A Collaborative Learning Network for Education Communities of Practice in Brazil

Rosita Félix Delmondes*, Renê Dettenborn, Telma Reijane Pinheiro da Costa, David Nadler Prata

Universidade Federal do Tocantins, Palmas, Brazil.

* Corresponding author. Tel.: +55 63 98138-8867; email: rositalima@uft.edu.br

Abstract: Collaborative learning networks are often used for collaborative organizational learning and communities of practice, providing opportunities to peer-to-peer learning and coaching. This article reports the experience of teachers and trainers involved in a collaborative learning network using a blog tool. The experience was developed in 13 Technological Learning Centers (TLC), belonging to the Regional Directorate of Teaching (strategically positioned in 13 cities of the State of Tocantins-Brazil). The purpose of this article is to describe the network structure and the innovations in collaborative learning relationships, and to analyze the collaborative learning network in terms of topology, time in activity, frequency of access and quantity of publications. The results showed that in terms of access, there is a period of more interaction and updating of posts in all blogs, but there was a discontinuity of use by some members of the network. Meanwhile, the quantitative of access revealed that even blogs that are more than 3 years without new publications, they remain accessed. The analysis of the network served as an instrument for monitoring and evaluating the TLC actions to support decision making in education public policies of Tocantins state.

Key words: Collaborative learning networks, education public policies, education data mining.

1. Introduction

The Internet has provided networking that, in addition to changing the way people live, either in forms of leisure, or in modes of production and work, has revolutionized communication in the last decades, acting as leverage for a new society. In this network, blogs have emerged, which are used as communication tools by professionals from the various branches of activity. Recuero [1], says that: *"Electronic journals: bring thoughts and facts of the personal life of the author and serve as a channel of expression; electronic publications: they are predominantly focused on information with news, tips and comments on certain subjects, based on the theme of the blog "*.

A blog network is made up of groups of people who share a variety of subjects, usually specific to their area of interest, whether it is to relate or to work.

The interactive communication among members of Educational Technology and Coordination Centers, and the conviction that the interaction would be of great value to monitoring the work of multiple teachers, form the dissemination of interactive networks using blogs. This proposal was often created to socialize the actions and studies carried out referring to software for each TLC, as well as the dissemination of work and the development of a culture of registering the activities. The network was characterized as a system or a

virtual campus of interaction that allows developing the authorship and co-authorship.

This article has the purpose to describe how the fabric of networks enables innovations in collaborative relationships. It is analyzed the collaborative network of learning regarding the topology, the time in activity, frequency of accesses and the quantity of publications during the 9 years of its creation, along the years of 2008 to 2017. In this way, its structure and the services possibilities are presented.

It is important to point out that this pedagogical proposal to use the blog as a learning network was awarded in the Microsoft Educators Innovative Prize 2010, held on August 4, 2010, during the Microsoft Forum of Innovative Education, in the Innovation and Collaboration modality.

2. Innovations in the Collaborative Relationships

From the advances in communication, social networks were created online in which social relations were established through the digital network with possibilities for interaction and knowledge building. These, in turn, present their particularities, models and functions that gain new contours and can be used both in the corporate world and in the academic sphere.

This technological evolution has recorded considerable progress in different phases of the history of humanity, and in each period of this evolutionary process, the technology has interfered and contributed in the socialization of humanity knowledge. In this sense, technologies are important not only for day-to-day activities and for optimization of academic spaces, but above all, for the development of interactions for community of practices.

In the formative process, it is necessary to mediate on the part of the teacher so that the students can develop the critical sense and the capacity of analysis and selection of what can be useful for the learning. This context requires improvements on the pedagogical practices and the exchange of knowledge that occurs through interaction, according to Silva [2]: *"The fundamentals of interactivity are basically three: a) participation - intervention: participating is not only answering" yes "and" no "or choosing a given option, it means changing the message; b) bidirectionality - hybridization: communication is joint production of the emission and reception, it is co-creation, the two poles encode and decode; c) permutation - potentiality: communication presupposes multiple articulatory networks of connections and freedom of trade, associations and meanings ".*
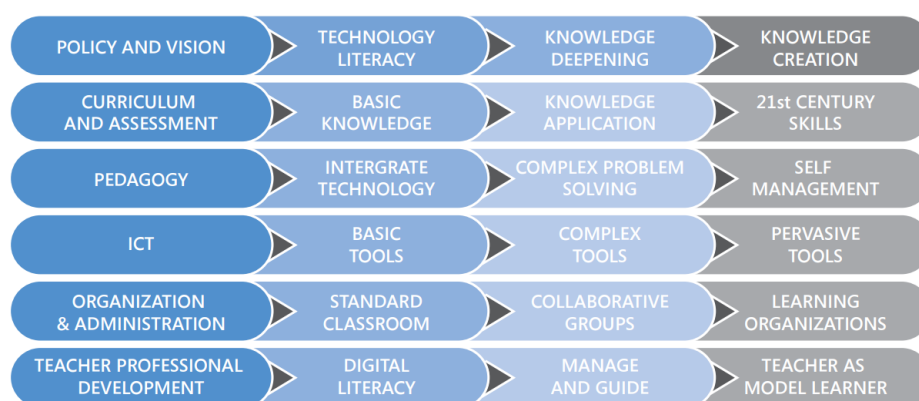

Fig. 1. Components and approaches. Source: UNESCO [3].

The foundations presented by Silva reaffirm that the current context requires the active participation of TLC teachers in communication processes, allowing authorship and co-authorship in production and trigger changes. In this sense, both the network training team and teachers need to develop skills and abilities in technologies, so that, this continuous training is essential.

As a way to favor a better understanding of the analysis of the implementation and maintenance of the use of social networks in pedagogical practice, the following question is asked: What competences are necessary to act in interactive social networks for education?

In accordance with these imperatives, the Unesco Skills Standards for Teachers [3] elucidate that the objectives are for those who are responsible to provide teacher training. The framework detailed objectives and methods, as well as the guidelines to develop new learning materials or review current ones on the support of one or more of these three approaches, Fig. 1.

3. Topology of Social Networks

Among the changes that the Technologies provided, it is highlighted the types of social ties that were created according to the interests of their authors and gave rise to interconnected groupings that received the name of network. According to the research by Baran [4], there are three types of basic network topologies, Fig. 2:
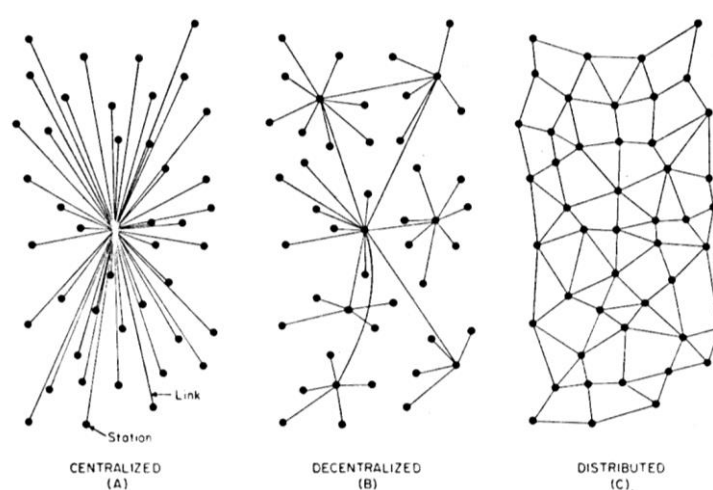

Fig. 2. Diagrams of networks by Paul Baran. Source: Baran [4].

Centralized: are networks in which a node centralizes a large part of the connections, (star shape). Decentralized: they are nets that are cultivated by a few knots. Distributed: are networks that have a proportional number of nodes.

3.1. Classification and Function of Blogs

Blogs provide quick information exchange, reaches more people in a short time, can replace the face-to-face conversation or traditional communication; the blogger can even have his/her blog as a source of income.

"Blogs are versions that are more dynamic than personal web sites and receive the same criticisms from the latter in terms of experiences of amateur publications", [1]. The content of blogs proposes the following classification from an empirical study: *"a) **Electronic Diaries** [...] b) **Electronic Publications** - focused predominantly on information with news, tips and comments on certain subjects, based on the theme of the blog. Ex: pop culture, music, technology, sports, etc. c) **Joint Publications**"*.

Considering the above classification, the proposal of the present work is the use of the blog as an Electronic Publications tool, with the purpose of productions socializations of the group of multiplier teachers that work in the Centers of Educational Technologies, in the Brazilian State of Tocantins.

3.2. Tocantins Collaborative Learning Network

A blog network is made up of groups that share a variety of subjects, usually specific to their area of interest, whether it is to relate or to work, so that the network of supporters has something that needs attention.

The Collaborative Learning Network of Tocantins, Fig. 3, was created in 2008, proposed as an environment with possibilities for interaction that has its technical characteristics, but can also be used as a tool for pedagogical use and to provide a learning on methodologies, activities and successful strategies, that can be shared.
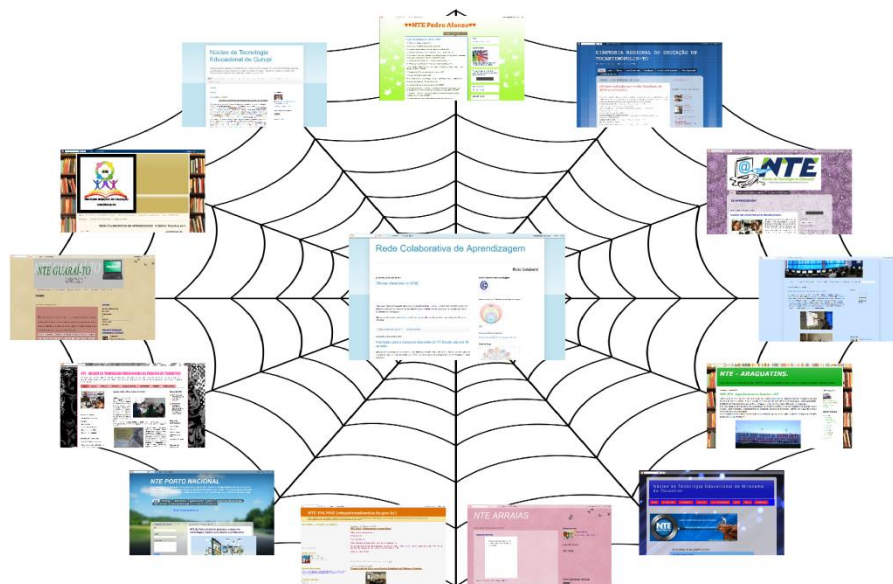

Fig. 3. Collaborative learning network blogs.

The creation of the learning network had the following proposition: A blog for the Coordination of Technologies in Education and a blog for each TLC of Tocantins that were linked to each other and thus formed the network. At the time of implementation, teachers participated as network multipliers crowded in the Coordination of Technologies in Education-CTE [5] and in TLC, from Tocantins. Training was offered to these multipliers teachers to carry out the publications and the monitoring of the network.

The objective was to keep the network updated with tutorial publications to use collaborative tools, with materials on the actions developed in the TLC with good practices of use of technologies and the indication of educational blogs and other sites to encourage the use of technologies applied to education in the State Schools. Thus, it was suggested to the TLC multipliers teachers to carry out the creation of blogs for the schools, electronic websites, and to link them to the network. The centers expanded the network to some other state schools using the same format, creating blogs and linking them to the network.

Thus, the network was composed of 14 blogs (Fig. 3), 13 of the TLC and one of the coordinating CTE, composed by 83 schools, although the school blogs are not objects of this study.

4. Possibilities of Interaction and Communication

The media have undergone a change that, consequently, provides the creation of new languages and new concepts used in social relations through the network, such as multidirectional and visual languages. The concept of "space of flows", that is, an abstract space that, according to Castells [6], means the place where information travels, thus offering possibilities for interaction through the use of tools such as the blog.

In this sense, the blogger movement can be characterized as a means of interaction by the diffusion of knowledge, by the possibility of exchange through collaboration. What differs from one type of interaction

to the other, according to the author, is the relationship maintained among the group. According to Primo [7], there are two types of interaction: "mutual interaction, which is characterized by interdependent relationships and processes of negotiation, affecting each other; and reactive interaction that is limited by deterministic relations of stimulus and response."

In this aspect, the blog tool, as a means of communication, through the network of blogs allows mutual interaction, since it incorporates different forms of expression and values, and also adds attitudes of commitment to the learning of the teachers through interaction. Prado [8] brings another concept of interaction "the shared, exchange of experiences, feelings and reflections gains a new dimension, that is, the interaction starts to add an attitude of commitment to the learning of the other." Considering this point of view, it can be said that society has a new form of production and appropriation of knowledge, in which the relation between the sender and the receiver of the message happens in real time. Even in different spaces, relationships happen without frontiers.

According to Recuero [9], "strong and weak ties are always relational because they are a consequence of the interaction that, through content and messages, constitutes a connection between the actors involved." Ties are created in the network. In the first case, the author highlights the sparse relationships without approach and intimacy. In the second case, it shows that they are the most concrete networks in which social exchanges take place. The author adds that in blogs, "the bonds are stronger and are mainly relational. The more the collective share of social capital is strengthened, the greater is the individual ownership of this capital [9]. It is through these interactions that the blogger creates his positive or negative reputation in a blog.

According to Hewitt [10] *"The novelty of the blogosphere is that there are no barriers to entry into a world that offers an almost unlimited audience."* Thus, the blog requires certain zeal as to its publications, being necessary to produce publications that arouse interest for the target audience. The entry of people on the blog depends a lot on what is set up and how often blogs are updated. In this sense, Watts quoted by Recuero [9] states that "there are no 'stopped' nets in time and space. Networks are dynamic and are always in transformation. ".

According to Castells [6], "A network-based social structure is a highly dynamic open system susceptible to innovation without threat to its equilibrium." Almeida [11] points out that "The net represents more than a technological resource, having the function of organizing and making feasible the bonds (connections) within the information (nodes) ".

Thus, as presented by the authors, through the network formed in cyberspace, new possibilities followed by new communication spaces, mediated by new machines, new connections, new environments and new supports make people knowledge producers with possibilities of registration, storage and dissemination. There is also the convergence of the media through the blog. According to Acedo and Buesa [12], blogs have a wide possibility of use and tendencies to present a varied graphic design with space for publication of photographs, textual content, and videos. Technical knowledge must also be considered as essential in this process. According to Hewitt [10], "the advantage of the blog is that it will force you to live in a world of ideas and debates, and this in the modern pace.".

Considering all these aspects, it can be understood that multimedia languages, formats, interfaces and levels of interactivity provide a theoretical and practical knowledge deepening, that is, the blogger must learn how to manipulate images through editing, convert files of sound, finally, by the convergence of the media create a blog with an understandable interface.

5. Research Methodology

In order to analyze the Collaborative Learning Network of Tocantins regarding its objectives, according to

Gil [13], this type of research aims to identify the factors that determine or contribute to the occurrence of the phenomena.

The data for analysis were collected through the statistics of the Blogger [11], [14] site itself that hosts the network blogs, collecting the total number of publications, the history of the views, the last date of publication, the total number of schools that were participating and the observation on the TLC blog situation. The bloggers were asked to forward the printscreen of the page that is the statistics of blogs.

These data were analyzed using the RStudio analysis software [15], in order to analyze the activity time, the access frequency, and the number of publications.

6. Results and Discussions

This study proposal illustrates the trajectory undertaken in the formation of the network of blogs for the State Department of Tocantins and other partners, based on the literature consulted. The way in which the registered actions, interactions, and studies, is related to the software used by each TLC, available in the Collaborative Learning Network. Thus, enabling the exchange of experiences and production of knowledge between the TLC and the CTE.
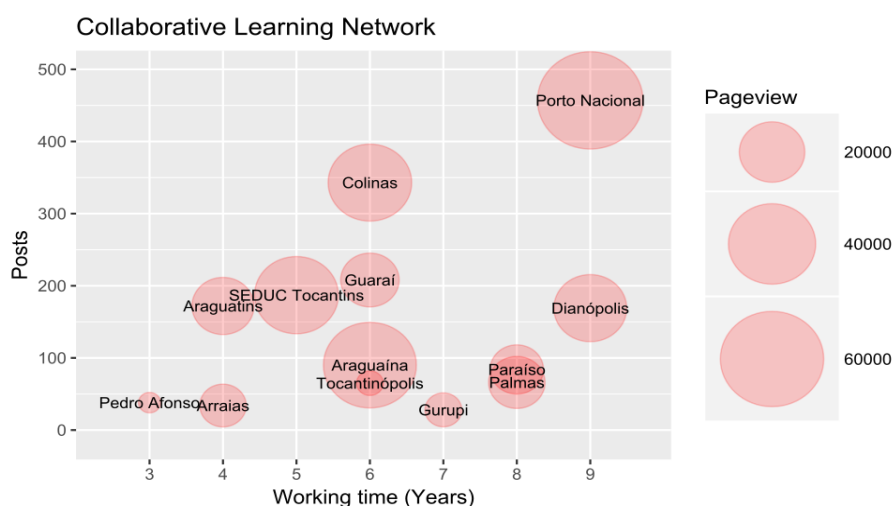

Fig. 4. Collaborative learning network.

The study is important to recognize the importance of the discussions about this type of network and its contributions to the area of education, as to the dissemination and construction of knowledge. The results are shown in Fig. 4, where it can be seen that the most accessed blog, and still in operation, is TLC of Porto Nacional city, with 63,062 accesses, in addition to leading the total of publications with 457 publications.

It is also observed, on the other hand, that TLC of Araguaína city obtained more hits per publication, an average of 589 accesses per publication, while TLC of Porto Nacional city obtained an average of 137 accesses per publication. The average of the survival blogs was 6 years.

It was perceived from the perspective of the network structure that the blogs bring the communication of type of electronic publications - "oriented predominantly for the information with news, tips and comments on certain subjects, based on the theme of the blog [1]; As for interactivity, it allowed participation, bidirectionality and permutability [2]; The topology is of the distributed type, [4].

7. Final Considerations

The work presented the panorama of creation, maintenance, operation and use of the Collaboration Network of Learning of the TLC and CTE. The analysis observed the continuity in the use of the blogs after

their implantation, even when the systematized follow-up was interrupted. The analysis of the registration and use of the Collaborative Learning Network of the TLC and CTE allowed to verify that of the 14 blogs that make up the network, only two are active. There were 83 blogs of the schools connected to this network, although schools are not the subject of study of this article.

In the analysis of the period of use of blogs, it was detected that the cities of Porto Nacional and Dianópolis have more time of use. In other words, these cities were active since the creation of the network until 2017, followed by the cities of Palmas and Paraíso, which had active blogs during 8 years. In situations where there is continuity of use, relevant actions and projects developed by the member schools were socialized in the network, favoring the dissemination of good practices.

Regarding the access, it was noticed that four blogs were highlighted: Porto Nacional city was an active blog since its creation; Araguaína city had publications discontinued since 2012, but having high access number in relation to the others; Colinas city had publications discontinued since 2014); Dianópolis city was also active so far; and the CTE blog was outdated since 2013.

As for the number of publications we have the following evidence: First was the Porto Nacional city; Colinas city was the second, even having stopped the publications; Guaraí city also stopped the publications in 2014; and the CTE blog outdated since 2013. Also according to the study, the discontinuity of publications of the users of the network happened due to lack of interest in the tool or because of operational problems.

In summary, the use of blog as a collaborative learning network is a viable methodology for the process of dissemination and construction of knowledge. Insofar, it enables the communicative action among the participants, since, it is detected a total of 289,935 views and 2,654 posts.

The configuration of the virtual space was through a network of the distributed type, according to the network topology suggested by Baran [4], since the TLC blogs connect each other and the CTE blog, which enables collaboration and stimulates the production and dissemination of actions, as well as content in the area of Educational Technologies. This happen, as long as bloggers have the skills at least in the Approach 2 - Deepening the knowledge to operate the tool - as suggested by the UNESCO Standards.

It was evidenced with the use of the blog network, the practical realization of the concepts addressed by Castells [6], of interactivity and instantaneity, "timeless" and "flow space". In other words, "the significant bases of society, space and time, are being transformed, organized around the space of flows and timeless". These bases allowed the communication and the exchange of experiences between the Teachers Multipliers of TLC and CTE.

This proposal is seen as innovation, since in the amplitude of the studies related to the technologies to the collaboration process there is a strong tendency to expand the strategy on the use of networks to support the education networks.

In order to create and maintain a collaborative learning network, it would be needed: 1) to define the objectives and the intentionality of using the network; 2) to think about what goes on and who will offer the published content (target audience); 3) to disseminate good teacher practices; 4) to use the institutional mail and not the personal one, to create the blog;(5) providing continuity, the activity of publications in the blogs may be daily, or at most weekly; 6) the criteria of the contents to be posted must respect copyright; (7) a visual standard that facilitates the accessibility and reading of content.

References

[1] Recuero, R. (2003). Weblogs, webrings e comunidades virtuais. Retrieved July 15, 2017, from http://www.pontomidia.com.br/raquel
[2] Silva, M. (2003). *Sala de Aula Interativa.* Editora Quartet.

[3] Unesco. (2009). *Padrões de Competência em Tic para Professores: Diretrizes de implementação.* Retrieved June 5, 2017, from http://unesdoc.unesco.org/images/0015 /001562/156209por.pdf

[4] Baran, P. (1964). *On Distributed Communications: I. Introduction to Distributed Communications Networks.* RAND Corporation. Retrieved July 13, 2017, from https://www.rand.org/pubs/research_memoranda/RM3420.html

[5] CTE. (2017). *Rede de Blogs da Coordenadoria de Tecnologias na Educação.* SEDUC Tocantins. Retrieved May 5, 2017, from http://cte-seductocantins.blogspot.com

[6] Castells, M. (1999). *A era da informação: economia, sociedade e cultura.* Rio de Janeiro: Paz e Terra, p. 498. v. 1

[7] Primo, A. (2003) *A interação mediada por computador: a comunicação e a educação a distância segundo uma perspectiva sistêmica relacional.* 240f. Tese (Doutorado em Informática na Educação). Universidade Federal do Rio Grande do Sul – UFRGS, Porto Alegre, RS.

[8] Prado, M. E. B. B. (2003). *Educação a Distância via Internet*. Editora Avercamp. São Paulo.

[9] Recuero, R. (2009). *Redes Sociais: Internet.* Porto Alegre: Sulina.

[10] Hewitt, H. (2007). *Blog, Entenda a Revolução.* Trad. Alexandre Martins Morais. Rio de Janeiro: Thomas Nélson Brasil.

[11] Almeida, M. E. B. (2005). *Projeto: Uma Nova Cultura de Aprendizagem.* Retrieved July 8, 2017, from http://www.proinfo.gov.br

[12] Acedo, S. O., & Buesa, C. B. (2007). *Convergência de médios.* Programa Modular em Tecnologias Digitales y Sociedade do Conhecimento. Universidad Nacional de Educacion a Distância. Madrid: UNED.

[13] Gil, A. C. (1991). Métodos e Técnicas de Pesquisa Social. São Paulo: Atlas.

[14] Blogger. (2017). Serviço gratuito, de propriedade do Google, para hospedagem de blogs. Retrieved May 31, 2017, from https://www.blogger.com/about/?hl=pt-BR

[15] Rstudio. (2017). *Open Source and Enterprise-Ready Professional Software for R*. Retrieved May 31, 2017, from https://www.rstudio.com

Rosita Félix Delmondes was MSc student in computational modeling of systems with emphasis in education at Federal University of Tocantins. She got the master's degree in integrated technologies and knowledge society by UNED, graduated in History in Araripina-PE, (2000); post-graduated in: technology in education, interactive communication systems and history and geography of Brazil. Her research interests are technologies applied to education, competence of educators in education technologies and education on distance - EAD.

Renê Dettenborn was born in Rio Grande do Sul, Brazil. He graduated in computing science and has a specialization in development of high complexity systems by the Federal University of Tocantins. He is currently a judicial analyst of the 2nd Instance - Court of Justice of the State of Tocantins.

Telma Reijane Pinheiro da Costa was MSc student in computational modeling of systems with emphasis in Education at Federal University of Tocantins – UFT. She got the master's degree in integrated technologies and knowledge society by UNED. She a degree in Portuguese; post-graduated in: technology in education, interactive communication systems and psychopedagogy. Her research interests are education, technologies applied to education, interdisciplinarity and education on distance – EAD.

David Nadler Prata was born in Goiânia, Brazil. His doctoral was developed at Campina Grande Federal University, and in part at Carnegie Mellon University, USA, completed in 2008. He is currently coordinating a master degree in computational model. His research interests are machine learning applied to education and ecosystems.