An Analysis of a Heuristic to Assist Sociability Evaluation in Online Communities

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Abstract. Online Communities could be defined as environments that allow the interaction and information exchange between their members. An inherent aspect of Online Communities is the sociability, that regards social rules, privacy forms, freedom of speech, confidence, among other relations that may arise from the interaction between people. In this context, a heuristic, named SVCoP was proposed in order to analyze the sociability in Virtual Communities of Practice. As the potential of the aforementioned heuristic towards evaluating other types of online community was being noticed, in the present paper, an analysis of its application in VLEs and on Social Networks is performed. The SVCoP is composed by 46 questions that evaluate sociability aspects of the community related to the purpose, policies, members, knowledge, abilities, behavior, communication, coordination, cooperation, perception and decision-making. From the evaluation performed, the heuristic aspects were classified according to their occurrence and application for each type of community.

Keywords: Heuristic · Online communities · Virtual comunities of practice · Virtual Learning Environments · Social Networks · Sociability

1 Introduction

The evolution of knowledge may take place individually, however, not as much as in groups. The reason why it occurs is that people interaction, namely sharing ideas and opinions, results in enhanced knowledge [26]. [12] states that "collaboration completes individual capacity, knowledge, and efforts".

In a collaboration environment, the interaction elements should offer resources to instigate group activities in order to mitigate difficulties and facilitate people interaction [7]. Online communities may be defined as tools that allow people to interact and exchange information between users via computers connected to the Internet [10]. According to [21], people in online communities, sharing a sole purpose, access a computer's system with policies. [21] also states that in online communities, users are able to socially interact with people, which satisfies their needs, performing roles,

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sharing information and interests through pre-established rules which guide interpersonal relationship along with support and leverage of computers.

Therefore, a concern regarding sociability, intrinsic to online communities, takes place. Sociability refers to the gathering of people, which generates purposes and practices in which individuals share a sole interest and establish several relations (harmonic and conflicting), thus, individuals always acquire knowledge on capabilities and contributions one another [23].

In this context, this paper presents the classification of a heuristic, initially proposed to an evaluation of sociability within virtual communities of practice (VCoPs), though presenting potential for evaluating other types of online communities. The aspects of the heuristic were classified in accordance with their importance and occurrence in each type of community. In this research, the following online communities were taken into account for heuristic classification: Virtual Learning Environments (VLEs), Social Networks and VCoPs.

2 Online Communities and Sociability

Collaborative systems are places that may provide learning, which could be understood as the possibility of building knowledge not only in group, but also democratically, along with cognitive autonomy [2].

Online communities, which is seen as a taxonomy in collaborative systems, are tools which provide interaction and collaboration. [22] states that the goal of online tools is to engage people to communicate and interact with other people as they were physically present. [22] also affirms that the coordination happen when people work together, and talk between one another sounding commands, so others are aware of the way they are progressing.

In this line, [12] developed the 3C model, which is based on the following premise: aiming the collaboration, individuals should exchange information (communication), organize themselves (coordination), and operate in ground within a shared space (cooperation). The perception is generated by interactions which take place in the group, leveraging all the collaboration. [22] stresses that the perception is essential to the independent tasks, in which the activity result of a person is necessary in order to others to be able to perform their tasks. [1] defines perception as the a person's "knowledge" about the state of a shared computational environment, for instance, the knowledge on other people that share their interactions with the workspace, worked concepts, tasks and status of shared artifacts.

[13] describes that the social interaction is considered the main factor which influence in the collaboration in groups and in learning performances to such groups. According to [8], the collaborative learning is provided through the interaction which pushes involved people to act jointly and thus, a sharing feeling is created, which favors the continuous change and the improvement of group knowledge. [7] states that, in order to support the interaction and the collaboration, several tools become necessary. The main tools are: chat, e-mail, discussion lists, forums, instant messages, audio conference, video conference, and multi user editor.

Facing the online communities' scenario, sociability is a theme which deserves great attention by the software designers. According to [4], verifying and characterizing as the software designers deal with sociability on their interfaces has become a relevant research question in order to not only improve existing systems, but also to develop solutions that leverage social interaction [4]. According to [21], sociability refers to social rules, privacy, freedom of speech, trust, among other aspects which rise along with interaction.

Online communities need to present satisfactory sociability in order to ensure that their goals are reached. [20] stresses that social softwares which present satisfactory sociability are those containing established policies, people, and rules, in which: the purpose refers to the interests, needs, information and shared services by the social software users; people are members whose goals is to interact between one another, approaching the purpose that motivates themselves; and finally, the rules regards the language and protocols which govern people interaction.

There are some types of online communities, among them: Virtual Learning Environments (VLEs), Social Networks and Virtual Communities of Practice (VCoPs). The aforementioned communities are described in the following section:

2.1 Sociability and VLEs

VLEs are cyberspaces where communication between participants could happen anywhere, anytime, one to one, one to many, and many to many [17]. In such spaces, collaborative learning may occur, which in the opinion of [8], is provided through the interaction that drives involved individuals to act jointly and thus, a sharing feeling is created, which favors constant change and improvement of the group knowledge.

Learning environments are strongly interactive and hold a synchronicity aspect of what happens in real time. Interaction between different knowledge levels, decision-making in groups, and the accomplishment of joint tasks not only facilitate learning, but also the knowledge development [16]. EVAs enable people to cohabit along with diversity of view points, to dialogue, decision making and to produce knowledge, moreover, to express thoughts and feelings [19]. An EVA is a space where an individual, interacting with knowledge objects, becomes the learning process core.

Knowledge is seen as a social construct, and therefore, the educational process is favored by the social participation in such environments, that encourages interaction, collaboration and evaluation. According to [16], the basic elements of the collaborative learning are:

- Group interdependence: students aim to proceed and should work efficiently in group in order to achieve it;
- Interaction: improve students competency when working in teams;
- Conflicting opinions: activities should be elaborated in order to encourage collaboration, instead of competition;
- Evaluation: methods of independent evaluation are based on question games, exercises, observations regarding the group interaction and ***hetero-evaluation.

An EVA is an open and flexible environment, thus, its expansion takes place due to the high production of information and knowledge built by individual and groups distributed geographically. Such environment develop and socialize knowledge in several ways, not only via software, but also interfaces, hypertexts, and other media [24].

Sociability in EVAs is given as the professor's capacity of making social bonds with other professors and especially with students through synchronous interaction and communication (chats, instant messages) and asynchronous (mail, discussion forum) [9].

The cyberculture has promoted new possibilities of socialization and learning via EVAs. [3] reports that it is not possible to implement programs which allow interactivity, autonomy, learning to learn and the sociability promotion. According to [3], several strategies are utilized to reach the learning objective. For instance, the perception and sociability strategies, which are disposed through the content of a certain group.

2.2 Sociability in Social Networks

Online social networks allow people grouping who hold common interests [5]. According to [23], such spaces are composed by two elements: actors and relationships which actors develop between one another. There are several types of social networks, however, a similarity among them is the fact that the user has a profile, so it is possible to visualize their friends' network [5].

Online relationships networks aim to encourage human relations through technology [15]. Such networks gather people who wish to communicate and interact, namely, they look for shared purposes. Each network has a set of policies and rules [21]. Social networks are big flow channels in the circulation of information, links, values and social speeches, which has been enlarging, delimiting, and merging territories [15]. Interaction is a condition for the social construction of such networks. The most important elements for the relationship to be kept in such networks are: motivation, available time and involvement of people around these discussions, permanency, and technical grasp aiming the utilization of resources and communication establishments [15].

2.3 Sociability in VCoPs

The expression "Community of Practice" is defined as a group of people who share an interest or passion towards a subject and aim to interact regularly in order to improve their knowledge about the aforementioned subject [28]. VCoP regards a group of people sharing common interests via a virtual environment. In a VCoP, through the practice and exchange of experiences, not only acquiring knowledge becomes achievable, but also finding and reaching problems' solutions in a shorter amount of time compared to regular individual processes.

The main goal of Communities of Practices (CoPs) is the sociability promotion, participants' competency development, and the generation and exchange of knowledge [6]. According to [27], a CoP characterizes itself by the following aspects: community, members, competency, collaboration, decision-making, and CoP's resources.

[28] states that a CoP is a group of people who share an interest or passion by a certain subject and aim to interact regularly in order to improve their knowledge about

the aforementioned subject. The construction of knowledge occurs during the collaboration within these communities, via the exchange of experiences, observations and simulation of specific skills, which are intrinsic to every participant.

3 Heuristics Application Methodology

The heuristic of the sociability evaluation is titled SVCoP and is composed by 46 questions, structured in five axes: (i) Community - Purpose and Policies; (ii) Members; (iii) Competency - Knowledge, Skills and Behavior; (iv) Collaboration - Communication, Coordination, Cooperation and Perception and (v) Decision Making. The SVCoP was structured based on the following researches: [22], which describe directives towards guiding the development of heuristics focusing on the sociability aspect; [27], who presents a series of concepts of a CoP, including main elements and their inter-relations; and [11], who includes in their research the 3C Collaboration Model. In [14] the SVCoP is described with more details. Figure 1 presents the conceptual structure of the SVCoP heuristic.

Fig. 1. Conceptual structure of the SVCoP heuristic

The SVCoP is organized as follows:

- "Community" refers to the domain, objective, composition, and cultural diversity of the CoP. It connects to the concepts of [21], in the second level. "Purpose" regards the reason why a member pertains to the VCoP and "Policies" are records and codes which guide interpersonal within VCoP.

- "Members" are people of the CoP holding their personal roles and characteristics. "Members" refers to characteristics of the people in the community and their roles.
- "Competency" is defined as a set of resources provided to be acquired by an actor, in the second level of the tree. The resources to acquire the competency are "knowledge", which refers to acquiring theoretical information on a certain subject, "skills" regards the capacity of an actor to perform in practice and behavior conceptualizes in the fashion an actor behaves in a group or in certain situation.
- "Collaboration" groups concepts of "communication", "coordination", "cooperation" and "perception" cited by [11] and the 3C Collaboration Model, which is present in the second level. This model is based on the following premise: in order to establish collaboration, a junction of communication, coordination, cooperation and perception is required.
- "Decision making" refers to the available resources for such, involved actors and utilized strategies.

The heuristic presents parameters to the verification of aspects' occurrence in the community. The parameters vary from −1 to 2 as follows: (−1) Do not apply; (0) No occurrence, the aspect is not identified in the community; (1) Partial occurrence, the aspect is identified in an unsatisfactory way in the community; (2) Satisfactory occurrence, the aspect occurs satisfactorily in the community.

The classification of the heuristic involved four steps: (i) Selection of online communities which would be evaluated; (ii) Selection of evaluators according to the required profile (online community users and specialists in IHC); (iii) Application of the heuristic in the evaluation of online communities (EVAs and Social Networks), performed in an individual fashion by each one of the evaluators; (iv) Outcome analysis aiming the heuristic classification.

Two EVAs and three social networks were chosen for evaluation. Information Systems and Computer Science students and professors of the State University of Southern Parana, totalizing sixty-two people, distributed according to their familiarity towards online communities.

After performing the evaluations, by sixty-two evaluators, the aspects that does not apply to certain types of online communities were identified. For the classification, not only the parameters "Do not apply" and "No occurrence" demonstrated evidence of the aspect not being pertinent to such type of online community. However, the aspect "No occurrence" may also indicate that the community could not present satisfactory sociability. Thus, the study on the characteristics of each type of online community was added to the evaluation in order to better identify the not pertinent aspects.

3.1 Results and Discussion

From the evaluations performed on the SVCoP, the heuristic aspects that would not apply to certain type of online community may be noticed. In addition, another important observation was the identification of the sociability aspects that are not satisfactorily present in the evaluated communities.

The evaluators are users, who were chosen by their availability and familiarity with the online communities. There were 31 evaluators regarding the VLEs, and 31 regarding Social Networks. As the SVCoP was firstly developed towards VCoPs, such is not evaluation again, once their aspects were already validated in [14].

Table 1. Most outstanding SVCoP heuristic aspects in the evaluation of VLEs

Axes	Aspects	NA	NO	OP	% NA e NO	% NO e OP
Purpose	The title and content communicate satisfactorily the purpose of the community, thus, people are willing to participate of the community?	1	3	17	12,9	64,5
Policies	If there are commercial transactions in the community, is there a declaration that assures the safety of the user's' credit card data?	20	9	2	93,5	35,5
	Is there any way of complaint regarding the cases in which the community is incorrectly used?	15	10	5	80,6	48,4
	Is it established any type of punishment in case the community is incorrectly used?	13	13	4	83,9	54,8
Behavior	Does the community allow the evaluation of members' satisfaction?	10	12	3	71,0	48,4
Communication	Can I express myself the way I wish in the community?	12	13	3	80,6	51,6
	Is there a protocol (rules) towards the communication in the community?	15	6	8	67,7	45,2
Cooperation	Is there disclosure of events that encourage people to cooperate and return regularly to the community?	11	10	7	67,7	54,8
Perception	Are people able to view what other people are doing in the community?	9	13	8	71,0	67,7
Decision making	Does the community promote mechanisms regarding decision-making?	13	13	3	83,9	51,6

Tables 1 and 2 show the most outstanding heuristic aspects to the VLEs and Social Networks. The NA column represents the number of answers "Do not apply", the NO

Table 2. SVCoP heuristic aspects of more featured on Social Networks evaluation

Axes	Aspects	NA	NO	OP	% NA e NO	% NO e OP
Politicies	Are the policies of use largely published?	0	6	19	19,4	80,6
	In professional groups of discussion, are there copy-rights' statement?	10	13	6	74,2	61,3
Cooperation	Does the community allow the use of pre-elaborate messages in order to users to be able to exchange during the conversation?	3	19	5	71,0	77,4
Perception	Are people able to visualize what other people are doing in the community?	0	6	16	19,4	71,0
	Does the community present the user's function?	10	11	5	67,7	51,6
Decision making	Does the community promote mechanisms regarding decision-making?	10	9	4	61,3	41,9
	Is there any specialist with specific knowledge towards decision-making?	15	9	5	77,4	45,2

column represents the number of answers "No occurrence", the OP column represents the number of answers "Partial occurrence", the % NA and NO column represents the percentage of the sum of the columns NA and NO, finally, the % NO and OP column indicates the percentage of the sum of the columns NO and OP.

The present analysis has taken into account that in case a evaluated heuristic aspect does not occur in the community, such aspect may not apply to the respective type of community, or the respective community may present a sociability problem. Therefore, understanding that the answers "No occurrence" may also point out that the evaluation aspect do not apply for such type of community, these answers were summed to the answers "Do not apply" and the percentage regarding the total of evaluations (column % NA and NO) was obtained. Likewise, in order to analyze the aspects presenting bigger sociability problems, the answers "No occurrence" and "Partial occurrence" (column % NO and OP) were summed.

Table 1 demonstrates the heuristic aspects that shows more percentage for the %NA e NO column or for the % NO and OP column to the VLEs.

Once all the answers were compiled, it was observed that, to the VLEs (Table 1), the heuristic aspect that could present the biggest evidence of not applying to the community was related to the commercial transaction. Other aspects that do not apply to this community, to the answers, are related to the ways of complaint and punishment for the incorrect use of the community; the possible ways of expression in the community; and the mechanisms of decision making. However, analyzing the characteristics of VLEs, it is observed that commercial transactions may occur, once events

are promoted in such environments, several materials are provided, among others. The VLEs could establish types of decision making (which learners opine towards the event type, evaluation, research, among others) and also protocols, including rules, punishments and types of complaint regarding the incorrect use of the community in order to reach its goal.

The compilation of answers also allowed identifying bigger problems regarding sociability within such environments. The aspects that may not occur satisfactorily in VLEs are related to: lack of identification to the purpose of community; absence of ways to punish the incorrect use of community; absence of events which stimulate cooperation; and lack of perception towards other peoples' actions in the environment.

Table 2 shows, to Social Networks, heuristic aspects which presented the biggest percentages to the %NA and NO column or to the %NO and OP column.

To Social Networks (Table 2), the heuristic aspects point out the most of not applying to such type of community are related to: declaring copyright; users' roles and decision making. Regarding the amplitude and features of Social Networks, it appears that it is hard to provide mechanisms to the declaration of copyrights in case of disclosure of contents. Furthermore, the fact that users may not hold different roles and an explicit coordination on the network may not exist is observed, which decharacterizes the existence of a specialist moderator for the decision-making in the environment.

However, regarding sociability, it appears that the aspects presenting the biggest problems were associated to: concealment of policies of use; unavailability of pre-elaborated messages for conversation and the unsatisfactory perception of action that are being conducted by people.

4 Conclusion

In the present paper an analysis on the SVCoP heuristic (first developed in order to evaluate the sociability in VCoPs) as your application in other types of online community, the VLEs and the Social Networks was conducted.

The SVCoP containing 46 questions, organized in five aspects (Community, Members, Competency, Collaboration and Decision Making) was applied by 62 users who evaluated three Social Networks and two VLEs.

Once the answers analysis and the verification of characteristics of online communities were concluded, we found that the SVCoP heuristic also applies to VLEs and to Social Networks, once, of 46 evaluation aspects, the majority are pertinents to such environments.

Based on the evaluators' answers regarding "Do not apply" and "No occurrence", only five elements pointed out evidences of not applying to VLEs. However, none was considered not applicable by the majority evaluators. The item that obtained the biggest number of answers "Do not apply", referring to commercial transactions in the community, reached 64,5 %. On the other hand, to social networks, only three elements pointed out evidences of not applying to such environments, taking into account that the answer which obtained the biggest percentage of "Do not apply", referring to decision making, reached 48,4 %.

From the application of the heuristic, the sociability aspects that are not satisfactory within such communities are verified. In the VLEs, a lack of attractively took place as the community purpose was given; lack of punishment forms towards the incorrect use of users within the community; absence of events which stimulate cooperation; and finally, lack of perception towards other peoples' actions in the environment. On the other hand, in Social Networks, the weakest points were the lack of disclosure of policies of use; the unavailability of pre-elaborated messages for the conversation between members and the unsatisfactory perception towards actions performed by other users in the community.

As future work, we aim to perform new evaluations in order to reinforce the results hereby achieved and also to verify the application of the heuristic on other types of online communities.

References

1. Alves, S.V.L., Alves, E.C.M., Gomes, A.S.: Percepção em groupware educacionais. Revista Brasileira de Informática na Educação (2008)
2. Amarante, D.P.M.: Utilização do design instrucional em curso ead: Análise do Ambiente Virtual de Aprendizagem de curso técnico à distância de uma instituição pública de ensino. Universidade FUMEC, Belo Horizonte, MG (2015)
3. Arbex, D.F., Bittencourt, D.F.: Estratégias para o desenvolvimento de um ambiente virtual de aprendizagem: um estudo de caso realizado na unisul virtual, Revista Brasileira de Aprendizagem Aberta e a Distância, São Paulo, Dez. (2007)
4. Barbosa, G.A.R., Santos, G.E., Pereira, V.M.O.: Caracterização Qualitativa da Sociabilidade no Facebook. In: IHC (2013) Proceedings - Full Papers
5. Batista, H.: Aplicativo de comunidade virtual para a prática de esportes voltada para dispositivos móveis (2014)
6. Benghozi, P.: Les Communautés Virtuelles: Structuration Sociale ou Outil de Gestion? Entreprises et Histoire **43**, 67–81 (2006). France
7. Brito, R.F., E Pereira, A.T.: Um estudo para ambientes colaborativos e suas ferramentas. Universidade Federal de Santa Catarina (2004)
8. Chagas, C.G., Freitas, C.S.C.: O Uso Das Redes Sociais No Ensino A Distância Como Ferramenta De Aprendizagem, Revista Cesuca Virtual: Conhecimento Sem Fronteiras 2(3), Ago (2015). ISSN: 2318–4221
9. Cunha, F.O., Silva, J.M.C.: Análise das Dimensões Afetivas do Tutor em Turmas de EaD no Ambiente Virtual Moodle (2009)
10. Forato, B.B.A.: Heurísticas para a criação de uma comunidade online (2011)
11. Fuks, H., Raposo, A.B., Gerosa, M.A.: Engenharia de Groupware: Desenvolvimento de Aplicações Colaborativas. In XXI Jornada de Atualização em Informática, Anais do XXII Congresso da Sociedade Brasileira de Computação, vol. 2, Chap. 3 (2002). ISBN: 85-88442-24-8
12. Fuks, H., Raposo, A.B., Gerosa, M.A.: Do modelo de colaboração 3c à engenharia de groupware. In: Simpósio brasileiro de sistemas multimídia e web - web-mídia 2003, 9, 2003. Anais… [S. l.: s. n.], pp. 445–452 (2003)
13. Kreijns, K., et al.: Measuring perceived sociability of computer-supported collaborative learning environments (2007)

14. Lopes, L.A., Guilhermino, D.F., Coleti, T.A., Sgarbi, E.M., de Oliveira, T.F.: Heuristic to support the sociability evaluation in virtual communities of practices. In: Kurosu, M. (ed.) Human-Computer Interaction, Part III, HCII 2015. LNCS, vol. 9171, pp. 3–14. Springer, Heidelberg (2015)
15. Machado, J.R., Tijiboy, A.V.: Redes Sociais Virtuais: um espaço para efetivação da aprendizagem cooperative, 3(1), Maio (2005)
16. Martins, J.G.: Aprendizagem baseada em problemas aplicada a ambiente virtual de aprendizagem, Universidade Federal de Santa Catarina, Programa de Pós-Graduação em Engenharia de Produção (2002)
17. Moraes, M.: A monitoria como serviços de apoio ao aluno na educação a distância
18. Florianópolis: Tese (Doutorado em Engenharia de Produção) pelo Departamento de Engenharia de Produção da UFSC. Florianópolis (2004)
19. Obregon R.F.A.: O padrão arquetípico da alteridade e o compartilhamento de conhecimento em ambiente virtual de aprendizagem inclusivo (2011)
20. Pereira, R., Baranauskas, M.C.C., da Silva, S.R.P.: Softwares sociais: uma visão orientada a valores. In: Proceedings of the IX Symposium on Human Factors in Computing Systems, IHC 2010, pp. 149–158 (2010)
21. Preece, J.: Online Communities: Designing Usability, Supporting Sociability. Wiley, NewYork (2000)
22. Preece, J.: Online Communities: Designing Usabiliy, Supporting Sociability. Preece, Rogers, Sharp Design de Interação, 3ª ed. (2013)
23. Recuero, R.: Facebook x Orkut no Brasil: alguns apontamentos. Social Media, 24 Ago. (2009)
24. Santos, E.O.: Educação online: cibercultura e pesquisa-formação na prática docente, Capitulo II - A educação online para além da educação a distância: um evento da cibercultura (2005)
25. Silva, S.: Sociabilidades juvenis online (2007)
26. Terra, J.C.C., Gordon, C.: Portais Corporativos: A Revolução na Gestão do Conhecimento. São Paulo, SP: Negócio, 480 p. (2002)
27. Tifous, A., Ghali, A.E., Dieng-Kuntz, R., Giboin, A., Evangelou, C., Vidou, G.: Na ontology for supporting communities of practice. In K-CAP 39-4 (2007)
28. Wenger, E.: Communities of practice and social learning systems: the career of a concept. Social Learning Systems and Communities of Practice. Chap. 11 in Blackmore, p. 179. Springer, Dordrecht (2010)