighbouring nodes, i.e., there are many degrees of distribution, considering that each node has several possible routes to send data. If a route or neighbouring node is destroyed, another path is available (Baran, 1964). Therefore, we believe that nodes and connections are essential elements of the network, where the former are represented by people and the second are the

relations between these individuals through various interactions, "When that indeed happens, we say that a connection was established" (Franco, 2008b: page 113).

It is through the connectivity that we establish the relationship of an element belonging to the set, giving momentum to the group and organization. The more points are related to each other, the denser it becomes, thus, not requiring the existence of any source or intermediate point to establish communication between the participants (Costa; Junqueira; Martinho; Fecuri (coords), 2003).

3. Sites from the Social Web

According to the site of the *Web Internet* (2008), from the 90s, an interesting phenomenon began to be perceived and experienced in the world. This phenomenon, the new forms of communication, could be explained using the process of massification of the internet which with the establishment of the communication protocol of the Internet (IRC - Internet Relay Chat) and social sites contributed information to become universal and no longer confined to a small group of people.

Furthermore, with Web 2.0, it was possible to discern a variety of features which support social networks, such as emails, forums, newsgroups, chat rooms, Social Software like Orkut, Ning, Facebook, MySpace, among others.

In this context, the connectivity was also responsible for the changes in the forms of communication and relationship, as well as cultural mediation of this new society (information society). These changes were possible, given the number of existing software applications or Web 2.0, called social networking. According to Ribas & Ziviani (2008: page 6):

> This is the era of sharing of ideas, and the massive use of tools, such as Orkut, My Space, You tube, among others. A new paradigm of human communication; a break with this magnitude that had only occurred in the world with the invention of the printing press by Gutenberg in Germany, around 1500.

However, it is important to highlight that this social software, while providing us with the communication exchange, cannot be regarded virtual communities in themselves because according to Machado & Tijiboy (2005: page 3), "social software function as an organic system that meet several virtual communities."

In this way, people can, through a host of Web 2.0 tools, store personal data with the freedom to choose whether or not the privacy of the information, update the information in a collaborative way, and enrich their knowledge through discussions in virtual communities that can be created from most of the existing social software in the social web.

4. Virtual Communities (VC)

For Levy (1998), the cyberspace represents a new medium where everyone can contribute to their growth and development through production and dissemination of information and knowledge. This growth is linked to cyberspace because it is the manifestation of the practices, cultures, and opinions of different users who frequent the virtual environments. It is in this context of collaboration which arise virtual communities supported by the interconnection and collective intelligence. The first has present in addition to virtual communities the various forms of interaction, and the second represents the outcome of the collaboration that is possible in the cyberspace, since all can be producers of knowledge because according to Levy (2003) the possibility of interaction within communities revolve around the same theme that makes them an attractive location for dissemination of cyberculture.

In this sense, we may say that virtual communities represent the interests of a particular group of people who share common information, which makes them a space for a variety of cultural, educational, promoting rapprochement, and uniting them by various interests.

For Castells (2002), over time these groups eventually provide personal support, to subsidize more technically specific users on various issues of their lives, or even by providing emotional support, thus, broadening the process of communication over time. This may contribute to sociality in the cyberspace, considering the fact that social characteristics do not exert a strong influence in these areas; the obstacles and constraints are lower in the communication process, facilitating a more egalitarian model of interaction.

Virtual communities are the manifestation of desires and hopes of a new social order, which emerges from the technological paradigm that sees in digital technologies new opportunities for communication in a horizontal way which imbued with common interests begin to share their knowledge,

contributing for the production of knowledge in a collective way. This new way of conceiving knowledge could be related to the philosophical principles of Paulo Freire (1984, page 63), when he said that "no one teaches anyone. No one educates themselves, men educate within each other, mediated by the world."

So, in addition to promote sociability in space, they provide an informal learning because according to Oliveira (1997:38), "social interactions, either directly with other members of the culture, or through the various elements of the culturally structured environment, provide the raw material for the psychological development of the individual." Actively participate in the discussions in a virtual community also contributes to the pursuit of collaborative writing, to deepen knowledge in the formal space of a classroom, and enable the social construction of meaning with the possibility of being applied in other social contexts through connections with other knowledge.

5.   STAGES OF DEVELOPMENT AND VALIDATION OF THE ANALYSIS GRID

5.1 Initial Version

Since it was our intention to undertake an analysis of virtual communities available on the social Web, the first step was to search the Web, and in journals, and in national and international scientific conference proceedings in order to find an analysis grid of the communities of social networks[1]. Verified the absence of an instrument with the desired characteristics, we decided to create our own grid based on authors that address the topic of social networks with special focus on learning opportunities that they can provide in informal contexts, as well as in the role of the e-moderator as a mediating agent in these environments. Among the authors consulted we highlight Dias (2008), Salmon (2000), Anderson (2004), Wenger (1998) and Salvat & Quiroz (2005).

The proposed classification for the contents was of interest to identify the social ties established as "that which is exchanged between peers through social interactions, such as the amount of information, feelings, support, knowledge, and so on." These factors contribute to the social construction of meaning in a collaborative virtual learning community, considered essential to its operation. It was with this thought and with such certainty that we have devised an analysis grid of virtual communities that as in the **version I** of the grid that is sketched in Table 1, represented below, comprises 05 (five) sections, 23 (twenty three) sub-sections, and 61 (sixty one) items. Among the categories, we give prominence to the e-moderation, language used, and stages of progression of the activities in community because they are essential factors so that there can be a learning process in a virtual community, which we will make a brief explanation:

E-moderation - Considered "as a regulatory activity of the processes of grouping and learning in virtual environments, with particular attention to the ways of boosting, management, and monitoring" (Dias, 2008: page 3) because what can promote the expansion or reduction of the learning environment are contained bundles of interactions between participants, which are directly related to technical and human components, thereby ensuring the quality of connections and learning;

Language used - This topic is important whereas in cyberspace the interactions occur in virtual space, so there is no physical contact. Therefore, the way people communicate (written language) can provide us with data to verify the quality of discourse, and the level of socialization of the group because according to Dias (2008: page 6), "the interaction between members consists of multiple discourses through which the negotiation of the direction of the learning group takes place." Thus, it is interesting to analyze the different types of language, as a way to understand if and how learning takes place in virtual space. Based on these considerations, we choose 03 (three) forms of language that would be analyzed from the grid that are reflective and critical, cooperative and accommodated;

- **Phases of development activities in the community** - To ensure continuity of people in a social group, being it physical or virtual space, it is necessary that the activities can be challenging, creative, and innovative. It is, therefore, interesting to identify the progression of these activities, which may be an indicator showing the performance of the e-moderator, as well as the themes and methodologies that may be of interest to members to remain in a virtual community and actively participate, Kato & Damião (2006: page 13).

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[1]   In the search carried out, two new works were found performed in a discipline of a post-graduate course and destined for analysis of Youths' Social sites (MySpace: http://www.slideshare.net/verenaribeiro/anlise-do-myspace and Hi5: http://www.scribd.com/doc/11524036/Construcao-e-Aplicacao-de-Grelha-de-Analise-de-Sites-Sociais-de-Jovens).

Section I	Section II	Section III	Section IV	Section V
Basic Identification	**Attributes**	**Attributes**	**Attributes**	**Observations**

1. Name of the page;
2. URL;
3. Date of creation;
4. Number of members;
5. Idiom;
6. Category;
7. Moderators;
8. Contact x e-mail:
    - Yes
    - No
9. Type of community:
    - Moderated
    - Public;
10. Place;
11. Access:
    - Free
    - Restricted;
12. Gender:
    - Male
    - Female
 	
13. Age:
    - 18 to 23
    - 24 to 29
    - 30 to 35
    - 36 to 41
    - 42 to 47
    - 48 to 53
    - 53 to 59
    -> 60
14. Level of education:
 - Superior complete
 - Superior incomplete
 -Graduate Degree
 - Specialization Course (Graduate)
 - Master Degree
 - PhD
 - Others
	15. Frequency of posts
	
	1. Daily;
	2. Weekly;
	3. Biweekly;
	4. Monthly
	5. Annually.
	
	16. Subjects dealt
	
	1. Software/programs
	2. Web 2.0 applications;
	3. Report and exchange of experiences;
	4. Readings;
	5. Use of applications in an educational context;
	6. Advertising and Promotion;
	7. Others
		17. Communication
		
		1. Forums;
		2. Surveys;
		3. E-mail;
		4. Blog;
		5. Related communities;
		6. Links of interest;
		7. Advertisements of products and services;
		8. Established only with the moderator;
		9. Established between members;
		10. Announcements of events;
		11. Report experiences.
		
		18. Language used
		
		1.Reflexive and critic;
		2. Cooperative (which shows respect for the idea of the other, seeking a shared vision);
		3.Accommodated (passive and without reflections)
			19. E-Moderator
			1. Promotes the involvement of participants;
			2. Favours the construction of meanings;
			3. Assumes an active and dynamic role in community's organization;
			4. Encourages reflective practices;
			5. Implements discussion activities (between pairs) and analyzes the contents;
			6. Leads the discussions within the online group in a shared way;
			7. Assumes the role of facilitator of the tasks and learning experiences
			
			20. Phases of development activities in the community
			
			1. The issues are challenging;
			2. There is exchange of information;
			3. Mediation is collaborative
			4. The group is independent;
			5. Online Socialization (sharing experience online);
			.
				21. Most positive aspects of the community;
				
				22. Most negative aspects of the community;
				
				23. Other Observations of the community

Table 1: Analysis Grid of Social Networks (Virtual Communities) - Initial Version

5.2. Validation of the analysis grid

5.2.1 Content Validity

Once the grid was created, we started the process of validation. Validity and reliability are the two characteristics that an instrument must be to ensure the quality of information data with its application; the validity shows us "the extent to which what we measure with our instrument reflects the reality that we know" (Coutinho, 2005, page 123), and the fidelity "ensures whether the data was obtained independently of the context of the instrument or of the investigator" (Mehrens & Lehman, 1984, page 83).

The determination of the validity of the created grid based on the opinion of three independent experts in the field of social networks that analyzed in detail the content on a scale of specifications where the authors discriminate the definitions of the concepts which the items encompassed (Almeida and Freire, 1997). The suggestions obtained from the experts resulted in a reformulation of the grid resulting in the **version II**.

i. Empirical validation

The empirical validation of an instrument implies its application to a pilot group similar to the final recipients (Coutinho, 2005). In the case of our research, and since we wanted to analyze social networks, the process involved the application of the grid to a set of virtual communities developed in the social networking Web and that represented the universe that we wanted to examine to see if it was (or not) efficient to categorize/evaluate VC as platforms for informal learning.

The analysis of VC was carried out by a team of three assessors, two teachers from the area of Educational Technology and another from Computer Science, who were trained to do so in a public presentation of the grid taken into practice by researchers. In this session, once the goals that governed the creation of the grid were clarified, it was exemplified in an analysis of a VC in which all had the opportunity to ask questions about aspects of the analysis process.

They were then selected at random, 9 virtual communities of three different social networks (Orkut, Facebook and Ning) that had in common the fact of developing around the central theme Education-Training-Technology. Each of the three raters independently completed an analysis grid for each of the 9 selected communities. Following this stage, the evaluation team met to analyze the responses from a difference of degree of agreement or consensus of 73%, which provided the objectivity of the scale for the assessment of VC. The "reliability of the agreement of the observers or judges" (Fox, 1987; Goetz & Lecompte, 1984), which is evaluated in terms of % of agreement or consensus, can be defined as the extent to which different observers are proposed for the same phenomenon, congruent meanings. The logic is simple: being assessors trained for observation/analysis and being the situation the observation of the same, it is expected that in the end both reach the same records and results. In our study, the degree of agreement reached - 73% - was a good initial indicator of the reliability of the instrument.

Equally important at this stage of empirical validation of the analysis grid of VC were the comments left by evaluators, both in the training session as in the final session of the evaluation process. In fact, the discussion generated around the issues where there was greater disagreement made possible new arrangements on the grid that led to the implementation of the final version that will be used by the authors in the study that they are already developing, and involves the analysis of the structure and modes of operation of the created communities based on software of the social Web.

In this phase, which occurred in April, 2009, some changes were suggested which led to the reformulation of the initial grid. Whereas the majority, or nearly 100% (hundred percent) of community members do not provide their e-mail because according Mocellim (2007, page 107):

> While there are users who are concerned to develop a profile based on what they feel, or reshape it according to the time of their life, there are others who do not care so much, and/or care too much about leaving their profiles without writing anything so that there could be no mistake, or to increase their privacy. This may be part of someone's transition that resorted to the style mentioned above and currently prefer to close the doors to the identification of their identity.

Based on this assumption, the evaluation team suggested the removal of the item "contact/email" section of this basic identification. Other changes suggested by the evaluators were the withdrawal of the topics "age" and "level of education", whereas many social networks (the case of Orkut, for example) allow the blocking of the desired information regarding the age and level of

education, i.e. more than 70% of members do not publish this information, making it difficult to evaluate these items. It was suggested to maintain only to quantify the gender of the members of this community.

In the topic of "Frequency of posts", it was suggested the inclusion of one more item "*does not exist*", whereas in some communities was just registered the name, but there was no post. It was also suggested in the topic "communication" a number of amendments that we now describe: i) exclude the items "email", "blog", "connected communities" and "report of experiences" whereas the information of the first two items is never available in the members' profiles, while the third item was not of great relevance for the study, whereas the communities involved would not be the subject of our study, and, ultimately, it was also believed that the last item had been discussed under the name "Report and exchange of experience" of the topic "subjects dealt"; ii) the division of the topic in two, one with the name of "communication tools", containing the items "forums" and "surveys" and the other would receive the name of "Forms of communication", covering the following items: "Established the moderator with the members" and "Established between the members."

It was suggested that the topic named "e-moderator" was replaced with "Role of the e-moderator", considering that the items that composed it were related to the role that it played in the community. It was also suggested to include a new item "promotes members autonomy" because one of e-moderator most important roles was to exercise a shared leadership.

And finally, with regard to the topic "phases of development activities in the community ", it was agreed between assessors and the investigator herself to exclude the topic "online socialization" (sharing of online experience) because this subject had already been discussed in previous topics.

After this analysis, the next step was to make the changes that took its final form (see table 2), which now consist of 05 (five) sections, 20 (twenty) topics, and 43 (forty-three) items.

ANALYSIS GRID OF SOCIAL NETWORKS (VIRTUAL COMMUNITIES)					SECTION III Indicators (mark with an x for yes or no)		Yes	No
SECTION I Basic Identification					3.1 – Communication Tools	Forums		
1.1 - Name of the Page						Surveys		
1.2 - URL					3.2 – Types of communication	Established only with the moderator		
1.3 - Community's Purpose						Established between members		
1.4 - Date of Creation					3.2 – Language used	Reflexive and critic		
1.5 – Number of members						Collaborative (in the sense of the combined experience in the construction of knowledge)		
1.6 - Idiom						Accommodated (passive and without reflections)		
1.7 - Category								
1.8 - Moderator (s)					**SECTION IV Attributes (mark with an x for yes or no)**		Yes	No
1.9 - Type of community	Moderated		Public		4.1 – Role of the E-Moderator	Promotes the involvement of participants		
1.10 - Place						Favours the construction of meanings		
1.11 - Access	Free		Restricted			Assumes an active and dynamic role in the community's organization		
			Quantity			Encourages reflective practices		
1.12 – Gender of members		Male	Female			Implements discussion activities (between pairs) and analyzes the contents		
						Leads the discussions within the online group in a shared way		
SECTION II Indicators (mark with an x)						Assumes the role of facilitator of the tasks and learning experiences		
2.1 – Frequency of posts	Daily					Promotes the autonomy of group members		
	Weekly				4.2 – Phases of development activities in the community	The issues are challenging		
	Biweekly					There is exchange of information		
	Monthly					Mediation is collaborative		
	Annually					The group is independent		
	Does not exist							
Indicators (mark with an x for yes or no)		Yes	No		**SECTION V – Observations**			
2.2 – Subjects Dealt (posts and comments)	Software, programs				5.1 - Other Observations of the community			
	Web 2.0 applications							
	Report and exchange of experiences							
	Readings							
	Use of applications in an educational context							
	Advertising and Promotion							
	Videos							
	News							
	Links of interest							
	Advertisements of products and services							
	Announcements of events							
	Others							

Table 2: Analysis Grid of Social Networks (Virtual Communities) - Final Version

6. Conclusion:

We are experiencing profound changes, which require from the society a new look at the ways to develop knowledge because the knowledge that was once valid for a relatively long time, with the advent of Web 2.0, is constantly being updated. This can be explained having in mind a large number of applications that allow users to interact with others with the aim of establishing social bonds, or share knowledge and experiences in a collaborative manner through the creation of or participation in virtual communities.

Therefore, in order to investigate whether these virtual environments, especially virtual communities, can provide users with informal learning and act as a parallel school that we devised a checklist, focusing on various forms of interactions, and the role of the e-moderator as an agent that mobilizes and encourages reflective practices within communities, providing a collaborative learning in which the social, cognitive and learning presence (Garrison, Anderson, Archer, 2000) is felt.

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