Social, open and personalised environments for communication and knowledge management between business and educational organisations

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ABSTRACT

This pilot research describes an investigation on web-based work environments for business and educational organisations involved on collaborative projects for social innovations. The objective of this work is to identify key functionalities of ubiquitous environments for strategic communication, collaborative learning and knowledge management between enterprise and educational professionals. This qualitative study focuses on the Brazilian project "Nestlé Nutrir Crianças Saudáveis" (Nestlé Nurturing Project - Healthy Children) whose objective is to prevent teenagers' malnutrition and obesity through the collaboration and voluntary work of educational association professionals and Nestlé's employees. Semi-structured interviews and online questionnaires were applied to public relation professionals at Nestlé Company and project managers of educational organisations who participated in Nestlé Nutrir. Based on key findings represented to visual analytics, it was possible to identify that business and educational organization use a variety of different environments including for similar functionalities, such as the dissemination of their collaborative project, process and key achievements. This pilot study suggests, then, some recommendations on work environments applied to ubiquitous contexts through weSPOT – working environment with social, open and personalised tools. Further studies will then focus weSPOT functionalities for effective partnerships between companies and educational institutions for effective communication-collaboration and collective inquiry projects for social innovation.

Categories and Subject Descriptors

[Management of Computing and Information Systems] [Project and People Management][Strategic information systems planning][Computer and Education][Collaborative learning]

General Terms

Design, Experimentation, visual analytics

Keywords

Strategic Communication; knowledge management, Colearning, visual analytics, weSPOT.

1. INTRODUCTION

Due to globalization and the advancement of information and communication technologies (ICT), an "interconnected society" (Castells, 1999) has emerged provoking changes in several areas including business and education. The rapid growth of knowledge, global economy and high competitiveness have been requiring institutions to develop new strategies to become more efficient and updated. Digital technologies have been occupying a considerable part of people's lives enabling them to communicate anytime and anywhere as well as to construct knowledge in authentic situations through ubiquitous environments. The opportunities for collective projects, continuing professional development and "collaborative open learning" – colearning – increased considerably with the emergence of communities of practice, massive open events and social networks (Okada et al, 2012). Additionally, through web2.0, social media and mobile interfaces, organisations can establish long term relationships with their customers, encourage their professionals to develop digital competences as well as establish partnerships with other sectors in order to deliver better quality services by meeting their needs efficiently.

This pilot study aims to investigate the functionalities of a social, open and personalised environment for communication, knowledge sharing and collaborative learning through collective projects between business and educational organisations. This case study focuses on food companies interested in improving their performance in the field of communication through network environments with associations and schools interested in inquiry or problem based learning projects.

The initial study centres on the leading nutrition and health company, Nestlé, particularly on the Nurturing Programme ("Nutrir") developed by Nestlé Brazil Foundation. This programme involves low-income children and adolescents in Brazil and aims at preventing teenagers' malnutrition and obesity as well as increasing employees' opportunities for voluntary work. Since its beginning in 1999, the program trained over 11,000 teachers and reached 1.2 million children (Nutrir, 2013; Fundação Nestle Brasil, 2005).

Based on qualitative analysis of semi-structured interviews with employees and school coordinators, as well as online websites, the first objective of this study is to indicate the communication strategies as well as key competences that are required or which might be developed among participants involved in collective projects represented with visual analytics. The second objective is then to suggest key functionalities for setting up social open personalised environments for promoting effective communication and collaboration for enriching their achievements.

This study considers that the weSPOT – web-based Working Environment with Social, Personal and Open Technologies for Inquiry Based Learning, funded by the European Commission, constitutes and incorporates the key features that are necessary for the development of strategies for communication and colearning among its participants.

2. COMMUNICATION & COLEARNING

In the information age, strategic management becomes an essential tool to guarantee business success as the human factor has gained emphasis and a new focus. Managing the objectives of the enterprise and customers in a beneficial and reciprocal way becomes a fundamental activity. Grunig & Hunt (2003) analyses this process and indicates that organisations develop strategic management when they manage to take an opportunity and transform it into competitive advantage. Being open to stakeholders and establishing partnerships lead to an organizational learning process that facilitates the development of competences as well as competitive advantage to be acquired.

Thus, one of the focuses of strategic management consists in aggregating different objectives and highlighting communicative processes as it is essential for the enterprise progress to manage information strategically in order to promote collective engagement (Colnago, 2008) and colearning (Okada et al., 2012). Organisational communication has been receiving more importance due to the current globalised and complex scenario, which makes it essential to the success of relationships and businesses in any organisation (Cardoso et al., 2009; França, 2006).

Nevertheless, in order to follow contemporary complexity, communication processes also have to suffer changes, i. e., organisational communication must become a strategic tool. According to Corrado (1994), communication strategy consists in the enterprise's plan to transmit news to its public defining the public, the importance of communicating with them, the time and place of communication, the sectors that are responsible for communications, the message and its connection to commercial goals. However, according to the author, the most important part of the communication strategy is the communication environment that is created. So, in order to be efficient, high management must lead communication planning.

Due to competition, strategic communication must go beyond matters that concern only the enterprise, it must comprise a social function and produce a democratic work environment where dialog, ethics and responsibility are key elements that must be encouraged and cultivated. Then, being aware of the constant social, political, economic and technological changes becomes fundamental to the life of an enterprise (Colnago, 2008).

The fast advances of digital technologies and Web 2.0 have been promoting the creation and exchange of user-generated content, best practices sharing, open educational resources and social networks. The process of colearning - collaborative open learning - is enriched through wide participation for creating, managing, reusing and disseminating open knowledge (Okada et al., 2012). Colearning acts toward people centred learning as well as building a more genuine "community of practice" through dynamic and participatory engagement and interactive communication for collective construction of knowledge (Brantmeier 2005).

Strategic organisational communication has become a competitive advantage as it aims at sharing information, decision making and relationship development that integrate and coordinate all parts (Kunsch, 2003). Besides, its dialogic and participative action has become a differential as information fluxes are managed competently (Andrelo & Calonego, 2012).

In this context, the role of professionals such as Public Relations (PR) becomes fundamental for communication strategic management, as one of the roles of these professionals is the management of the relationship between organisations and their strategic public, which implies in the generation and dissemination of information using different technological resources as mediators (Andrelo, 2012).

Moreover, the role of PR professionals concerning social media is highlighted as they require strategic, planned and systematic use of digital technologies in the Digital Age so that they can integrate discourses and audience, being a space of great potential to achieve business goals through inquiries. Considering the current interconnected society, which is formed by more demanding and informed citizens, strategic inquiries might be useful as a strategy conducted by PR professionals.

3. METHODOLOGY

This study comprises of a qualitative investigation of descriptive character, which aimed at understanding and describing the applications of a social phenomenon (strategic communication) using an instrument of technological mediation (collaborative virtual environment).

As the study aimed at understanding the characteristics and processes that were involved in enterprises' strategic communication from work environments based on the web, it was also necessary to understand its application in the real world, as suggested by Selltiz *et al.* (1987) and Babbie (1998), in order to establish possible relations among variables that define the study. Then, two cases in Brazil were selected as study objects: Nestlé's "Nutrir" Project developed in partnership with the (1) organisation Bairro da Juventude, in Pinheirinho, Santa Catarina and (2) Fernanda Keller's Institute, in Rio de Janeiro, Rio de Janeiro. The initial data collection involved the application of an online questionnaire with PR professionals in food sector companies based in Brazil. Research subjects were identified via their public profiles in the social networking site Facebook and were intentionally chosen according to their accessibility as justified by Triviños (2006) and Minayo (2001).

Thirteen (13) out of fifteen (15) professionals that were contacted answered the questionnaire that was related to their professional practice in web-based work environments. The questionnaire was adapted from Okada et al.'s framework and visual analytics to the analysis of key competences for colearning and co-inquiry in the digital age (2013). Their answers enabled the general characterisation of the virtual environments used by these professionals, propitiating the comparison to the weSPOT platform, which is considered as a reference in terms of the functionalities to support the needs of enterprises, including circumstances that involve partnership with other companies.

Thus, as a complement to the questionnaires, semi-structured interviews were conducted with the representatives of Bairro da Juventude and the Fernanda Keller Institute. The interviewees were chosen according to their ability with the communicational basis established during the Nestlé's Nutrir Project and contributed both to the practical verification of the functionalities of the web platform used by the enterprise in the partnership with the school and to the revelation of possible application of weSPOT beyond the academic area.

After data organisation, data were decomposed into smaller

units in an inductive way and under a qualitative perspective (Gil, 1994) so that they could be organised into relating categories evidencing patterns and represented with visual analytics. Such procedure was used to analyse data collected from the online questionnaire and interviews.

4. FINDINGS AND DISCUSSION

Aiming at identifying the necessary functionalities of a collaborative virtual environment to favour enterprises' strategic communication and colearning, the study searched for PR professionals' contributions for the characterisation of web-based work environments, such as weSPOT, used for enterprises' strategic communication. The findings and discussions presented in this paper are organised according to the sequence of the questions proposed in the research instruments used for data collection.

The initial question, aimed at identifying the web environments these professionals used for their work, showed that most PR professionals used social networking sites (Facebook, Google+, etc.) and web conferencing tools on a regular basis. However, the results did not indicate the same trend when approaching the use of blogs (Twitter, Blogger, etc.) and the use of a Virtual Learning Environment (Moodle, Elgg, Ning) and other social platforms). In both approaches the results reflect a distance between PR professionals and these resources.

On the other hand, when asked about the use of social media tools such as YouTube, Flickr, etc, the results were balanced in relation to the frequency of their use showing that although these kinds of tools do not constitute unanimity in professional contexts, they seem to admit the necessity of using these tools for the benefit of the enterprise.

When asked about the frequency they use computers for work the necessity of this tool in the PR professional scenario was evident as all the respondents claimed always using them. Smartphones and tablets, however, seem not to be as useful in these contexts, being still considered as supporting tools.

Aiming at contemplating what respondents consider when they engage in a web-based work environment, professionals were allowed to choose as many alternatives as appropriate. Consequently, results show that most professionals establish goals for their work on the web. However, the establishment of goals does not necessarily mean their achievement or even self-management for the definition of the following steps.

These evidences were also verified in establishing how much of these actions were voluntary and which functionalities were present in these professionals' web-based work environment. In other words, it was verified that if the web work environment does not encourage self-management, professionals will not do it voluntarily, which may hinder the improvement of what has been shared and exposed in the virtual environment.

The data also indicated that although participants use different software, search mechanisms and social media, they are not used to RSS feeds and tags. Most participants are used to sharing questions and doubts, hyperlinks (url of images, websites, etc), ideas and suggestions and comments. They also interact in the web work environment by offering support, contributing to collective interests and using feedback.

Additionally, the analysis reveals what these professionals do in order to organize knowledge that is shared in the web-based work environments. Most of them claimed making use of schemes/maps to represent ideas and interpretations to express meanings, sharing analytic reflections, synthetizing contributions

for understanding, and conducting self-assessment for improvement. These data indicate the beginning of self-management and learning that are proportionated by the professional themselves and that could be expanded.

Based on this perspective we were able to identify the possible levels of interaction in web-based work environments. The answers to the questionnaire show that these spaces are preferably used with and among the employees, with minimal or no use of these environments as an interface with strategic audiences. The absence of an interactive communication tool in order to ensure the exchange of information of mutual interest with the different audiences was evident.

The last question presented in the questionnaire allowed respondents to include their opinions on the functionalities they considered vital but that were not available in their web work environments. The answers varied considerably and indicated different visions and necessities on functions that are hardly ever found in only one web-based work environment. Among the answers that were similar, many respondents mentioned the deficiency in communication to share information and create strategic bounds to audiences. Other tools and functionalities which would be useful in this scenario were suggested by the professionals: managing and personalising the environment, efficient sharing of news, a space for different sectors to investigate and share best practices, tools for managing relationship with customers and other stakeholders.

In order to represent the results of the questionnaire we used the visual analytics "C developed to identify key competences for colearning and co-inquiry in the digital age" designed by Okada et al (2013).

The answers were organised and presented using colour circles of different sizes according to the frequency of the answers in the questionnaire (bigger circles indicate the options that were selected more frequently by respondents and the smaller ones, the ones with less frequency). In other words, the colours are associated to the degree of these frequencies in a scale of occurrence according to the expressions – never, rarely, sometimes and always.

The following image (Figure 1) shows that PR professionals indicated many operational skills that are necessary for the key competences related to Digital Literacy, Communication-Collaboration and Critical-Creative Thinking such as planning objectives, time and priorities; using hypermedia and software; sharing questions, hyperlinks, ideas; managing networks, support, feedback, interests and improvements. However, based on the data, the skills related to Scientific Literacy were not contemplated, including others such as: using RSS feeds and tags; sharing annotations and open content; managing the organisation of the virtual collaborative environment; systematising contents in the environment.

The image shows a gap that enterprises should work on with their employees: developing research scientifically and creating innovative outcomes. This indicates a path to be investigated in order to encourage ubiquitous learning for these competences once they constitute key domains for the digital era.
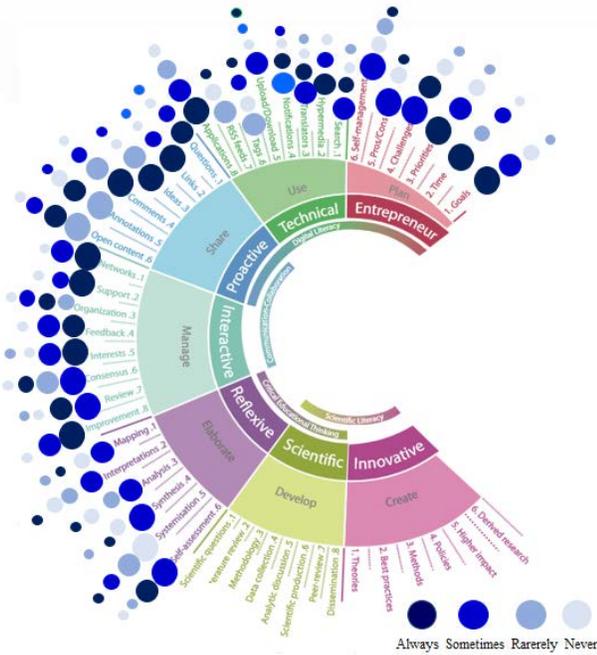
Figure 1: Visual analytics "C" for analysing key competences for colearning and co-inquiry through web-based working environments used by public relation professionals participants of Nestle Nutrir. *Source: Okada et all, 2013.*

After the questionnaire data collection, two interviews were conducted with coordinators of the two educational organisations that participate in the Nestlé Nutrir Health Children Program. These interviews aimed at verifying how strategic communication between enterprises and their audiences take place. The same agenda of semi-structured interview was used with representatives of two educational associations aiming at finding out the functionalities of Nestlé's web environment used in processes of communication and colearning during the program management.

Interviewees clearly highlighted their objectives in the project "*perform the anthropometric exam in about 700 children and adolescents aged between 6 and 14 years old. From the results of this test, 60 children and adolescents who were underweight, overweight or obese were selected and accompanied during one year. A group of nutritionists, physical educators, health professionals, psychologists and social assistants worked in the program guiding and making the kids aware of the importance of healthy feeding habits allied to the practice of physical activity. The other students in the institution who were evaluated also participate in the program indirectly as they participate in several activities that promote balanced feeding and sports practice*."

They were also able to describe their priorities to promote social innovation "*the importance of good nutrition along with the practice of sports without ignoring health care. This project aims at improving the life quality of children and adolescents who suffer the effects of a sedentary life and lack of information on what a balanced diet means.*"

Regarding interactions, the interviewees revealed that the teams engaged in the project belonged to management, kitchen, health and psycho-social departments. They mentioned that the communication channels used more frequently were e-mail and telephone, besides occasional face-to-face meetings for placement, orientations and evaluation of actions. On one hand, Social Networking Sites and Social Media in general, which are present in the daily life of organisations, were not mentioned as accessible or explored vehicles for communication and colearning between the organisations nor the "Nutrir" Portal.

One the other hand, their answers reveal that information sharing between Nestlé and the organisations seem to have occurred satisfactorily as the respondents claimed their interactions were always corresponded according to their needs.

Concerning software tools applied to their investigations, they mentioned that Nestlé had developed specific software for data input and follow-up. This software, besides constituting a modern tool, facilitates the follow-up of program results and keeps an up-dated and reliable database.

Related to assessment and evaluation of the project they emphasised that the analysis using the software contributed to identify its key outcomes: "*it is possible to perceive some changes in feeding culture besides the benefits of using different equipment for cooking food and the positive results of the professional training courses about cooking and health in the institutions*". They also mentioned as key benefits the "*change in behaviour of hundreds of children, adolescents and their families. Change in health habits including the practice of physical activity and learning about the importance of a healthy diet from project team's meetings and lectures.*"

Professionals also mentioned that the results are shared with employees, children, adolescents and their families in meetings and activities. They are also disseminated by the benefited families themselves in their communities, by the Municipal Foundation of Education, academic researches and several articles published by national and international media.

The following image (Figure 2) shows that educational organizations indicated some key skills that are necessary for the key competences related to Critical-Creative Thinking and Scientific Literacy, such as planning objectives, time and priorities; using hypermedia and software; sharing questions, hyperlinks, ideas; managing networks, support, feedback, interests and improvements. However, based on the data, the skills related to Digital Literacy and Communication and Collaboration were not contemplated on the web-based working environment. As it was mentioned the discussion, collaboration, training activities were basically face-to-face.

The visual analytics "C" of educational organisations (Figure 1) and the business organisation (Figure 2) indicate that a Working Environment with Social, Personal and Open Technologies for communication colearning and co-inquiry (collective inquiry) might be useful for improving their performance and expanding their achievements.

Based on both analyses, some recommendations were described for the weSPOT project.
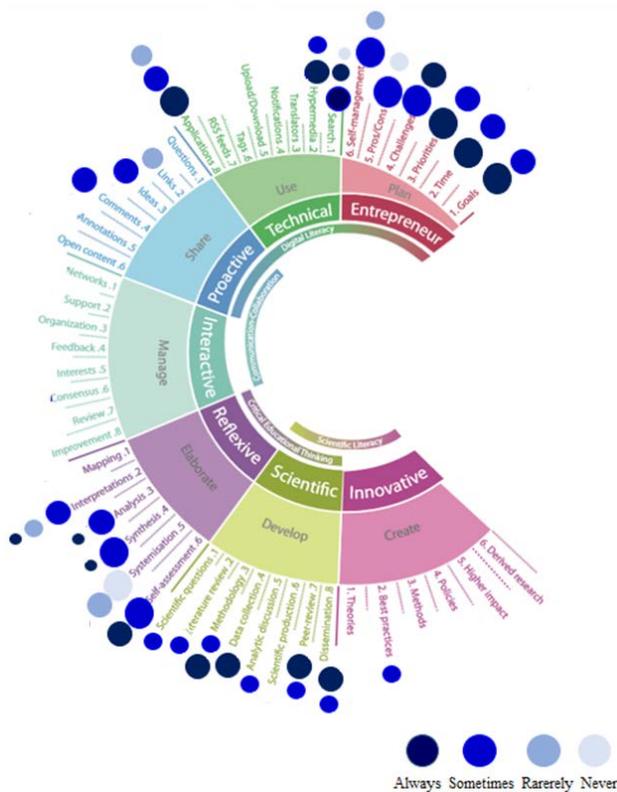
Figure 2: Visual analytics "C" for analysing key competences for colearning and co-inquiry through web-based working environments used by educational organisation' participants of Nestlé Nutrir. *Source: Okada et all, 2013.*

5. weSPOT – Working Environment

WeSPOT provides participants with the ability to build their own inquiry-based learning environment, enriched with social and collaborative technologies. It offers smart support tools for orchestrating inquiry workflows, including mobile apps, visual analytics support, and social collaboration on scientific inquiry. This working environment, which can be applied to ubiquitous contexts, allows participants to filter inquiry resources and tools according to their own needs and preferences. Participants are encouraged to interact with their peers in order to reflect on their inquiry workflows, share resources, data, receive and provide feedback, mentor each other, thus forming meaningful social connections that might help them in their colearning (weSPOT, 2012).

WeSPOT, despite constituting a typical colearning and co-inquiry environment in academic settings, presents all the functionalities mentioned and suggested in business contexts. weSPOT contemplates questions and hypothesis questions, operationalisation of what is being worked, data collection and analysis, results interpretation and communication. It also allows users to interact with others, aggregating opinions and reflections related to their investigations. Furthermore, its functionalities comprise uploading of files, comments, reflections, questions/doubts, besides the creation of pages, blogs, Pinboards and Mind maps to systematise ideas in general.

Thus, the design of a social, open and personalised environment such as weSPOT for the development of communication processes between companies and educational institutions necessarily encompasses the creation of an auspicious colearning environment (Figure3).

Without an educational perspective guiding the partnership relation, the potentialities of exploring the environment functionalities may be reduced and the opportunity for the constitution of an interactive environment where co-inquiry, even empirically, strategically favours the partners may be lost.

In general, both results from the questionnaires and the interviews evidence the lack of interaction resources that are able to contribute to this perspective. Although the interviews have revealed indications of educational institutions' scientific literacy, the web-based work environment used by Nestlé did not seem to be able to explore this specific dimension and neither favoured annotation or open content sharing so that other participants in the program could develop relevant learning experiences for their actions.

According to its nature, weSPOT fully and widely incorporates the necessary resources to favour companies' strategic communication in contexts of educational partnerships as it is shown below (Figure 3 and Figure 4):

These data show that, despite constituting a typical learning environment in academic settings aiming at scientific inquiry, weSPOT can also be used as a web work environment and support enterprises' strategic communication and colearning particularly for those interested in collaborative investigations, knowledge exchange and scientific enterprise, which includes best practices, sustainability and innovation strategies.

Based on data collected from both organisations, the partnership between schools and companies can be highlighted through weSPOT particularly applying key functionalities to strength strategic communication and colearning between all participants, such as:

1. Mind Maps for mapping new suggestions and aletrnatives (e.g. different equipment for cooking food in the schools, tools for analysing data) with feedback from the participants of both organisations.
2. Questions created by both organisations for collecting more evidence during the project based on both intererests (best strategies to promote better food and health; indicators of social innovation).
3. Wikipage to present professional training courses about cooking and health suggested by both organisations
4. Discussion forum for different schools and companies to keep in contact and share useful information for their investigations.
5. Files area – repository with key references such as presentations about team´s meetings amd lecturers
6. Surveys to collect data and share results for both organisations.
7. Mobile data collection for obtaining content through different media, (e.g. audio – recording comments and perceptions about the project from different kinds of participants: teachers, students, cooking staff, communication professionals, …) Photos of the food, physical activities, changes related to the diet (after and before), Video of the analysts and educators to highlight key evidence on the project.
8. Learning analytics and reflection can be used to analyse the process and participation of everyone, as well as to access the information source easily, by clicking on the dot and seeing the data directly.

Figure 4: weSPOT – Food and Health co-inquiry for PR professionals and educators by Calonego (2013)

6. weSPOT – FUTURE WORK

weSPOT is a working environment in development. As soon as all interfaces are developed including data collection for different kinds of mobile devices, our aim is then to elaborate a case study on food security and food health. We are expecting to contribute to a collective project for social innovation, in which schools, companies and Universities can develop a co-inquiry – collective investigation together. This pilot provided useful information for applying the working environment weSPOT and variety of key functionalities that might be useful for all stakeholders.

7. FINAL REMARKS

This study aimed at identifying the functionalities of a collaborative virtual environment in order to favour enterprises' strategic communication in a changing world characterised by rapid scientific advances, high competitiveness and interconnected society. Therefore working environments and strategies for promoting co-inquiry and colearning might be useful for effective communication, expanding collaboration towards significant outcomes.

Key findings indicate that although web-based work environments can be applied to assist the process of strategic communication, however their working environment, such as Facebook and the "Nestle Nutrir" Portal were basically used for

the dissemination of their project, process and some of their key achievements. It was possible to observe that educational organisations have been using software tools for managing their investigations, particularly for collecting data with their students, but not necessarily using a web-based working environment for sharing outcomes and feedback with participants and partners.

This pilot study highlights that a work environment with social personal and open technologies for inquiry based learning – weSPOT - applied to ubiquitous contexts might be useful for establishing a strong partnership between business and educational organisations.

The future investigations will therefore be focused on weSPOT functionalities for effective communication and collaboration in collective inquiry projects developed by companies and educational institutions.

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