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Integrating social features in service systems: the case of a library service

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ABSTRACT

Socially-oriented technologies are growing in importance and are increasingly being used in organizations. There is an opportunity to enhance customer interactions in service offerings using social features, yet the incorporation of social features into information systems has been largely unexplored. In this paper, we propose a modeling extension that enhances existing information systems' modeling techniques such that they can be used to identify opportunities to incorporate social features in service system exchanges. We define social features as online technologies that support the creation of: 1) user profiles; 2) articulated social connections and membership within groups or communities; and, 3) user-generated content. We demonstrate the use of our social features modeling extension in a library service offering.

Keywords

Social features, socially-oriented technologies, service interactions, service exchange, information systems.

INTRODUCTION

A renewed understanding of service activities has taken hold in the past years; formalized as service-dominant logic, it has led to an understanding of service as a process of exchange among parties collaborating to cocreate value (Vargo and Lusch, 2008). Because of the necessary involvement of the customer in cocreating value, increased connections and collaborations between the provider and customer are sources of innovation and competitive advantage in service (Lusch, Vargo and O'Brien, 2007). Therefore, a crucial opportunity for service innovation lies in the ability to enhance the service exchange that frames the interactions among service systems.

Information technology is an important means to support the collaborative exchanges that lead to the cocreation of value (Lusch et al., 2007). Furthermore, the interactions that support these exchanges are social in nature, thus learned and reproduced in wider social structures (Edvardsson, Tronvoll and Gruber, 2010). Therefore, service exchange innovation should take advantage of the integration of social features within existing information systems and technology. However, many service organizations are adopting social technologies without a thorough understanding of the ways in which their offerings will be enhanced through their use, often implementing social technologies that have been used in similar organizations. While this should eventually provide opportunities to enhance the service exchange through social interaction, it does not take into consideration unique offerings provided by these organizations for their specific community of customers. Instead, socially-oriented technologies should support collaborative exchange in a way that is relevant for the organization and its customers.

Decisions about innovating through information systems or technology rely on the creation of models or representations of current and future scenarios through all stages of the information system development life cycle. However, existing modeling techniques do not offer constructs able to capture social features. Because of this, leading software companies have reported to the principle author that they do not use modeling techniques to help them design and develop social technologies. Instead, they either design and build social technologies based on existing systems or make use of traditional modeling techniques only for the underlying software and rely on ad-hoc mechanisms for describing social features.

There are, however, a number of current modeling techniques that are concerned with innovating in the service exchange space. For example, Service Blueprinting (SB) can be used to determine service innovations that may or may not be implemented using technology (Bitner, Ostrom and Morgan, 2008). The Service Experience Blueprint (SEB) extends SB and addresses the introduction of technology more specifically by accounting for the possible presence of multiple interfaces

through which the customer can experience the business service (Patrício, Fisk and Falcão E. Cunha, 2008). The goal of SEB is to provide a method for designing business services that have multiple interfaces with an emphasis on determining when to enhance experiences through information technology. However, SEB is not specifically suited to finding opportunities to support the service exchange through social features.

Another approach is the media constellation diagram (MCD), which models a business' existing interactions in order to determine relevant places in which to incorporate technology to mediate the interactions (Flor and Maglio, 2004). This approach thus enables the identification of opportunities to introduce IT into existing non-technology-enabled business services; however, similar to the SEB approach, MCDs do not provide constructs that enable the introduction of socially-oriented technology. These examples show that in spite of the rise of social technologies to enhance service exchanges, the incorporation of social features into the design of service-oriented information systems has been largely unexplored.

To address this gap, we propose a modeling extension that can be used to expand existing modeling techniques in order to identify opportunities to incorporate online social features. Because our approach is an extension that can be incorporated into existing modeling techniques, it enables social features to be better integrated into existing information systems.

In the following sections, we first present the social features framework from which our extension has been derived. We then present our modeling extension in more detail and illustrate its use to extend MCD (Flor and Maglio, 2004). Finally, we demonstrate its effectiveness by showing how it was used to find opportunities to introduce online social features in a library service offering.

SOCIAL FEATURES

The term "social features" is used here to mean features that, when added to an information system or application, transform it into a socially-oriented information system or application. This applies both to information systems and applications that are open on the web or closed within an organization. There is not yet a general theory or framework that definitively characterizes social features, social media, social applications, or social websites. While some theories such as social network theory (Wellman and Berkowitz, 1988) or social exchange theory (Homans, 1958), and frameworks such as communities of practice (Wenger, 1997) may help in understanding different aspects of social media and social features, they do not fully characterize the breadth of what has emerged as social media today. While, design principles for social websites can suggest features for socially-oriented information systems, current principles do not address all aspects of social media, specifically what is commonly referred to as user-generated content (Girgensohn and Lee, 2002).

In the absence of a general theory or set of design principles, we define our social features framework from recent literature in information systems and computer science that pertain to socially-oriented technology. We have identified three key social features of technology across the literature: 1) user profiles; 2) articulated social connections and membership within groups or communities; and, 3) user-generated content. User profiles enable people interacting within a socially-oriented information system to have a social presence and identity in the system. Articulated social connections provide explicit links between people interacting within a socially-oriented information system and enable the formation of groups and subgroups (or communities) within the network. User-generated content broadly includes any contribution of content (information, data) by people interacting within a socially-oriented information system including various kinds of media and comments, ratings, tags, etc., on other peoples' user-generated content.

Table 1 illustrates our characterization of social features framework relative to the key papers reviewed in this section.

Construct from Literature	Profiles	Articulated connections and communities	User-generated content
Social Network Sites (boyd and Ellison, 2007)	X	Known people	--
Social Networking Sites (boyd and Ellison, 2007)	X	X	--
Socializing Social Network sites (Thelwall, 2007)	--	Known people	--
Networking Social Network Sites (Thelwall, 2007)	X	X	--
Social Navigation Social Network Sites (Thelwall, 2007)	X	X	Finding information associated with people
Social Networking Sites (Kim, Jeong and Lee, 2010)	X	X	--
Social Media Sites (Kim et al., 2010)	--	X	X
Social Web Sites (Kim et al., 2010)	X	X	X
Social Computing (Parameswaran and Whinston, 2007)	--	X	X

Table 1. Key online social features indentified in literature

Before highlighting the literature from which our framework has been defined, we discuss common terminology. Several terms are used interchangeably in the academic literature to refer to socially-oriented applications including: social computing (Parameswaran and Whinston, 2007); social software (Parameswaran and Whinston, 2007); social network sites (boyd and Ellison, 2007; Thelwall, 2007); social networking websites (Cardon, 2009; Kim et al., 2010); online social networks (Yang, 2008); online collaboration sites (Yang, 2008); and, social media websites (Kim et al., 2010). Often, a formal definition of these terms is not provided but meanings are derived from descriptions of well-known social websites. This makes it difficult to identify key constructs that underlie these applications. In some cases, however, authors have tried to articulate the salient features of social websites and socially-oriented technology (e.g., boyd and Ellison, 2007; Kim et al., 2010; Parameswaran and Whinston, 2007; Thelwall, 2007). To develop our social features framework, we thus identified the key constructs that were directly or indirectly referred to in this body of literature.

The widely-cited paper by boyd and Ellison (2007) was one of the first to trace the history of social network sites and define them as web-based services that allow people to: 1) create a public or private profile; 2) explicitly express people with whom they are connected; and 3) view and traverse the connections within the system. They chose the term "social network site" instead of "social networking site" to emphasize the fact that most sites facilitate connections with an existing network of people rather than enabling networking within new groups. Our framework does not however differentiate between these purposes since the same social feature can support more than one purpose. In our framework, we retain as social features the presence of user profiles and the ability for those users to express to whom they are connected and to view others' connections.

Boyd and Ellison's (2007) definition was extended in a typology that differentiates between different kinds of social network sites (Thelwall, 2007). This typology is based on the ways in which social network sites (SNS) are used and differentiates between socializing SNS (designed for social communication among members where the articulated network is that of existing friends now connected online), networking SNS (designed for nonsocial interpersonal communication where connections are used to find new members of one's network); and, social navigation SNS (which have social network features that are primarily used to find a particular type of information or resource). The classification scheme based on the uses of an SNS does not necessarily refer to different sets of social features since the same features can be used for different purposes. For example, communicating with an existing social network online may use many of the same social features as would be used in a site for networking However, the usage differentiation provided by this typology identifies a third key social feature: that of finding resources or information associated with people. While not explicitly construed as such, this points to the now well-established concept of user-generated content.

The importance of allowing users to generate content has more directly been emphasized by Kim et al. (2010), who present a taxonomy of social websites which they define as sites (either on the web or restricted to within organizations) that enable people to form communities online and to share user-generated content. User-generated content includes photos, videos, webpage bookmarks, user profiles, activity updates, text, etc. Sharing of user-generated content includes (at the minimum)

posting, viewing, commenting on, and voting on content. According to this definition, social websites include both social media websites which enable the social sharing of different types of media through networks and social networking websites which facilitate connections between people online. This taxonomy of social websites identifies user-generated content as another key feature of socially-oriented technology. Moreover, it emphasizes that users are not merely connected in a dyadic fashion through social features, but that information sharing happens at the level of communities.

The definition of social computing as a collection of technologies that provide community formation and user level content creation (Parameswaran and Whinston, 2007) adds to the previously discussed characterizations. This broad characterization compares social computing technologies to traditional platforms on several traits including the fact that they are dynamic, enable rapid dissemination of information, are freeform and flexible and exhibit a bottom-up structure. While these traits do not enumerate additional social features, they present qualities that shape the overall trends taking place through these emerging technologies. The two key social features identified are community formation and user-level content creation.

We are interested in establishing a social features framework that distinguishes socially-oriented technology from other types of technologies. While the literature reviewed above shows a great deal of similar concepts, we found it necessary to combine their propositions in order to arrive at a comprehensive framework; yet, we aimed to conflate similar concepts in order to avoid redundancy and focus on key features. The features of socially-oriented technologies that make up our framework and form the basis for our modeling extension are: 1) user profiles; 2) articulated social connections and membership within groups or communities; and, 3) user-generated content.

MODELING EXTENSION

In information systems development, models are used to represent different aspects of the system being developed at each stage of the system development life cycle. Some of the items represented in these models are data and information, people who interact with the system (customers, employees, system users), system components (hardware, software, networks, etc.), relationships among different parts of the system, the ways in which the system is used, system requirements, interfaces to the system, the flow of information or work processes within the system, etc. Models are used to represent different levels of abstraction from conceptual to logical to physical each abstracting further from the real world and closer to a system implementation. Some modeling techniques such as i* (Yu, 2009) aim to elicit requirements where other well-known modeling approaches represent a subset of the overall system such as entity-relationship diagrams, data flow diagrams, and Unified Modeling Language (UML) class diagrams. Some modeling techniques are designed to represent a significant part of the overall system including the people who interact with it such as service experience blueprints (Patrício et al., 2008; Shostack, 1984), media constellation diagrams (Flor and Maglio, 2004), and UML use case diagrams.

Our modeling extension finds opportunities to introduce social features in information systems in order to innovate in the service exchange. It thus focuses on those aspects of service systems involved in exchange, namely, people, information, and technology, and has been designed to work with modeling techniques that represent an overall system including the people who interact with it. Once an existing modeling technique has been used to create a representation of the system, our modeling extension is applied as a final step in the modeling process. In particular, the social features extension walks through an existing model and identifies specific places where people or information are represented and where technology-mediated exchange or interaction takes place between people or between people and information.

Figure 1 illustrates how our modeling extension can be used with existing modeling techniques. One first identifies any representations of people, information (or data), people-to-people exchanges, and people-to-data exchanges that exist in the current model (left side of Figure 1). Once identified, the representations can then be evaluated as to whether they provide an opportunity to incorporate one or more of the social features identified in our framework (shown on the right side of Figure 1).

To demonstrate in more detail how our social features modeling extension works, we describe how it can be used to extend one particular modeling technique, media constellation diagrams (MCD) (Flor and Maglio, 2004). This technique was chosen to extend because it focuses on finding opportunities to innovate in service offerings through technology and represents an overall system including the people who interact with it.

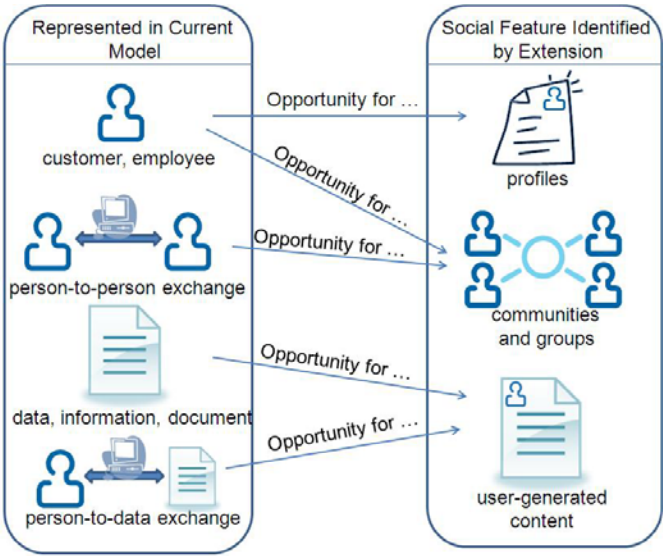

Figure 1. Social features modeling extension identifies social features (right side) opportunities (arrows) in existing representations (left side).

Applying the Social Features Modeling Extension to Media Constellation Diagrams

Media constellation diagrams (MCDs) (Flor and Maglio, 2004) model people, technology, and information as agents (or nodes) and represent items that are moved, communicated, or exchanged on media channels between agents as arrows (or directed edges). Media channels indicate the media through which the exchange takes place such as verbal communication, mail systems, email, paper, etc. A generic MCD of a service exchange is represented in Figure 2.

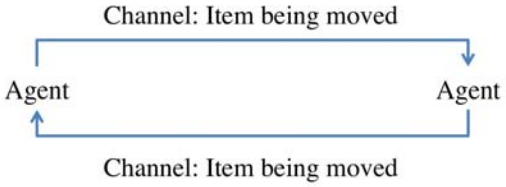

Figure 2. Generic MCD (Adapted from Flor and Maglio, 2004)

MCDs can be used to find computational opportunities in an offline service business by carrying out the following three steps (Flor and Maglio, 2004). First, one needs to identify the *products* of a service, which are defined as anything the customer leaves with that they did not have previously including knowledge or information acquired through interacting with people, technology, or entities in the business. The next step is to model the business activities as MCDs. One MCD is created for each identified product. The final step involves looking at the MCD models and identifying places where technology can be used to augment, substitute for, or give a new way of facilitating the creation of the products. Two places in the models are considered for incorporating technology: as substitutions for agents in the models; and, as mediators in exchanges between agents. For example, a computational agent such as an information system or online platform could mediate the exchanges between two person agents. Figure 3 shows two example MCDs where technology might be incorporated in Figure 2 if the two agents were human agents: a) to mediate exchange between two human agents; and, b) to substitute for one of the human agents.

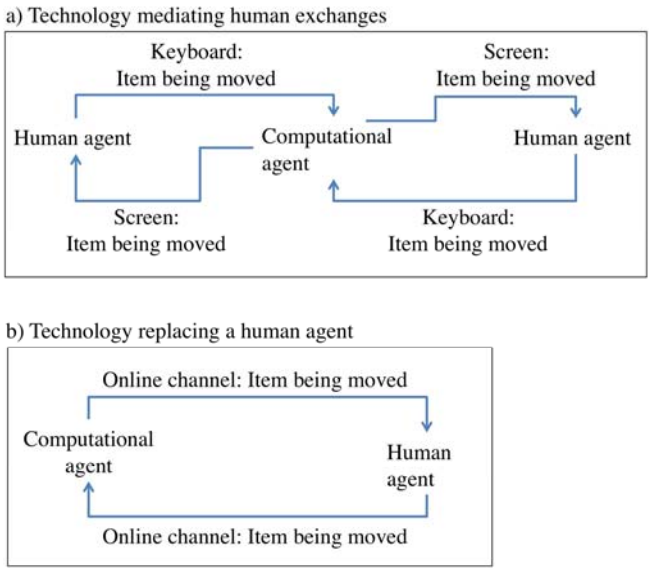

Figure 3. a) Example MCD introducing mediating technology between human exchanges; b) Example MCD substituting technology for a person agent

Our social media features modeling extension can be applied to the resulting MCDs by carrying out the following steps (see Figure 4):

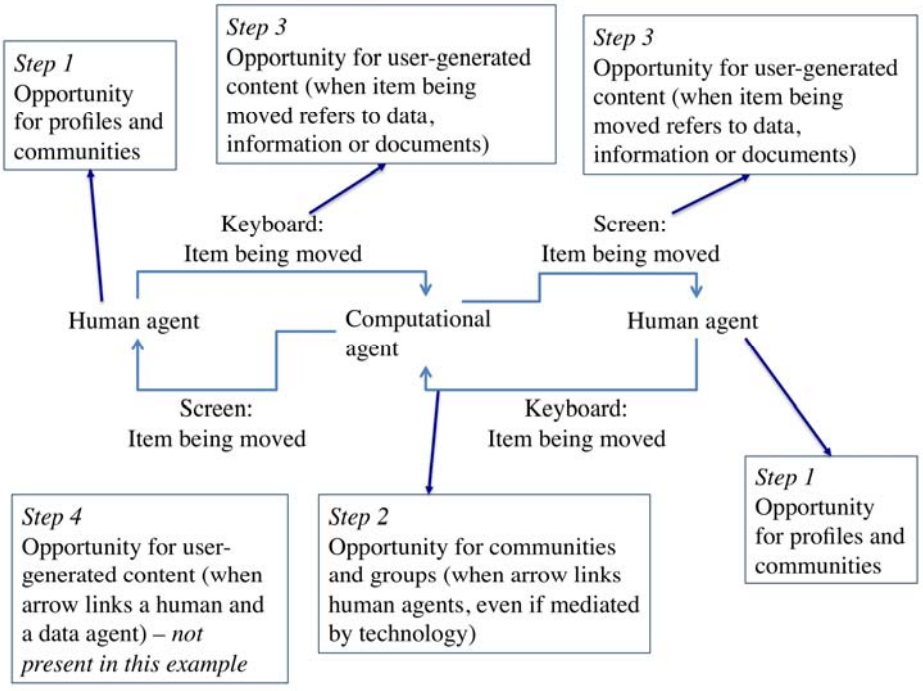

Figure 4. Modeling extension applied to an example MCD

Step 1: Examine each person agent to determine if profiles and community formation can be introduced.

Step 2: For each technology-mediated exchange between two person agents look for opportunities to enable community or group formation. The goal of this step is to find community formation opportunities among groups that are represented by two different entities in the model.

Step 3: For each agent that represents information or data and for each exchange involving data, look for opportunities to introduce user-generated content.

Step 4: Examine each technology-mediated exchange between person and information or data agents. These exchanges represent opportunities to introduce user-generated content.

The social features modeling extension has been described above in terms of MCDs; however, the four-step process can be applied to other models that include representations of people, information, and exchange such as UML Use Case diagrams or Business Process Models. The goal of the modeling extension is to provide a method for finding opportunities to introduce online social features into the information systems of service offerings. Each step examines a different aspect of the model looking for these opportunities. Of course, not all representations examined in each step will result in social features being introduced. The goal is to find all possible opportunities and make decisions about the appropriateness (or not) of introducing social features in each case, taking into account the local context in terms of, for example, issues of privacy and confidentiality.

CASE STUDY

We use a library service case study called the Current Contents (CC) service to illustrate the application of our modeling extension. The CC library service provides current tables of contents (TOCs) of periodicals to its customers (faculty members) and performs photocopying and mailing of articles selected by customers from the tables of contents. A master subscription list maintains the faculty member / periodical subscription information that is used to determine which faculty members receives which TOCs. Technology is currently not used to implement any part of the CC service. Given the apparent opportunity to innovate in the service exchange between the library and faculty members, the CC service is an ideal candidate for the introduction of socially-oriented technology.

In order to understand how the CC service is currently delivered, we conducted face-to-face interviews with eight users of the service. We also interviewed all four library staff with an administrative role in the CC service. We analyzed the interviews to understand the ways in which the CC service is currently used. We will not present details here due to space limitations, but will focus on the media constellation diagrams (MCDs) that were developed from the analysis.

In order to find opportunities to enhance the CC library service, our modeling extension was applied to the media constellation diagrams (MCD) approach as described in the previous section. Following the MCD approach, the products of the CC service were identified first. We identified four products in the CC service: TOCs; articles; subscription list; and, list of periodicals. For each of the products, we identified agents and exchanges used in the creation of the products and modeled them as MCDs. We will concentrate our discussion on the TOCs product due to space restrictions. The TOC product is created when a staff member receives the table of contents on a paper media channel (the physical periodical issue), retrieves a paper version of the master subscription list to see which faculty members are subscribed to which TOCs, photocopies the TOCs and mails the copies to the faculty members according to their subscriptions. Figure 5 (a) shows an MCD that represents the TOC product. Following the method in Flor and Maglio (2004), each agent is analyzed for possible substitution with technology and each exchange is analyzed for opportunities to mediate the exchange with technology. Figure 5 (b) shows the MCD after this analysis. Changes are indicated in red. We call the newly introduced computational agent “IT Service”, yet in reality it might have a more descriptive name such as Online CC System.

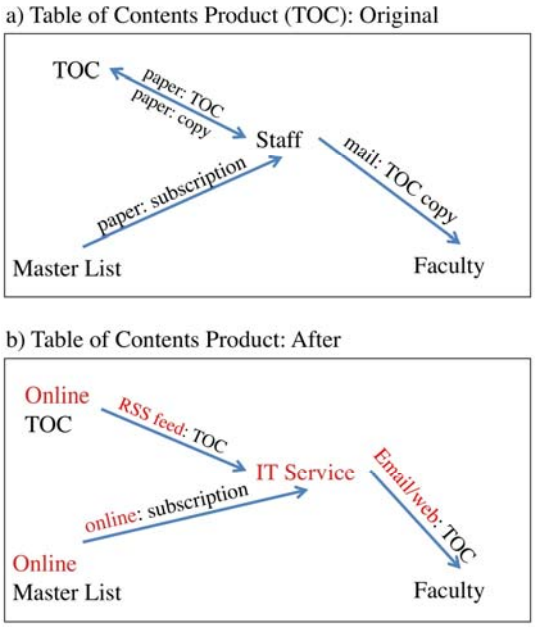

Figure 5. Table of Contents product: (a) before and (b) after identification of technology opportunities.

We now show how our modeling extension can be used to diagnose opportunities to integrate social features in the CC service. The four steps below describe the application of the four steps of our modeling extension to the TOC product resulting from the MCD analysis (in Figure 5 (b)).

Step 1: Examine each person agent: the Faculty agent presents an opportunity to introduce user profiles and community formation.

Step 2: Examine each technology-mediated exchange between two people agents: there are no technology-mediated exchanges between two people agents in the TOC product example; however, in the list of periodicals product, a technology-mediated exchange between the Staff and Faculty agents represented an opportunity to introduce profiles and community formation between faculty and staff.

Step 3: Examine each agent that represents information or data and each exchange involving data: data agents include the online master subscription list and the online TOC; exchanges involving data include the movement of TOCs to the IT Service and to faculty members. These represent opportunities for user-generated content such as enabling faculty members to comment on, tag, or rank TOCs.

Step 4: Examine each technology-mediated exchange between people and information or data: the technology-mediated exchange between faculty and the master subscription list and the exchange between the faculty and the TOC represent opportunities to introduce user-generated content. In this example, this step does not identify any additional opportunities to those already found in Step 3.

Figure 6 shows the MCD representing the TOC product with the addition of the selected online social features identified in the four steps above. Note that, although the master subscription list and the exchange between the faculty members and the master subscription list were identified as opportunities for user-generated content, a designer may not choose to include those opportunities. This illustrates the fact that not all representations examined in each step will result in the introduction of social features.

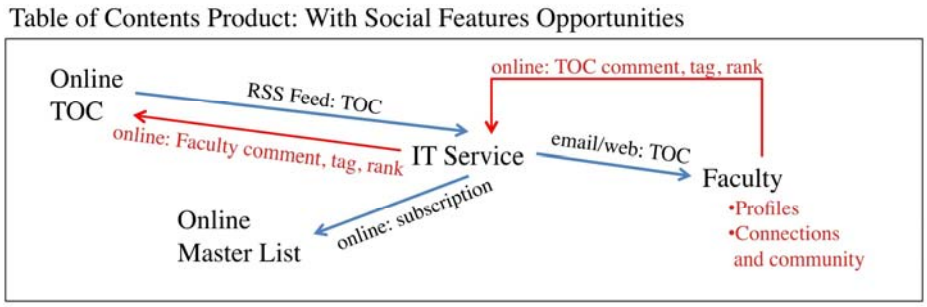

Figure 6. Identification of opportunities to introduce social features in the TOC product

The social features modeling extension process was carried out for each of the MCDs of the other three products that were identified in the CC library service. Based on this exercise, the following social features were selected to enhance the CC service exchange: enable creation of faculty profiles and community formation; enable faculty members to comment on, rank, and tag TOCs; and, enable faculty members to comment on, rank, tag articles.

CONCLUSION

This paper presented a social features framework and proposed a modeling extension that uses that framework to find opportunities to integrate social features in information systems. More specifically, our social features modeling extension is meant to be used a final step in the process of modeling techniques used for systems analysis and design. The extension first identifies representations of people, information (or data) and people-to-people and people-to-data exchanges. These representations are then examined as to their ability to incorporate one or more social features, namely user profiles, articulated connections and user-generated content. By enabling the identification of all places where people and information are represented, and where interactions takes place between them, our modeling extension aims to find enhancements in the service exchange through social interaction. Doing so can foster value cocreating connections among a service provider's customers, which are sources of innovation and competitive advantage in service (Lusch et al., 2007).

The extension was illustrated through its application to extend media constellation diagrams (MCDs) (Flor and Maglio, 2004) in a library service case study. In order to ensure that the proposed socially-oriented technologies would meet the needs of the library service provider and its customers, we compared the results of applying our modeling extension with a table of requirements developed from interviews conducted with staff and faculty members. Three requirements were identified that were not discovered through the application of our modeling extension: one was related to privacy settings; and, two were related to making available additional third-party information. These non-identified requirements show the scope and limitations of the social features modeling extension. While it can extend existing modeling techniques in terms of identifying opportunities to introduce social features, it does not add additional systems analysis and design possibilities in terms of the identification of privacy and confidentiality concerns or process improvement, for example.

Future work on the modeling extension will seek to ground the social features in existing theories related to social dimensions of technology, for example theories of collaboration, of information sharing, of community interaction, or of networking. This may allow the identification of additional key social features and the development of a finer-grained modeling extension. The extension will also be applied to extend other, more commonly used modeling techniques such as UML Use Case Diagrams and Business Process Modeling. This future work will help to refine the extension and ensure its ability to extend a wider range of systems analysis and design modeling techniques relevant for service system design. Also, while our library case study serves to illustrate the application of the modeling extension, it does not address the need to evaluate it. Future work will engage with professionals who design socially-oriented information systems to evaluate the relevance and usability of the modeling extension.

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