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Emphasizing Social Features in Information Portals: Effects on New Member Engagement

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Abstract

Many information portals are adding social features with hopes of enhancing the overall user experience. Invitations to join and welcome pages that highlight these social features are expected to encourage use and participation. While this approach is widespread and seems plausible, the effect of providing and highlighting social features remains to be tested. We studied the effects of emphasizing social features on users' response to invitations, their decisions to join, their willingness to provide profile information, and their engagement with the portal's social features. The results of a quasi-experiment found no significant effect of social emphasis in invitations on receivers' responsiveness. However, users receiving invitations highlighting social benefits were less likely to join the portal and provide profile information. Social emphasis in the initial welcome page for the site also was found to have a significant effect on whether individuals joined the portal, how much profile information they provided and shared, and how much they engaged with social features on the site. Unexpectedly, users who were welcomed in a social manner were less likely to join and provided less profile information; they also were less likely to engage with social features of the portal. This suggests that even in online contexts where social activity is an increasingly common feature, highlighting the presence of social features may not always be the optimal presentation strategy.

Introduction

Information portals such as library websites, digital libraries, and news sites are increasingly incorporating social features such as user profiles, peer commenting, and social networking. For libraries, this often involves adding social features to catalogs. An Online Computer Library Center report (Calhoun & Cellentani, 2009) found that users have indicated the need for user-generated content and recommendations in library portals. Nonlibrary portals also are adding social features to their websites. Holahan (2007) reported that more than 100,000 sites have added social networking tools. Consultants increasingly recommend that

developers deploy social technologies to facilitate user involvement and engagement (IBM Institute for Business Value, 2011).

Social features allow users to connect to one another and actively create public identities for themselves. Practitioners and authors of trade articles often have argued that providing social features supports a richer user experience that combines information resources and social activities (Abai, 2009). Researchers also have begun to consider how individuals respond to online social networking technologies that allow them to create profiles, document social connections, and share information with others (for a review, see Boyd & Ellison, 2008). From this work, it is clear that the presence of social features can affect how people interact with information resources. While social features on portals can be desirable and popular, some commentators also have suggested that social features may turn away users due to social networking fatigue (Holahan, 2007; Lenhart, Madden, Smith, & Macgill, 2007).

As social features are added to information portals, it also is common to highlight their presence in user recruiting messages and introductory materials. The impact of highlighting social features on new user enrollment and subsequent behavior will be of interest to designers and managers of information portals. The growing emphasis on social features has suggested that information portal creators and administrators expect that adding and highlighting social features will be helpful for increasing user enrollment and motivating participation (Abai, 2009). However, while there are a growing number of studies of behavior in dedicated social networking systems (Boyd & Ellison, 2007), researchers have not investigated how highlighting social aspects of an information portal specifically impacts user behavior. Thus, the assumption that adding and highlighting social features will only help attract and engage new users is tacit, widespread, and still untested.

Our goal is to empirically examine if this tacit, widespread, and untested assumption regarding the highlighting of social features when introducing an information portal to new and potential users can be confirmed. Specifically, we tested hypotheses about how frequently used ways of highlighting social aspects of an information portal affect new users' choices and behavior. To do this, we conducted a quasi-experimental field study of an information portal for Dental Informatics researchers.[1]

Research Questions and Hypotheses

Websites often emphasize the presence of social features when they present themselves to new users. Two common methods of highlighting social aspects are to mention them in initial e-mail invitations sent to potential users and in welcome pages seen by new users when they first encounter the site.

Many websites, including information portals, recruit new users through prepared, but customizable, invitations sent usually through e-mail. Whether they are sent in large batches or one-to-one by current users, invitations are often the first exposure that individuals have to a new site. As such, these invitations provide potential users with important signals that the recipients use to form expectations about the benefits and costs of engaging the site. Hence, it is likely that highlighting social aspects of a portal in an invitation message will affect prospective users' subsequent interactions with the portal. These interactions might include their response to the invitation, their decision to join the portal, their willingness to

[1]An earlier version of this article was presented at the 2010American Society for Information Science and Technology Conference and was published in its proceedings.

provide information about themselves if they do join the portal as an identified user, and their initial engagement with the portal.

Another place where portals advertise and emphasize social and other features are their "welcome pages." A welcome page greets prospective members who reach a portal through invitations or other means. Just as with invitations, it is expected that the nature of the material presented in a portal's welcome page will impact new users' decisions to join and their willingness to provide information about themselves as well as affect their initial engagement with the portal.

In this article, we will consider the following general research question: How does highlighting the social aspects and benefits of an information portal affect prospective and new users' decisions to respond, join, and share information about themselves as well as affect their initial engagement with the portal? In particular,

> **RQ1:** How does highlighting the social aspects and benefits of an information portal in *an initial invitation message* affect prospective and new users' decision to respond, join, and share information about themselves as well as affect their initial engagement with the portal?
>
> **RQ2:** How does highlighting the social aspects and benefits of an information portal in *a welcome page* affect prospective and new users' decisions to join and share information about themselves as well as affect their initial engagement with the portal?

Drawing from previous studies of social groups, online communities, and social networking sites and given the widespread tacit assumption prevailing in the area, we posit that the following hypotheses could be plausible:

> **H1:** Emphasizing social aspects of a portal in an invitation will increase the likelihood of a user responding to the invitation, joining the site, sharing information, and initially engaging with the portal.

People join online groups and social networking sites for a variety of informational and social reasons (Butler, Sproull, Keisler, & Kraut, 2007; Ridings & Gefen, 2004; Spallek et al., 2008). Providing signals about the types of activities, features, and resources available in a social setting affects formation of potential participants' expectations (Brinthaupt, Moreland, & Levine, 1991). These expectations play an important role in individuals' decisions to engage a group or a site. The contents of early presentations about a portal are likely to affect participation choices that individuals make later in the process of engaging a site.

Emphasizing the informational benefits that a portal provides might increase the likelihood of responding for those who are interested in information resources. Similarly, those who are interested in a platform for relationship formation, self-presentation, and interaction are more likely to respond if social features are highlighted. Moreover, some commentators (e.g., Miller, 2005) have argued that support for these types of social activities also results in better quality information, richer user experiences, and the opportunity to ask questions and receive clarification of issues related to the information resources. Hence, it is possible that even for individuals seeking informational outcomes, highlighting social features will signal that a portal is beneficial.

In particular, responding to an invitation is an indication of an individual's interest in engaging a portal. In most cases, gaining full access to the information resources and social facilities of a site requires a more explicit action of joining, beyond just responding to the invitation. Just as intention to use a system and actual use are related, but distinct, choices

(Lin & Lu, 2000), so too are responding to an invitation and joining the associated portal. Therefore, it is proposed that:

> **H1a:** Emphasizing social aspects of a site in an invitation message will increase the likelihood of a prospective user responding to the invitation.

However, the emphasis on social aspects in an invitation creates impressions that last beyond the initial act of responding to that invitation and will have an impact on an individuals' ultimate joining decisions. Therefore, it also is expected that:

> **H1b:** Emphasizing social aspects of a site in an invitation message will increase the likelihood of a prospective user joining the site.

As part of using websites, users often are asked for basic data about themselves such as e-mail addresses, first and last names, and other contact information. On traditional e-commerce sites and information portals, it has been assumed that the collected profile data will be securely stored and used only for provision of related services for the individual user. In these contexts, it is has been found that users are more willing to provide personal information if they anticipate receiving benefits such as increased convenience or easier access (Hann, Hui, Lee & Png, 2007; Norberg, Horne, & Home, 2007). However, with the addition of social features to a website or a portal, user information takes on a new function. Self-disclosed personal information is the primary basis for the user profiles that identify and characterize individuals for one another (Boyd & Ellison, 2007). In portals that have social features, user profiles are the basis for formation of interpersonal trust, relationship creation, reputation formation, and identification of potential interaction partners. User profile information contributes in a variety of ways to the benefits that the individual can expect to receive from participating in the socially enabled portal. Therefore, it is expected that highlighting benefits associated with a socially enabled portal also will increase individual's willingness to provide profile information.

> **H1c:** Emphasizing social benefits of a site in an invitation message will increase the amount of profile information a prospective user will be willing to provide.

As mentioned earlier, social features are often emphasized on portals with the assumption that users will join the portals with the intent to use social features. People provide and share profile information with the ultimate hope that this information will be useful when people interact with the social features of a portal. Therefore, it is expected that:

> **H1d:** Emphasizing social benefits of a site in an invitation message will increase the users' initial engagement with social features in the portal.

Overall, these arguments and prevailing assumptions in portal design suggest that highlighting the social aspects of an information portal in an invitation message will positively impact individuals'responsiveness to the invitation, decisions to join the portal, and willingness to provide information for a personal profile as well as their initial engagement with the social features of the portal. These assumptions have not been tested empirically, and their veracity remains to be seen.

> **H2:** Emphasizing social aspects of a portal in a welcome page will increase the likelihood of a user joining the site and sharing information.

How new users are welcomed to a site plays a significant role in their future engagement and behavior. Studies of online communities have found that receiving a timely, inclusive response from a prominent community member increases the likelihood that an individual will return as an active contributor (Arguello, Butler, Joyce, Kraut, Ling & Ross, 2006). Similarly, it has been argued that the creation of timely, friendly welcoming messages for new editors in Wikipedia contributes to their ongoing engagement with the site and the

associated community (Choi, Alexander, Kraut, & Levine, 2010). This work has implied that how new users are welcomed can shape how, or if, they participate in the future.

Social aspects of a portal also may be highlighted in welcome pages. The welcome pages can directly mention social activities and benefits or it can indirectly highlight the social features of a site by including personalized messages from a particular person such as a site administrator or a current user. Whether direct or indirect, emphasis on the social aspects of a portal is expected to contribute to both the formation and confirmation of the social benefits of engaging the site. As a result, it is predicted that:

> **H2a:** Emphasizing social aspects of a portal in a welcome page will increase the likelihood of a user joining the site.

A portal's welcome page is part of one of the first interactions that a new user has with that site. As such, the contents and form of a welcome page serves to establish users' expectations for both the site and for their own behavior. On one hand, the welcome message can reinforce individuals' developing beliefs about the benefits they can expect to receive from continued engagement with a group or community. In doing so, welcome messages can increase users' willingness to provide and share requested information (Hann, Hui, Lee & Png, 2007). A welcome message that includes self-disclosure by a current member or a site administrator also may provide a model for future behavior. Thus, whether emphasized in a direct description or indirectly through displayed behavior of the author, highlighting social aspects of a portal are expected to increase individual's willingness to provide profile information. Thus, we predict that:

> **H2b:** Emphasizing social aspects of a portal in a welcome page will increase the amount of profile information that a user is willing to provide.

In addition, it is also expected that a social emphasis in a welcome message will lead to more new users interacting and engaging with social features in the short-term. Again, longer term usage of social features may not be predicted by welcome type (see H1d).

Together, these arguments, drawn from prior research as well as from prevailing assumptions in portal design, suggest that it is plausible that welcome pages highlighting a portal's social aspects will have a positive impact on individuals' willingness to join, provide profile information, and initially engage with social features on the portal. Again, these arguments, though plausible, need to be examined empirically.

> **H3:** Emphasizing social aspects of a portal in both an invitation and a welcome page will increase the impact on users' willingness to join, share information, and initially engage with the social features.

Responding to an invitation and joining, sharing information, and interacting with social features are all part of a cumulative process. This process of portal engagement is similar to the process by which individuals joining groups are socialized (Moreland & Levine, 1982).At each point of interaction with the site, individuals' expectations of the benefits and costs associated with continued participation are modified. When prior expectations are confirmed, their impact on behavior is magnified (Bhattacherjee, 2001). Conversely, when prior expectations are disconfirmed or contradicted, individuals' certainty is reduced, potentially reducing confidence in their assessment of the site, the system, or the group as well as their willingness to continue participation.

Thus, from the related literature and prevailing portal design assumptions, it is plausible that:

H3a: Emphasizing social aspects of a portal in both an invitation and a welcome page will increase the impact on users' willingness to join.

H3b: Emphasizing social aspects of a portal in both an invitation and a welcome page will increase the impact on users' willingness to share profile information.

H3c: Emphasizing social aspects of a portal in both an invitation and a welcome page will increase the impact on users' initial engagement with social features.

Methods

To test the proposed hypotheses, a quasi-experimental field study was conducted. The information portal used in the study was the Dental Informatics Portal (http://www.dentalinformatics.com/). The website has information resources for dental informatics and the dental technology field as well as social features to allow users to connect with others to share ideas, problems, and research opportunities (see Figure 1). The community is managed by the University of Pittsburgh School of Dental Medicine. It includes archives of publications, a member and project directory, informatics links, and a forum. The presence of both information and social features in the website as well as the initiation of a drive from the portal creators to find more users provided the opportunity to differentially highlight these aspects and measure the hypotheses' effects.

Participants for this study were prospective users of the Dental Informatics Online Community (DIOC) website. E-mail invitations were sent in November and December 2007 to a sample of individuals drawn from two groups:

- Researchers with *known or expressed* interest in Dental Informatics (DI): These included authors of 620 publications related to dental informatics, authors of proceedings of the American Dental Education Association Technofair (2004–2006), Dental Informatics Conference (2003) attendees, and members of “working groups” on DI from the Conference of the American Medical Informatics Association and the International Medical Informatics Association as well as the attendees of dental research conferences (American Association for Dental Research, American Dental Education Association), bioinformatics researchers, and other individuals who had previously expressed interest in DI.
- Researchers with *possible* interest in DI: This group included medical librarians, funded dental researchers, and funded medical informatics researchers.

The target population of 11,424 individuals was created from these two groups to include individuals with a range of previously expressed interest in and level of engagement with the field of DI. The total number of participants in the quasi-experiment was 11,399 since 25 participants' data had missing information (see Table 1 for invitation numbers, response rates, and joining rates for the two groups of invited participants).

Since the DI community was a new community and therefore not established, we had access to only 1,194 people with known or expressed interest in the topic. Ideally, we would have liked to balance the number of people in both groups (those with expressed interest and those with potential interest). However, for people with potential interest, we anticipated a low response rate, which is typical for e-mail invitations, and thus sent the invitation to as many people with potential interest (n=10,205) as possible to increase the likelihood of obtaining a sufficient number of people to join and interact with the portal and the quasi-experiment.

Conditions

The study design involved a between-subjects manipulation of invitation message and welcome page. The invitation for participation was sent via e-mail with the contents customized to highlight different aspects of the DI portal. Invitation messages were one of the following three types: informational, social, or combined. Informational invitation messages (n=3,799) highlighted the informational resources of the website (learning center and publication archives). Social invitation messages (n=3,800) highlighted the social features of the website (e.g., people directory) and the possibilities of engagement with other users. Combined invitation messages (n=3,800) highlighted both informational and social capabilities of the website (in that order). The detailed text of the invitation messages can be seen in Appendix A.

Participants who responded to the invitation (n=532, response rate=~4.7%) were presented with a welcome page of one of the following three types: nonsocial, social-admin, or social-member. A nonsocial welcome page provided the participants (n=177) with a short description of the site, a form, and a request to provide profile information and join the community. A social-admin welcome page involved a site administrator/project manager in the portal welcoming participants (n=182). The name and a thumbnail profile picture of the administrator were presented along with a short welcome paragraph. This paragraph was followed by the data entry form and a request to provide profile information and join the community. A social-member welcome page involved an existing member welcoming participants (n=173). The name and a thumbnail profile picture of the individual were presented along with a short welcome paragraph describing the individual's use of the site. This was followed by the data entry form and a request to provide profile information and join the community. Figures B1, B2, and B3 in Appendix B show the details of the invitations for all three conditions.

Measure Construction

Dependent variables relating to participants' responses to various conditions were used to test the hypotheses. “Responded” was a binary variable used to measure if a participant clicked on the e-mail invitation. Its value was “1” if the invitation link was clicked and the participant reached the site's welcome page, and “0” if the invitation recipient did not click on the personalized link in the e-mail. “Joined” was a binary variable used to measure if the participant eventually joined the portal. Its value was “1” if the participant provided the required information in the sign-up form and clicked the “Save Profile” button, and “0” if the participant did not complete the initial sign-up. The required information included last name, first name, and e-mail address.

“Profile Information Provided” was a count of the number of profile elements provided by the participant during sign-up. These including required information (name, e-mail) as well as optional element such as a photograph, title, position, phone number, and address (street, city, state, postal code, country).

“Photo Provided” was a binary variable used to measure if a profile picture was uploaded. Its value was “1” if the participant provided and shared a profile picture, and “0” if the participant did not upload and share a profile picture. Participants were given the choice of uploading and sharing a profile picture in the process of joining the portal. A photograph is arguably the element of most social importance of all the profile elements provided (name, work information, and address). A decision to share a profile picture also implies a willingness to engage socially with other members (Walther, 1996).

“Initial Social Feature Engagement” was a binary variable that measured use of social features in the portal in the short-term. Its value was “1” if the participants engaged with any

social features in the portal, and “0” if the participant never engaged with social features of the website. The participants were asked to create their own profile pages with information regarding DI projects in which they were interested. Participants also were informed that they could browse and visit project profile pages created by other participants. Information regarding project profile visits was logged and used to create counts for visits by each participant. Information regarding project page visits for each participant was collected for the first month and used to ascertain how much a participant initially engaged with a social feature after joining the portal.

“Long-Term Social Feature Engagement” was a count of the number of times a participant used social features on the portal. The following events were counted toward social feature use: member directory search, photo modification, updating interest information, updating other profile information, and project directory search. Usage logs from the start of the quasi-experiment in 2007 to April 2010 were utilized to measure long-term social feature engagement.

Of the 11,399 participants invited, the number of individuals responding (n=532) and joining (n=257) was sufficient to allow for analysis of the effect of social highlighting on responding, joining, and providing/sharing profile information.

Preliminary analysis indicated that there was no significant difference between the social invitation and the combined (informational+social) invitation conditions with respect to the dependent variables. To analyze the effect of social highlighting in the invitation, the invitation conditions were reduced to the following indicator of *invitation types*: A nonsocial invitation highlighted the informational resources of the website (learning center and publication archives) for the participants (n=3,799). A social invitation highlighted the social features of the website (e.g., people directory) and the possibilities of engagement with other community members (with or without mentioning the informational benefits) for the participants (n=7,600).

Similarly, preliminary analysis found no significant difference between the social-admin and social-member conditions. To analyze the effect of social highlighting, the welcome conditions also were reduced to the following indicator of *welcome types*: **A** nonsocial welcome page provided participants (n=177) with a form and requested them to enter profile information and join the community. A social welcome page involved an identified person (either a project manager or a current participant) welcoming the participants (n=355). The name and a thumbnail profile picture of the individual were presented along with a short welcome paragraph.

In addition, interest in DI is a variable likely to affect people's decisions to respond to invitations, join, provide information about themselves, and interact with the portal. As might be expected, individuals with different levels of previously expressed interest in DI responded and joined at different rates (see Table 1). In general, participants with a realized or an expressed interest in DI were more likely engage with the portal. In contrast, individuals drawn from general professional organizations' membership directories with only potential interest in DI were less likely to respond to the invitation. To analyze the effects of invitation and welcome, we created a binary variable to control for “interest.” Its value was “1” if the participant had a known or an expressed interest in DI, and “0” if the participant had only a potential interest in DI.

These measures of the dependent variables (responded, joined, profile information provided, and profile information shared) and the independent variables (interest, invitation type, and welcome type) were the basis for testing the proposed hypotheses.

Analysis and Results

The overall response rate for the study was 4.66%, with 48.3% of those who responded ultimately joining the portal.A descriptive summary for measures for each of the conditions is provided in Table 2.

Analysis of variance (ANOVA) was used to compare outcomes for various manipulations (social/nonsocial, invitation, and welcome) as well as controls (interest) and to test the proposed hypotheses.

Two-way ANOVAs (Table 3) found no significant effect of invitation type on likelihood of initial response (i.e., H1a was not supported). Level of prior interest in DI had a significant effect on response. Those with a known or an expressed interest in DI were more likely ($p<0.001$) to respond to an e-mail invitation to join the portal. No significant interaction between level of prior interest in DI and invitation type was observed on participant response to invitations.

Three-way ANOVAs (Table 4) found a marginal main effect for invitation emphasis ($p<0.1$) on joining, with a smaller percentage of participants who received a social invitation ultimately joining the site (i.e., H1b was not supported). A significant main effect for welcome type on joining was found ($p<0.05$); however, participants who saw a welcome message that emphasized the social aspects of the site by presenting a message from an identified individual were less likely to join (i.e., H2a was not supported). Joining was not affected by interest in DI or by interaction effects (i.e., H3a was not supported) between the three variables (invitation, welcome, and interest).

Three-way ANOVAs (Table 5) found no main effect for invitation type, welcome type, and interest in DI on the number of profile elements that users chose to provide (i.e., H1c and H2b were not supported); however, there was a significant interaction effect ($p<0.05$) between welcome type and interest in DI on the number of profile elements provided by participants. For those interested in DI, a social welcome reduced the number of profile elements provided while the inverse was observed for those with potential interest in the portal. Figure 2 shows the interaction effect between welcome type and interest.

Three-way ANOVAs (Table 6) found no main effect for invitation type, welcome type, and interest in DI on whether participants chose to upload a photograph; however, there was a significant Invitation×Welcome Types ($p<0.05$) interaction, as predicted by H3b. Participants welcomed in a social manner were more likely to upload a photograph if they were invited with a social emphasis. The inverse was observed for those invited without emphasizing social aspects in the invitation. Figure 3 shows the interaction effect between invitation and welcome type.

Three-way ANOVAs (Table 7) showed a significant main effect ($p<0.05$) for invitation type on initial engagement with social feature (project page visit). Participants receiving a social invitation were more likely to initially use provided social features (i.e., H1d was supported). A marginal main effect for interest ($p<0.1$) also was found. Participants interested in DI were more likely to engage with project pages created by others. There were no interaction effects of interest, invitation, and welcome on initial engagement (i.e., H3c was not supported).

Three-way ANOVAs (Table 8) showed a significant main effect ($p<0.05$) for invitation type on long-term engagement with social feature (project page visit). In the long-term, participants receiving a social invitation were less likely to use provided social features.

Discussion

Individual profiles, user reviews, and explicit social networks are being added to many websites and information portals (Holahan, 2007). The addition of these capabilities creates the opportunity for portal designers to highlight social features to entice members to join (Abai, 2009). In this article, we examined how emphasizing social aspects of an information portal in invitation messages and welcome pages affects users' decisions to respond, join, provide information about themselves, and engage with a site's social features.

While it was hypothesized that emphasizing social features in invitation messages sent to potential users might increase responsiveness, this was not supported. The significant effect of interest on responsiveness and the marginal support for a relationship between invitation type and joining suggest that the impact of emphasizing social features is contingent on higher level factors such as overall interest in the topic or prior experience with the community of users who are likely to be associated with the described portal. While this result might be interpreted as implying that highlighting social features in an invitation has little impact on portal user behavior, the presence of a significant effect of invitation type on both short- and long-term social feature use underscores the need to carefully design user-invitation strategies. While social emphasis in invitations increased the possibility of initially engaging with social features of the portal, over a longer term, this emphasis resulted in lower use of social features. As predicted, social invitations resulted in increased engagement with social features in the short-term. However, instead of having no effect over the long-term, social invitations were associated with reduced usage over time. This is contrary to what would be expected if social features provided a richer, more engaging experience (Abai, 2009; Mansfield, Ward, McEwan, Siqueira, & Wilkinson, 2001). One possible explanation is that people initially joined the site to utilize social features, but were somehow turned off by them over time. This could be due to either the design of the features or to higher expectations of utility by those members whose invitations emphasized these features. Future studies should focus on replicating these results and examining potential explanations for the pattern of reduced long-term use.

The ANOVA results also provide support for the idea that highlighting social aspects of a portal in the welcome screen will significantly affect individuals' willingness to join the portal. However, instead of increasing the likelihood of joining, providing profile information, and using social features, as seems to be generally assumed and consequently suggested by H2a, H2b, and H2c, the empirical findings indicate that emphasizing social activities in the welcome pages reduces the likelihood of individuals joining and has no direct impact on other behavior. The interaction effect of welcome type and interest on provision of profile information suggests that those with interest in the portal topic (e.g., DI) shared even less profile information when reminded of social features during welcoming.

As predicted by H3b, the presence of a significant Invitation × Welcome interaction effect on provision of crucial social information (e.g., a photograph) confirmed that a social invitation followed by a social welcome led to increased provision of a photograph. In addition, a nonsocial invitation followed by a social welcome led to decreased provision of a photograph. Sharing a photograph signals an individual's willingness to engage socially on a portal. If portals intend to promote sharing of crucial social information, they need to be consistent in their emphasis of social features across all venues where they reach out to new users. An invitation primes the recipient and raises related expectations for new users, and a welcome strategy should reaffirm those expectations.

Contrary to the optimistic perspective of many consultants and early adopters (e.g., Adai, 2009; IBM Institute for BusinessValue, 2011), the results reported in this article show that

the relationship between social features and user engagement is not unambiguously positive. While it is beyond the scope of this study to definitively explain these nuanced findings, existing studies of online behavior have provided a basis for potential explanations and directions for future research. For example, it may be the case that at the time the study was conducted (2007), the target population (dentists and dental informatics researchers) might have seen online social activity as risky and unnecessary. In 2007, highlighting the social aspects of the portal may have led risk-averse users to decide that participation would expose them to unacceptable risks, with little or no benefit. If so, it is possible that observed negative relationships may be reduced as more adults and older adults become comfortable with online social activity. Madden (2010) found that social networking use among Internet users age 18 to 29 years increased from 25 to 61% between May 2008 and May 2010. At the same time, use of social technologies in the workplace also has become more commonplace (DiMicco et al. 2008). Additional studies of the impact of portal presentation on potential users' choices in other populations are needed to determine if perceptions of the risks and benefits of online social activity are a significant factor.

Discrepancies between the findings of the study and the more uniform positive expectations of popular commentators also could be the result of generational differences. Participants in this study were all adults who had achieved a basic level of professional standing (professors and researchers). It has been argued that younger Internet users, especially teenagers, find social features more attractive in general. For example, in a study of YouTube users, Chau (2010) found that teens joined the site partly due to the social features. If this is the case more generally, then it may be that this study's findings may be limited to professional, work-related portals targeted toward adults. Note, however, that teens also are showing some social network fatigue (Lenhart et al., 2007); therefore, highlighting social features even for teen populations needs to be examined carefully.

Another possible explanation for the observed relationships between welcome type and user engagement relates to different ways individuals evaluate information sources in the presence and absence of explicit information about the people involved. Studies of individuals' responses to reviews in e-commerce settings have found that when no information is provided about the personal characteristics of a review's author, readers are more likely to assume that the author is similar to them (Naylor, Lamberton, & Norton, 2010). As a result, anonymous reviewers are more likely to be perceived by readers as trustworthy, reliable sources. Conversely, if review authors are identified and described, then the likelihood of readers emphasizing differences increases, reducing their acceptance of the author and the review. In the context of information portals, this egocentric anchoring behavior might result in new users assuming higher levels of similarity (and hence, trustworthiness) when particular individuals are not identified—and thus being more willing to join and provide a profile when encountering an impersonal welcome screen. While this explanation is speculative, it is consistent with the findings of this study. Further work with explicit measurement of new users' inferences about other users is needed to assess this explanation of the impact welcome-page construction has on user behavior.

Limitations and Implications

As with any study, this work has numerous limitations that should be taken into account when interpreting its findings. As noted earlier, the study considers only a single target population and a single point in time as well as a particular topic area and type of information portal. Only two mechanisms for portal presentation (invitation messages and welcome pages) are considered. Specific social features and particular individuals are emphasized in the “social” conditions. All of these factors contribute to the potentially idiosyncratic nature of the data collected for this study and the associated findings. While a

study of this type is sufficient to demonstrate that assuming a positive relationship between highlighting social features and user engagement is not defensible, it is of limited value for determining the full nature of this complex relationship.At a minimum, additional studies of portal presentation, social features, and user engagement in other contexts are needed to develop a comprehensive model.

The study also had a low (5%) response rate that varied considerably between various target groups. On one hand, this is an expected problem since the motivation for the study was to increase user engagement. Other the other hand, it places some limits on our ability to use the results of the presented analyses as the basis for definitive conclusions about the nature of the relationship between presentation of social features and user engagement. Targeting a homogenous group or counterbalancing manipulation between the various groups in future studies may allow for more conclusive statements about the impact of invitation emphasis. These limitations notwithstanding, the findings suggest that highlighting social benefits can have a significant impact that if not accounted for can have unexpected consequences for information portal developers.

Conclusions

Are information portals and online social spaces similar or different entities? The temptation is to treat them as the same since they are just different “flavors” of websites; however, the results presented here suggest, at least in terms of individual choices and behaviors, that they may operate in different ways. If users perceive information portals and social spaces to be fundamentally different, subject to different risks and to be evaluated in different ways, then making sense out of users'responses to different designs requires that they be treated differently. It also raises important questions about what types of signals trigger perception of a system as an information source or a social space, and what it means to combine them.

The results described earlier also offer a practical warning for developers and managers thinking about “goingWeb 2.0.” “Adding social features” may not be a simple matter of adding capabilities to a technological infrastructure. Rather, it may be the case that doing so will change how users perceive and respond to the site. This may or may not be desirable, but it should be done deliberately, with a knowledge of the potential consequences.

On one hand, there is the temptation to cast new technologies as revolutionary changes—fundamentally shifting how organizations, societies, and everything operate; the Internet changes everything, wikis change everything, and social networking systems change everything. On the other hand, there is a temptation to assume that new systems are just incremental modifications to systems we already use. Social networks are information sources that can be “queried” (albeit with a different syntax), online communities are just information systems that are “used,” and individual profiles are just data that are entered and collected.

The results of this study suggest that either extreme is misguided. Assuming that everything changes misses opportunities to build on existing concepts and understandings to develop our ability to build, manage, and evaluate new systems and technologies. Yet, treating everything as being in the same class misses the reality that sometimes things are different—and that seemingly small changes in the technical features may result in significantly different classifications and responses to a system.

This study is just one step in examining the complex boundary between information sources and social spaces—a boundary that is paradoxically blurring and remaining intact as social computing technologies and information systems converge.

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Appendix A

Recruitment E-mail Invitation Text With Different Emphases

Dear Colleague,

The Dental Informatics Online Community (DIOC) was recently established to create central information resource for people interested in dental informatics in order to stimulate progress in dental informatics research. This is your opportunity to join and gain access to this ever-expanding resource for information about dental informatics research.

Version 1 (Informational): After registering with DIOC, you will have full access to the Learning Center, which features FAQ-like documents. The Learning Center has a usable interface which allows you to easily navigate through the questions and answers, and you can add questions you have in order to get an answer. DIOC also contains a searchable paper archive which holds literature pertaining to information technology and informatics in the dental field. As a member you can comment on each paper and enhance the resource by adding meta information.

Version 2 (Social): After registering with DIOC, you will have full access to the People Directory, which is a searchable directory of dental informatics researchers and the projects they are working on. The People Directory has a usable interface which allows you to easily navigate profiles and project information. Fellow researchers post their areas of interest, and you can post yours as well to facilitate future collaborations. By posting project information, you can also invite other researchers who may be able to enhance your research to contact you.

Version 3 (Combined): After registering with DIOC, you will have full access to the Learning Center, which features FAQ-like documents, and the People Directory, which is a searchable director of dental informatics researchers and the projects they are working on. The Learning Center and the People Directory both have a usable interface which allows you to easily navigate through the information. You also have the unique opportunity to post questions of your own, display your own research interests, and enter your project information. Participating in these activities provides you with valuable information and facilitates future collaborations. DIOC also contains a searchable paper archive which holds literature pertaining to information technology and informatics in the dental field. As a member you can comment on each paper and enhance the resource by adding meta information.

DIOC was created with funding from the National Library of Medicine and other sources and was designed with help from researchers like you. The community was tailored around the information gathered about how these researchers learn about new fields and stay informed.

If you would like to join DIOC, please follow the link below. Joining takes only a few minutes and provides you with many time-saving resources. Please don't hesitate to contact me with any questions or concerns.

[individualized link to join DIOC]

Sincerely,

Heiko Spallek

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Appendix B

Screen Captures Showing Welcome Messages for Three Different Conditions

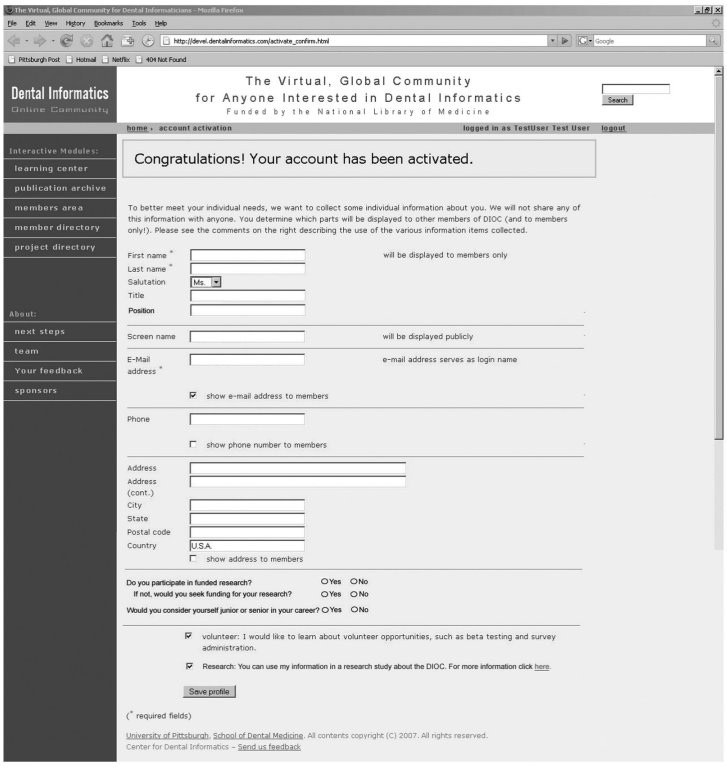

FIG. B1.
Nonsocial welcome.

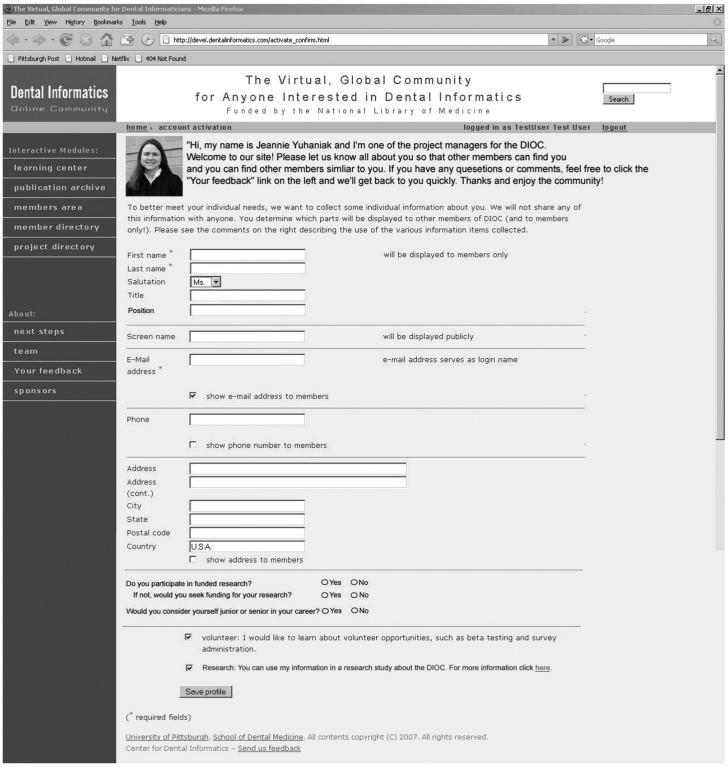

FIG. B2.
Social-admin welcome.

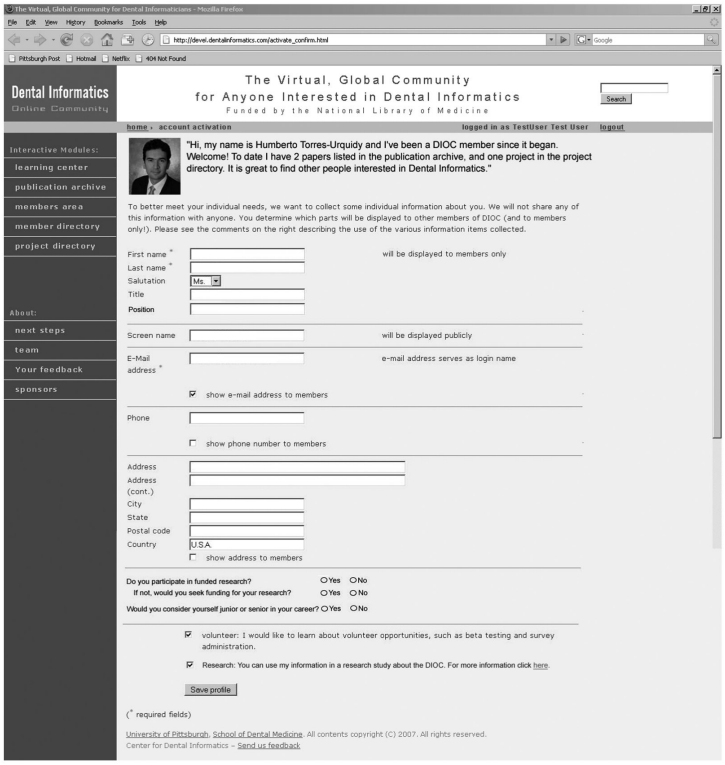

FIG. B3.

Social-member welcome.

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FIG. 1.
Dental Informatics Online Community (DIOC) website.

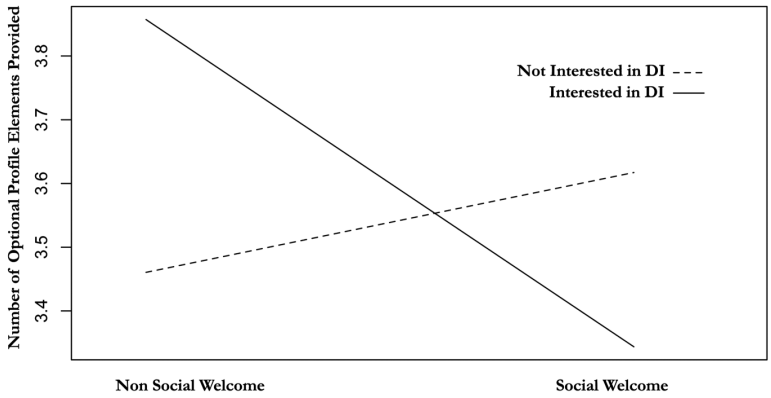

FIG. 2.
Interaction of welcome and interest on profile elements provided.

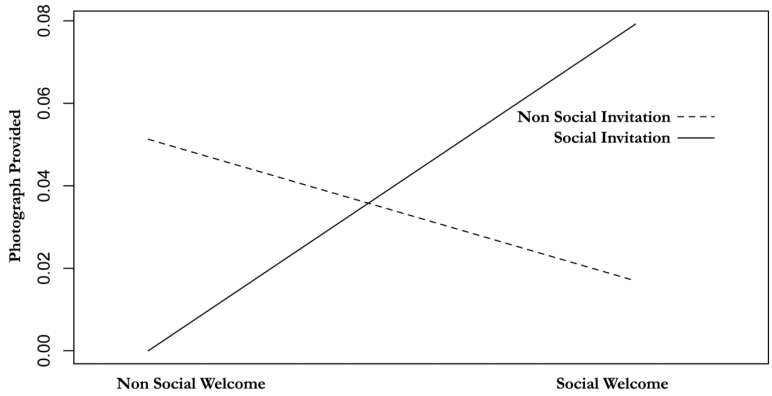

FIG. 3.
Interaction of invitation and welcome on photograph provided.

TABLE 1

Response rates among invited groups.

Invited group	Invited	Responded (%)	Joined (%)
People with known or expressed interest in dental informatics	1,194	116 (9.7)	53 (4.4)
People with possible interest in dental informatics	10,205	416 (4.1)	204 (2)
Overall	11,399	532 (4.7)	257 (2.3)

TABLE 2

Summary of user behavior by conditions.[a]

	%Responded	%Joined	%Added photo	Provided other profile elements	%Visited profile pages	Used social features over time
Social invitation	4.48	45.7	5.03	3.54	28.9*	3.38*
Nonsocial invitation	4.84	53.3	3.06	3.58	15.3*	4.46*
Social welcome	n/a	45.2*	5.6	3.56	24.2	3.93
Nonsocial welcome	n/a	54.6*	2.1	3.55	22.9	3.55
Interested in dental informatics	9.72*	45.3	7.68	3.55	32.6	3.99
Not interested in dental informatics	4.08*	49.2	3.4	3.56	21.4	3.74
Overall	4.66	48.3	4.28	3.56	23.7	3.8

Note. “Responded” = percentage of people who responded to the invitation of all participants invited; “Joined” = percentage of people who joined to all participants who responded to the invitation; “Added photo” and “Visited profile pages” = percentage of people who uploaded photos and visited profile pages, respectively, to all participants who joined; “Provided other profile elements” = no. of profile elements provided by all those who joined; “Used social features over time” = count of instances of social feature use by those who joined; n/a = not applicable.

[a]Conditions (invitation, welcome, interest) are in rows; variables are in columns.

*Values for measures different at the $p < 0.05$ level.

TABLE 3

Analyses of variance of responding by invitation type and interest in dental informatics.

	df	Sum squares	*M* square	*F*	Participant response (>*F*)
Invitation	1	0.02	0.18	0.40	0.09
Interest	1	3.40	3.50	76.91	<0.001 *
Invitation × Interest	1	0.10	0.10	2.21	0.14
Residuals	11,395	503.66	0.04		

* $p < 0.001$.

TABLE 4

Analyses of variance of joining by invitation type, welcome type, and interest in dental informatics.

	df	Sum of squares	*M* square	*F*	Participant response (>*F*)
Invitation	1	0.69	0.69	2.16	0.097
Welcome	1	1.04	1.04	4.15	0.042*
Interest	1	0.14	0.14	0.55	0.457
Invitation × Welcome	1	0.01	0.01	0.01	0.807
Invitation × Interest	1	0.00	0.00	0.00	0.898
Welcome × Interest	1	0.01	0.01	0.00	0.871
Invitation × Welcome × Interest	1	0.02	0.02	0.017	0.791
Residuals	524	130.94	0.25		

*$p < 0.05$.

TABLE 5

Analyses of variance of profile elements shared by invitation type, welcome type, and interest in dental informatics.

	df	Sum of squares	*M* square	*F*	Participant response (<*F*)
Invitation	1	0.101	0.100	0.095	0.758
Welcome	1	0.018	0.018	0.017	0.895
Interest	1	0.007	0.007	0.007	0.934
Invitation × Welcome	1	0.734	0.743	0.702	0.403
Invitation × Interest	1	0.234	0.234	0.221	0.638
Welcome × Interest	1	4.517	4.517	4.267	0.04*
Invitation × Welcome × Interest	1	0.198	0.198	0.187	0.665
Residuals	249	263.613	1.059		

*$p < 0.05$.

TABLE 6

Analyses of variance of photo upload by invitation type, welcome type, and interest in dental informatics.

	df	Sum of squares	*M* square	*F*	Participant response (>*F*)
Invitation	1	0.024	0.024	0.578	0.448
Welcome	1	0.074	0.074	1.816	0.179
Interest	1	0.077	0.077	1.894	0.170
Invitation × Welcome	1	0.177	0.177	4.338	0.038*
Invitation × Interest	1	0.035	0.035	0.861	0.354
Welcome × Interest	1	0.005	0.005	0.123	0.726
Invitation × Welcome × Interest	1	0.000	0.000	0.004	0.950
Residuals	249	10.138	0.040		

*$p < 0.05$.

TABLE 7

Analyses of variance of initial social feature use by invitation type, welcome type, and interest in dental informatics.

	df	Sum of squares	*M* square	*F*	Participant response (>*F*)
Invitation	1	1.125	1.125	6.305	0.013 *
Welcome	1	0.009	0.009	0.052	0.820
Interest	1	0.521	0.521	2.916	0.089
Invitation × Welcome	1	0.042	0.042	0.235	0.628
Invitation × Interest	1	0.311	0.311	1.742	0.189
Welcome × Interest	1	0.024	0.024	0.134	0.715
Invitation × Welcome × Interest	1	0.040	0.040	0.225	0.636
Residuals	249	44.449	0.179		

* $p < 0.1$.

TABLE 8

Ananlyses of variance of long-term social feature use by invitation type, welcome type, and interest in dental informatics.

	df	Sum of squares	*M* square	*F*	Participant response (>*F*)
Invitation	1	71	70.958	4.230	0.041 *
Welcome	1	8.6	8.614	0.513	0.474
Interest	1	2.7	2.652	0.158	0.691
Invitation × Welcome	1	37.8	37.765	2.251	0.134
Invitation × Interest	1	8.5	8.48	0.505	0.477
Welcome × Interest	1	28.4	28.439	1.695	0.194
Invitation × Welcome × Interest	1	1	1.013	0.060	0.806
Residuals	249	4176.7	16.774		

* $p < 0.05$.