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Does content categorization lead to knowledge building? An experiment in a social bookmarking service

Carlos Rosemberg Maia de Carvalho [a,b,*], Elizabeth Sucupira Furtado [a], Vasco Furtado [a]

[a] University of Fortaleza – UNIFOR, Avenida Washington Soares, 1321 – Edson Queiroz, Fortaleza, CE 60811-905, Brazil
[b] Rua das Carnaúbas, 100 – Casa 3200 – Passaré, CEP 60743-780 Fortaleza, CE, Brazil

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ABSTRACT

Designers of systems with knowledge building purposes (learning platforms, serious games, etc.) are increasingly, sometimes inadvertently, using strategies like collaboration (Wikis), social networking, and Gamification. They aim to engage people and help them evolve their knowledge through several forms of interaction (sharing, commenting, editing, liking, replying, tagging, etc.). Given this scenario, the present work analyzed the impact of a collaborative, tag-based content categorization mechanism in user's perception of knowledge building in a social bookmarking service. To achieve this we performed a statistical analysis based on usage log data recorded from the tagging interactions and a post-usage online survey with 84 responses. Although the user interaction with content (tagging) would suggest higher levels of learning, the results showed that the perception of knowledge building is not affected by user participation behavior, and lurkers and posters could equally benefit from the service.

1. Introduction

In the recent years, social networking, collaboration and the rise of user-generated content are dictating the scope of knowledge-focused digital products and services like learning platforms, content repositories, serious and educational games, etc. New forms of user interaction (sharing, commenting, editing, liking, replying, tagging, etc.) emerged and the possibilities for knowledge building in these virtual communities seem to expand exponentially.

A well-accepted categorization for virtual communities (Ren, Kraut, & Kiesler, 2007) defines environments that attract users from the appealing of a common identity (identity-based communities) and those that attract users who want to create and strength their social ties (bond-based communities). Particularly in identity-based communities, people join the community to solve tasks that require cooperation, where a common purpose is shared and the contents are related to the purpose of the community. In such initiatives, knowledge creation and relevant content sharing are fundamental. These activities play important role in consolidating the community as well as lead the users to realize the increase of their knowledge. In this way, the concept used herein "Knowledge oriented virtual community"—like the notion of identity-based community—refers to a social system where users expect increasing knowledge when using it.

In this scenario, user role evolved from a passive information consumer to an active content producer, originating the concept of 'prosumer' (Fischer, 2011). As a response, designers of collaborative systems have concentrated efforts in creating functionalities that increase users' participation, turning them from "*lurkers*" (passive users) into "posters" (active users, or content creators) (Fischer, 2011; Mo & Coulson, 2010; Preece, Nonnecke, & Andrews, 2004; Schneider, von Krogh, & Jäger, 2013; Zhou, 2011) In practical terms, though, what lurking and posting behavior means depends on the environment/system. For instance, in social networks it can be a post, a comment, and a "like or favorite" action. In wiki-like systems, by its turn, it can be the content creation, update and classification, and even abuse reporting.

In the case of systems were the real purpose is personal knowledge building, user participation can be a complex topic. Some studies suggest that in wiki-based systems knowledge is built when a person adds his/her own knowledge to the shared digital artifact, in a clear posting behavior. By the other hand, studies also suggest that some cases the posting behavior can negatively affect the learning in message boards (Dennen, 2008). Finally, in online support groups, lurkers might benefit from participation to the same extent as those who read and post messages (Mo & Coulson, 2010; van Uden-Kraan, Drossaert, Taal, Seydel, & van de

* Corresponding author at: Rua das Carnaúbas, 100 – Casa 3200 – Passaré, CEP 60743-780 Fortaleza, CE, Brazil. Tel.: +55 85 8213 6034.
E-mail addresses: rosemberg@edu.unifor.br (C.R.M. de Carvalho), elizabet@unifor.br (E.S. Furtado), vasco@unifor.br (V. Furtado).

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Laar, 2008). In this context, a fundamental question rises: does the user participation (lurking or posting) impact the one's perception of increasing his/her knowledge?

With the aim of exploring questions like that, we created a social bookmarking service called Uxmarks.com, a knowledge oriented virtual community that automatically collects web content related to its purpose (User Experience, Human Computer Interaction and adjacencies) and promotes its collaborative categorization by users. At Uxmarks.com, users may adopt basically two types of participation behavior: classify the collected contents into categories (which is equivalent to posting behavior) or just explore the content (interpreted here as lurking behavior). Therefore, instantiating the main question above to Uxmarks.com case, we found the research question of this paper: Does the content categorization in Uxmarks lead to an increase in the user's perception of knowledge building? In order to providing answers to this question, we ran a study based on literature review and empirical analysis of user's expressions of motivation and his/her perception when using Uxmarks.com, detailed further.

This paper is organized as it follows: First, we explore useful concepts from theories in HCI and knowledge management disciplines in order to set a unified vision of the research question about personal knowledge building and User Participation. With this information, the research hypothesis is set and a research model is built. Afterwards, we describe the experiment in Uxmarks.com. Finally, we discuss the experiment results and explore the main conclusions, making the necessary generalizations and providing guidance to apply the findings in other systems and situations.

2. Personal knowledge building

The term knowledge refers to a broad and mostly subjective topic approached by many disciplines and areas. Among other definitions, knowledge can be described as "information combined with experience, context, interpretation and reflection" (Davenport & Prusak, 1998). Seeing knowledge is so important in modern societies, individuals and organizations began setting strategies to increasingly achieve more knowledge in order to systematically benefit from what they know. The literature shows the knowledge can be approached at the personal and collective levels. The personal knowledge-building variable, (focus of this work) is one of the outcomes of a knowledge creation process. It consists in the measure (quantitative) or specification (qualitative) of the personal knowledge resulting from the experience. Such events can be diverse, from passive (learning from reading a book or watching a documentary on the TV) to active [learning from applying an inspection method to evaluate the semiotics of an user interface (de Souza, Leitão, Prates, Bim, & da Silva, 2010)].

In the field of collaborative editing (wiki-like systems) Cress and Kimmerle proposed the Co-evolution Model of Cognitive and Social Systems (Cress & Kimmerle, 2007) (Fig. 1), building through the interaction between the individual (person) and social (wiki) systems. Basically, it integrates individual learning and knowledge building through four processes: *Assimilation* (of new information, prior to any related knowledge), *Accommodation* (of new information and ideas, causing modifications in the existing knowledge), *Externalization* (when a person adds his/her own knowledge to the shared digital artifact) and *Internalization* (when a person expands his/her individual knowledge base by the act of "taking" information and knowledge from a shared digital artifact). While the *internalization* and *externalization* processes explain the interchange of knowledge and information between the people and shared digital artifacts, *assimilation* and *accommodation* are related to what happens inside each one, affecting the learning process as Piaget first proposed (Piaget, 1977).

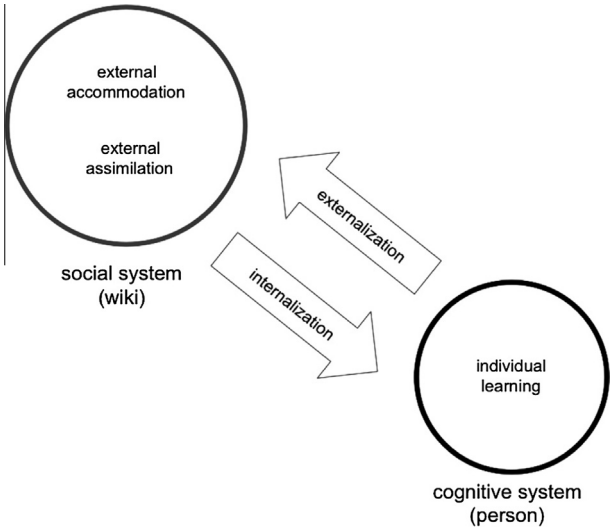

Fig. 1. Co-evolution model processes (Moskaliuk, Kimmerle, & Cress, 2012).

3. User participation

User participation is at the core of collaborative systems. Not surprisingly, there are many theories that can be used to explain the reasons why people actively participate in online communities (and other types of collaborative systems) and why people show great effort and persistence (or none at all) on doing things (Piccolo & Baranauskas, 2012). Some examples are the social psychology (Fischer, 2011), social influence theory (Zhou, 2011), social capital theory (Chiu, Hsu, & Wang, 2006; Wiertz & de Ruyter, 2007), trust theory (Porter & Donthu, 2008; Wu, Chen, & Chung, 2010) and commitment theory (Bateman, Gray, & Butler, 2011). These studies show that human factors like commitment, perceived usefulness, self-efficacy, outcome expectation and social processes may significantly affect online community user participation. In HCI, concepts of motivation theories are being applied to diverse topics: (i) the physiological and psychological needs of an individual (e.g., coming from Maslow's Need Hierarchic Theory (Maslow, 1943)) in usability requirements (Thew & Sutcliffe, 2011); (ii) the social and cultural factors (e.g., the intrinsic and extrinsic sources of motivation coming from Self-Determination Theory (Deci & Ryan, 1985)), in users' profile (Piccolo & Baranauskas, 2012); (iii) the mental states of a user (e.g., coming from Flow Theory (Csikszentmihalyi, 1997)) in affective quality of user interfaces (Norman, 2004) and temporal aspect of user experiences (de Carvalho, 2007); and (iv) the user's characteristics of achievement (e.g., perseverance and competition coming from Achievement Motivation Theory (McClelland, 1953)), in social interaction design patterns (Furtado & Furtado, 2013).

The literature focusing on user participation in on-line environments (mainly in message board communities like forums, social networking sites, etc.) repeatedly summarizes user with two behavior types: posting and lurking. While the first refers to the active users of a community, the second is regarded to the passive behavior of not posting any content (Mo & Coulson, 2010; Preece et al., 2004; Schneider et al., 2013; Zhou, 2011). Some findings are highlighted between lurkers and posters:

- Posters have a greater sense of belonging to a community than lurkers (Preece et al., 2004).
- They tend to like interaction more (Preece et al., 2004).
- Posters respect other posters more than lurkers respect posters (Preece et al., 2004).