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Understanding Tailorable Technology Use through Social Representations Theory

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ABSTRACT

This research utilizes social representations theory to inform the study of tailorable technologies. Specifically, we investigate how social representations theory can be used as a mechanism to understanding technology tailoring-in-use. The work extends earlier tailorable technology design work by looking at the processes by which people tailor technology during use. It also extends social representations theory by applying it in the emerging domain of technologies that are defined in-use by users and not through predetermined goals of a design team. Together these two domains support the notion that technology and interaction constitute an emergent combination that cannot be generalized beyond the local interactions of groups. It is therefore critical for us to have the tools to understand this new order and social representations theory and tailorable technology use proved an excellent platform to consider this challenge.

Keywords

Tailorable Technology, Social Representations Theory, Web 2.0

INTRODUCTION

The emergence of new, user-defined, tailorable technologies is outstripping our ability, as researchers, to explain and theorize about them. As a result, we are at a crossroads. Historically, we had used generalizable theory to inform the study of an increasingly refined set of information systems that were set to accomplish predetermined tasks. We focused on theory to inform the reduction of model error, improve user efficiency, and increase expected outcomes. Researchers controlled the pace by which new technologies were explained and theorized about. It appears that those days are gone, at least with respect to certain technologies.

The emergence of a new class of user-defined and tailored technologies is all around us and they are becoming increasingly recognized in IS research (Kane and Fichman 2009; Ren, Kraut, and Kiesler, 2007; Germonprez, Hovorka, and Collopy 2007). These technologies are built without full understanding of how they are going to be used, in which contexts, and under what conditions. The outcomes associated with tailorable technologies are often unknown and highly emergent. Where we once prescribed the processes of information systems, we are now presented with organic and undetermined systems; a smaller and smaller set of systems we use are predefined from input to output.

The consequent challenge facing researchers is not the reigning in of this technology to fit existing research models but rather the discovery of new research models to explain this new class of technology. Research in this domain has been rightly criticized for its lack of generalizable theory that is applicable to a broad set of technologies (Majchrzak, 2009). This is likely due to the fact that when studying wikis, blogs, and web portals, researchers find themselves in territory where kernel theories are increasingly difficult to apply in a classic input-process-output sense. Research also faces a potential problem when it falls back into a pattern of theory development for generalizable use. It fails to recognize the emergent set of technologies that is increasingly short-lived, user-defined, and contextually unique. As a result, generalization becomes nearly impossible; where one theory works, another may fail, not because it is poorly conceived or suffers from logical inconsistencies, but because its application domain is fundamentally diverse. We appear stuck with a research model that belies the very systems it intends to study.

Tailorable technologies are materially described through affordances, constraints, and disruptions: where one technology is useful, another, similar one may fail; while a technology is bound to a particular context today, it may prove context-independent tomorrow. These technologies' features and functionalities unfold through their collective construction and use in public settings, as opposed to the proportionally small confines of an organization. Therefore, more than other, less flexible classes of technologies, tailorable technologies are ideographic in nature and enacted as they are utilized in different contexts. Consequently, the theoretical frameworks that inform and describe the nature of tailorable technologies must themselves be similarly flexible and ideographic.

To understand tailorable technologies in-use, we turn to the theory of social representations (Moscovici, 1961; Gal & Berente, 2008). In line with the unfolding nature of tailorable technologies, social representations theorists subscribe to the premise that technology users are social actors that are willing and capable of constructing and altering the environment within which they are contextually present. Rather than focusing on reducing the error term of classic IS outcome measures such as satisfaction, performance, or efficiency, social representations theory (SRT) offers a theoretical vocabulary to explore and explain the ongoing enactment of tailorable technologies and their changing uses and significance to their users. It does so by focusing on the collective processes whereby social actors give meaning to their environments by means of ongoing communicative activities which are produced and exchanged through tailorable technologies. In applying SRT to understand tailoring-in-use, we ask one primary question: *How can SRT be used to understand tailoring-in-use?*

In the following sections, we introduce both tailorable technology and SRT and explain how they are used in this paper. We then propose a method to identify the mechanisms by which SRT informs the understanding of tailoring-in-use, relying on collected data to illustrate the method in action. We then provide implications on how the application of SRT to understand tailoring-in-use furthers our understanding of phenomena in both domains.

TAILORABLE TECHNOLOGY

A trend in IS design research has focused on the technical factors in the design of IS (Hevner et al., 2004). This approach places an emphasis on artifacts (Orlikowski and Iacono, 1991, Hevner et al. 2004), and maintains a "view that the things or artifacts of interest in IS are technical systems" (McKay and Marshall 2005 p 2). The success of IS from this perspective is seen as rooted mainly in the ability of system designers to fully incorporate its intended users' requirements and translate them into an elegant and robust design.

Different from this line of thought, other research recognizes that there is more that happens to the artifact after it has been initially designed, primarily when the artifact is used in public (Ciborra, 2002). Some researchers have claimed that the stable

artifact approach to IS research, although valuable across numerous systems, breaks down with tailorable technology, specifically in the secondary design, or use, phase (Hovorka and Germonprez, 2009). The speed with which tailorable systems are identified, interacted with, and then disbanded suggests that the classic design-develop-implement approach is not well-suited for explaining processes of implementation and use of tailorable technologies. As a result, we need to turn to appropriate theories that can help us to understand these technologies. Only in this way can a coherent research stream be built to recognize the complexities associated with tailorable technology.

Previous research by Germonprez et al. (2007) provided a theory of tailorable technology *design*, which built on the works of Heidegger (1927) and Winograd and Flores (1986) according to which users are active participants in the ongoing design of IS. Designers recognize users as intentional actors who are able to tailor a system to suit their changing contexts. However, technology tailoring entails, at the minimum, two phases: one phase occurs before the technology is distributed to users, and another takes place when users discover new technologies, interact with them, and redesign them to fit their changing needs contexts.

Recently, the second phase of *tailoring-in-use* was addressed and shown to be more than just the evident modification of technology components. Germonprez and Zigurs (2009) found that tailoring-in-use can be manifest through combinations of technology and information. In their study of message boards and chat rooms the authors found that the use of these technologies varied in the type of content they carried for various groups. While the technology presentation and interface layers appeared unchanged, tailoring-in-use occurred at the content layer. Therefore, what may appear to be similar uses of technology components across groups are, in fact, variations in tailoring at the content level. This suggests that tailoring is a richer concept that includes modifications both at the presentation and content levels. This conceptualization further separates tailorable technology from more rigid systems like accounting technology and various enterprise systems where use-defined tailoring at the content level is generally unacceptable.

In light of this recent research, we define tailoring-in-use along two dimensions. First, tailoring-in-use occurs at the presentation layer. This includes the design of commonly considered technologies such as web portals and operating systems desktops. Second, tailoring-in-use occurs at the content layer. This layer, while less obvious than the presentation layer, encapsulates users' ability to alter the ways that technology components are used to deliver and exchange information. Our context, Wikipedia, supports tailoring at the content layer. Tailoring at this layer occurs through the technology supporting the *processes* of reading, reflecting, deleting, adding, or modifying content. Any technology is defined by more than just its presentation components. Content is a key component and certain, tailorable technologies support users to modify this layer in the context of use. We do not contend that the presentation and content layers are mutually exclusive from one another. In fact, they are likely intertwined such that the tailoring of one affects the other. We position content layer tailoring as an independent 'style' of tailoring as we inductively determine its characteristics and relationships. In the next section we introduce SRT as a way of understanding content layer tailoring-in-use.

SOCIAL REPRESENTATIONS THEORY

SRT's starting point is that people's relationship with the world is invariably mediated by a layer of socially constructed and continuously-evolving symbols, or representations, which serve to render the world meaningful for social actors. Moscovici (2001) defines social representations as "a system of values, ideas and practices with a twofold action: first, to establish an order which will enable individuals to orient themselves in their material and social world...and secondly to enable communication to take place among the members of a community by providing them with a code for social exchange and a code for...classifying...the various aspects of their world and of their individual and group history" (p.12). This highlights that social representations enable people to make sense of their world and to interact and communicate with other people.

One of the important characteristics of social representations is that they serve to familiarize the unfamiliar (Voelklein & Howarth, 2005). New and unfamiliar events or phenomena that groups encounter in their daily lives can be seen as challenges that need to be symbolically and collectively coped with by group members. At these moments there is a gap between what people know and what they cannot understand. As a result, there is a lack of meaning, a point where the unfamiliar appears, and increased representational work is undertaken to re-establish a sense of familiarity (Moscovici, 2001). Social representations can thus be understood as collective elaborations of unfamiliar phenomena or events (Wagner et al, 1999). Such phenomena or events only become *social* reality by virtue of their representations which the community holds. Only by being represented by a group of people by means of familiar conceptual devices can an event or phenomenon become a *social* object that can be perceived, characterized, compared to other social objects, and used in language and action.

Representations initially arise when new knowledge, ideas, or events are assimilated into pre-existing schemes of thought. For example, previous research has examined how psychoanalysis is assimilated to the religious rite of confession

(Moscovici, 1961), madness is anchored in folk theories of organic illness, AIDS is conceptualized as a divine punishment for homosexuality, and genes are thought to be injected into genetically modified food and to be “contagious” to humans (Bangerter & Heath, 2004).

Anchoring in existing categories places new knowledge in a familiar frame of reference. It facilitates the diffusion of new knowledge in the media and introduces it into everyday discourse and practice. In other words, it transforms it into common sense. Anchoring subsequently enables the creation of an objectified representation for the new knowledge, which may be distinguished from existing categories, and which affords it with a distinct status. For example, in the first days following the terrorist attacks on the world trade center and Washington DC, the events were anchored in previous major terrorist attacks. Only later was a representation called ‘9/11’ objectified which allowed the attacks to be distinguished from other terrorist activities.

Social representations are collective, group-level phenomena that are co-constructed and understood by individuals in their daily interactions (Wagner et al., 1999). Through ongoing inter-personal communicative activities, group members articulate their understandings of their surroundings. Therefore while representations can be expressed in individual cognition and action, they also exist across minds, in the inter-subjective space that is continuously enacted through multiple group members’ talk and action. Accordingly, social groups are the locus of representations. Understood as communicative systems, groups provide a space where representations emerge, circulate, evolve, and eventually die out.

Importantly, representations are constructed across time. A representation is an emergent property of a system that is composed of social actors, the represented artifact, and a project that binds actors through mutual interests, activities, goals, and concerns and which stretches both to the past and to the future. On the one hand, representations are constructed based on constant social interactions and negotiations, where existing social identities, group norms, and cultural traditions play a major role. On the other hand, social representations need to be interpreted in light of a group’s future shared goals, aspirations, and concerns.

Due to the evolving, emergent, and socially constructed nature of social representations, they are a useful conceptual mechanism to inform the understanding of tailoring-in-use. Tailorable technologies are no more guided by the artifacts of the technology than they are by the social representations generated by the people who use them. In combining tailorable technologies and SRT, we are able to identify principles, namely reflective principles that are present during the tailoring process (Germonprez et al., 2007). Next we describe the procedure we followed in applying SRT to study tailorable technologies.

APPLYING SRT TO UNDERSTAND TAILORABLE TECHNOLOGIES – AN ILLUSTRATIVE EXAMPLE

In this paper, we examined content level tailoring of a wiki. We assume the wiki to be a tailorable technology by design and set to explore tailoring-in-use. We used SRT to study a large publically-accessible wiki: Wikipedia. Content in Wikipedia, like in most wikis, is tailored by users to create an information environment representative of a particular domain. To investigate tailoring-in-use, we focused on usage patterns within Wikipedia, namely, on user contributions to a specific article.

To study social representations on Wikipedia we employed WikiDashboard¹, a tool developed by the Palo Alto Research Center aimed at analyzing and displaying social behavior on Wikipedia. The Wikidashboard tool allows researchers to view user contributions for any Wikipedia article as well as broad Wikipedia statistics. Visualization of user contributions is presented as a timeline depicting the previous two years and portraying periods of intense activity for top contributors. We also used toolserver.org, an online tool that extracts edit information for any duration of time for articles on Wikipedia. Using these tools, we were able to trace the history of any article on Wikipedia. These tools were used to identify Wikipedia pages that described significant real-life events or phenomena. We chose Wikipedia pages that described significant events to ensure that there was sufficient activity to identify social representation activity.

We present here one example of Sarah Palin’s Wikipedia page. Palin was the Republican nominee for vice-president in the 2008 US election and has been the focus of intense public attention since her nomination was announced on August 29th 2008. Over the course of her campaign she became increasingly familiar to the general public and was represented in different ways such as “the outsider,” “a moose-hunting power-mom,” and “barracuda.” The shaping of Palin’s narrative is reflected in her Wikipedia page whose continuing evolution constitutes ongoing, content-level tailoring.

We started our analysis by generating several quantitative descriptive statistics to assess the level and type of activity in Palin’s Wikipedia page from the end of June approximately until the end of October (8 weeks before and after the actual

¹ <http://wikidashboard.parc.com>

event of Palin’s nomination) (figure 1). These statistics indicated that prior to the week of August 23rd there was some minor activity evident in the low number of weekly users and edits. The number of weekly users and edits (both major and minor edits) started to rise in the days before Palin’s nomination was officially announced, indicating moderately increased representational work, and spiked after the official nomination on August 29th. Activity gradually decreased over the following 2 months.

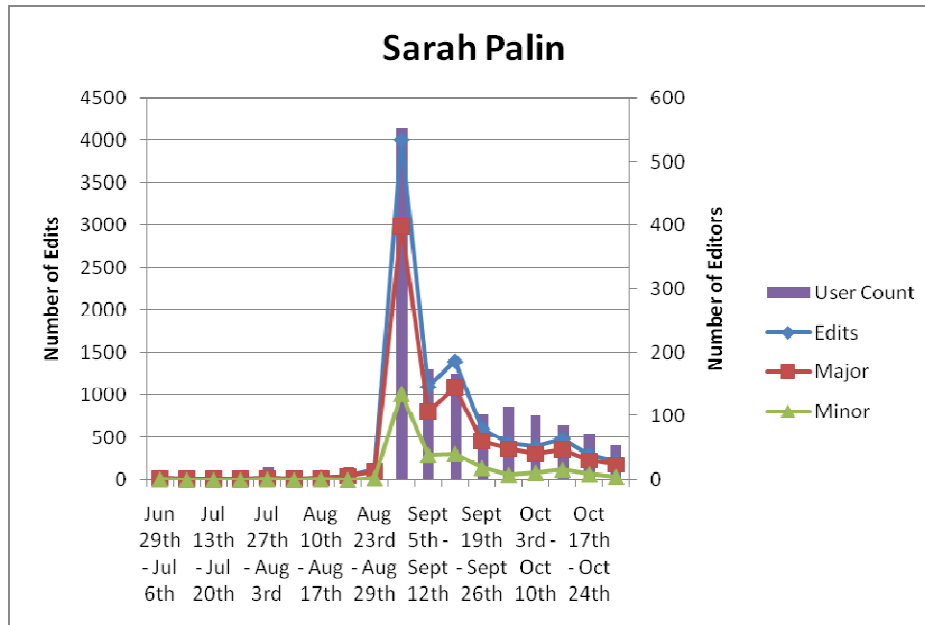


Figure 1: Activity Surrounding Sarah Palin Wikipedia Page

We used the quantitative evaluation to identify periods of high activity, which we then focused on in our qualitative analysis. We entered the discussion forum in Wikipedia to examine the public discourse around one ongoing issue that was discussed in Palin’s page rather than the entire article. This was necessary as the archive of discussion around the entire domain of Palin was well over 10,000 lines of text, while the scope of single issues was more manageable. For this paper, we focused on the social representation of the case known as ‘The Bridge to Nowhere’ during a period of high activity (>500 edits/week)

To observe content-level tailoring and identify representational activity, we coded the discourse in the Bridge to Nowhere sub-domain. In our coding we distinguished among 4 representational activities (table 1), which are temporally ordered: representations first emerge when new events or phenomena are named and situated in existing schemes or systems of categories (anchoring); next, the content or genre of the representation is negotiated among social actors in an effort to define and characterize the new event or phenomenon (defense and adaptation); the maturation of the negotiation process results in the emergence of an objectified representation which distinctly describes the new event or phenomenon and which enables it to be integrated into the communal stock of commonsense knowledge (objectification).

Components		Definitions
Anchoring		Communication aimed at naming new events or phenomena by placing them in existing categories or frames of reference
Negotiation	Defense	Discursive or argumentative communication aimed at defending elements of a social representation
	Adaptation	Communication aimed at reconceptualizing or reinterpreting elements of a social representation
Objectification		Communication indicating the concretizing of a new descriptor or representation which depicts the new event or phenomena

Table 1: Coded Social Representation Components

To demonstrate the usefulness of the coding framework, we applied it to the sub-domain of the Bridge to Nowhere in Sarah Palin’s Wikipedia page. Both authors examined the Wikipedia dialogue in this sub-domain. We focused on an intense two-day time period of discussion regarding the topic. During this time, there were approximately 225 messages examined. An example of the application of the coding framework to analyze the messages on the aforementioned sequence of events is presented below and in table 2:

1. For 10 days, back when we had pro-Palin and anti-Palin people on the site, there were pushes and shoves but basically compromises throughout the site. Now that virtually all the wikieditors are actively pushing pro-Palin point of view, the article has gone, IMHO, from B-class to D-class. It's true I've almost entirely been focused on the Bridges to Nowhere. I carefully researched more than 100 articles and explained each and every change on the talk page. For this I have received all manner of criticism.
 - GP (talk) 19:07, 19 September 2008 (UTC)
2. GP, outlasting others does not make you right -- nor does iterating archived material. We have finally gotten the section stable, and as close to NPOV as possible. To use your old version would cause another three or four hundred posts here. There comes a time to let it rest.
 - C (talk) 19:19, 19 September 2008 (UTC)
3. I strongly agree that "outlasting others" does not make you right. Which is why the mere fact that you have outlasted me, C, does not make you right. Care to address any of my points above OTHER than the Wasilla-Anchorage connection? Or do you agree with them?
 - GP (talk) 19:49, 19 September 2008 (UTC)
4. I note your (GP) claim that I am outlasting you. I would rather be known as one who uses fewer words, as that would not be construable as an attack. The tollroadnews.com cite is clear, and succinct, and agrees with the other factual cites around. I would trust, indeed, that this would end the desire to revert to a totally non-consensus status again. Thanks!
 - C (talk) 20:51, 19 September 2008 (UTC)
5. GP , Point 1. I think you're right. Point 4. By all means fix bad grammar. Points 2,3,5,6,7,8. This kind of detail really belongs in the sub article. Point 9. This doesn't seem true to me.
 - A (talk) 20:28, 19 September 2008 (UTC)
6. Thank you, A. Based on your support, I'll correct 1 and 4. Point 9 was already fixed by HG (which may be why it doesn't seem true anymore.)
 - GP (talk) 20:51, 19 September 2008 (UTC)

Communication Act	Member	SRT Component
1	GP	Defense
2	C	Defense
3	GP	Defense
4	C	Defense
5	A	Adaptation
6	GP	Adaptation

Table 2: Sample Coding Sheet

In this example, the first 4 messages reflect the intensity of the debate around some of the contested issues and illustrate how two of the editors dig their heels in to defend their respective positions. Accordingly, these messages were coded as ‘defense’ of a position that a member had taken surrounding points of view and data sources on the Bridge to Nowhere. Messages 5 and 6 on the other hand demonstrate how comments made by one editor (A) induce another (GP) to change content on the page thereby altering the presented representation. Therefore these messages were coded as ‘adaptation.’

We have intentionally chosen to keep the method as clear and concise as possible. What is presented is, in essence, a theoretically informed content analysis. The value of this method is that it provides the richest understanding of content-level tailoring to date, an important step in theoretically informing this emerging class of technologies. In the next section we discuss the implications of this research and how it can be further extended to support a richer picture of tailoring-in-use.

DISCUSSION AND CONCLUSIONS

In this work we addressed a call by Elizabeth Davidson to view blogs as an emerging technology in light of SRT (Vaast et al., 2006). In her paper, Davidson follows a content-level flow of information, suggesting how SRT plays an important role in understanding how the representations emerge on a blog. This is precisely the path followed in this paper; however, we extend her call by introducing a tractable method by which SRT can be applied during tailoring-in-use.

Applying SRT in the context of Wikipedia has demonstrated the theory’s capacity to inform the understanding of tailorable technologies, specifically the reflective components (Germonprez et al., 2007) We have argued that the applicability of existing IS theories to produce meaningful explanations of how tailorable technologies function has to be reconsidered. Established theories have often addressed technologies that are intentionally designed to be used in certain ways in order to achieve specific goals. The application of theories in this context aims to understand processes of technology design, implementation, and adoption in order to make them more efficient and produce effective outcomes for the adopting organizations. Tailorable technologies, on the other hand, are inherently unstructured and can be used in a variety of ways to serve multiple purposes, none of which is *a priori* defined by system designers. Their significance is rooted in their capacity to facilitate interaction and induce participation from a variety of users rather than in fulfilling predetermined aims. In this light, SRT is well suited to account for the manner in which interactions unfold in tailorable environments and explain how social knowledge is collectively created, shaped, aggregated, and disseminated through tailorable technologies. SRT also allows us to reconsider the notion of theory generalizability in this domain by allowing us to recognize recurring patterns of tailoring across recurring contexts. Such recognition could enable researchers to recommend theory of the tailoring process.

Our proposed coding framework provides a refined and theoretically informed mechanism with which researchers can discern various types of communicative activities, their interrelationships, and how they combine to create social representations. The framework demonstrates the usefulness of SRT and its capacity to yield rich and nuanced explanations of tailoring-in-use. While we applied the SRT-informed framework to only a single limited example in this paper, we believe that it constitutes a robust tool that can be used to examine a variety of tailorable environments in different contexts. Doing so can help researchers to systematically investigate patterns of communicative activities among social actors, different uses of tailorable technologies, and ways of creating and changing collective representations of different events and phenomena. Future considerations of the framework may include a temporal dimension beyond the mere identification of SRT components shown here. The framework could be used to investigate the relationships between anchoring and negotiation (defense and adaptation) in the formation of objectified social representations that can be later consumed for future events to be anchored in. Such considerations would ‘close the loop’ on the coding method, providing a complete and coherent mechanism that accommodates the frequency *and* relationship of the SRT components, an important aspect of SRT (Pawlowski et al., 2007).

It should be noted that whereas the framework provided by SRT can help researchers to identify different patterns and forms of tailoring-in-use, it does not give us a mechanism for defining better or worse tailoring. In other words, the theory and framework do not imply any evaluative stance toward one form of tailoring or another. SRT is aimed to unpack and explain the social process whereby things and events in the world acquire their meaning and how these meanings become part of the common sense stock of knowledge that is shared by community members.

Using SRT to understand tailorable technology use has enabled us to understand how social knowledge was socially reshaped within the technological platform of Wikipedia. However, we believe that the applicability of SRT extends beyond the confines of this specific technology. Other user-defined tailorable technologies can be similarly studied by using the theory. For instance, patterns of user interaction and knowledge generation can be examined in chat rooms, online forums, social networking tools, and other wikis.

This research has two key implications. First, the study provides a theoretical base from which to investigate how tailorable technologies are used in practice. We illustrate that tailoring does occur in the context of the interactions between users and information, not only at the level of technology artifacts (Germonprez and Zigurs, 2009). This is an important step in supporting research into this emerging class of technologies as a whole.

Second, because this study provided a look into tailorable technology use through the lens of SRT it allows us to treat tailorable technologies as processes rather than artifacts. This then enables researchers to understand how people use technologies in emergent ways. It allowed us to observe the impact that events had on representative knowledge inside a tailorable technology. It provides a theory base for tailorable technology but equally important, it expands an understanding of SRT by illustrating representative knowledge creation in action. We argue that the contributions to both tailoring and SRT are two critical considerations as we move forward in the theorizing of new and emerging technologies.

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