The Differences of User Behavior between Forum and Facebook for Smoking Cessation Intervention

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ABSTRACT
QuitNet is one of the most popular websites providing tools and services to help people quit smoking. QuitNet developed forums on its original website to help its users interact with each other. It also built a public page on Facebook, which provides another community for people to discuss issues of smoking cessation. This study compares user behaviors between the two communication channels on smoking cessation – QuitNet Forum and QuitNet Facebook. Social network analysis and user response immediacy were used to analyze user behavior on the two channels. It was found that users of QuitNet Forum participated in discussions more actively, while QuitNet Facebook users behaved more differently from each other.

KEYWORDS
QuitNet, Facebook, Forum, User behavior, Smoking cessation

INTRODUCTION
QuitNet (http://www.quitnet.com/) is one of the most popular online intervention programs for smoking cessation. It attracts a large number of users and provides different services to help them quit smoking. QuitNet developed 10 forums on its original website, providing communities for user interaction. QuitStop (http://forums.quitnet.com/aspBanjo/Message_List.asp?Conference_ID=10&Forum_ID=8&r=162526) is the most popular forum on QuitNet. Every registered user of QuitNet can start new threads and make comments on QuitStop. QuitNet also built a public page on Facebook (https://www.facebook.com/QuitNet), which provides another community for people to discuss on smoking cessation. For QuitNet Facebook, only the public page founder can initiate new threads on the wall. Users who like this page can receive threads in their “news feeds”, and make comments on these posts.

In this study, we compared user behaviors of QuitNet Forum and QuitNet Facebook, from both perspectives of social network analysis and user response immediacy. Our research questions include:

(1) What are the differences between QuitNet Forum and QuitNet Facebook in terms of their social network structures and actor centralities?
(2) What is the difference of user response immediacy between QuitNet Forum and QuitNet Facebook?

METHODS
Data Collection
During the same period, there are substantially more posts, comments and participating users on QuitNet Forum than QuitNet Facebook. To reduce this inequality, we collected 1-month (05/01/2011-05/31/2011) dataset of user posts and comments from QuitNet Forum “The QuitStop”, and 3-month (04/01/2011-06/31/2011) dataset from QuitNet Facebook. 3017 posts, 24,713 comments and 1,169 users were extracted from QuitNet Forum. 111 posts, 2,574 comments and 664 users were extracted from QuitNet Facebook.

Analysis Methods
Social Network Analysis
To answer the first research question, two undirected social networks were built based on the data of QuitNet Forum and QuitNet Facebook. To reduce this inequality, we collected 1-month (05/01/2011-05/31/2011) dataset of user posts and comments from QuitNet Forum “The QuitStop”, and 3-month (04/01/2011-06/31/2011) dataset from QuitNet Facebook. 3017 posts, 24,713 comments and 1,169 users were extracted from QuitNet Forum. 111 posts, 2,574 comments and 664 users were extracted from QuitNet Facebook.

Response Immediacy Analysis
We introduced average response time to represent response immediacy of each user. For a user in the communities, we extracted all posts that she commented on, and calculated her response time to each post, which referred to the number of seconds that she made the first comment on that post since it was released (A user might make more than one comment on a same post). The mean value of response
time to all posts that a user commented on is defined as the average response time of that user. It reflects how fast she responded to a post if participating in the discussion.

RESULTS AND DISCUSSIONS

Social Network Analysis
The social network of QuitNet Forum contained 1,169 actors with 40,540 ties, and that of QuitNet Facebook had 664 actors and 19,939 ties. The statistics data of actor degree centrality, core/periphery structure, density and centralization are shown in Table 1.

From the result of T-test, there was significant difference of degree centrality between actors of the two social networks. Although the number of actors in QuitNet Forum was only about 1.8 times as many as that of QuitNet Facebook, the average degree of the former (213.406) was about 2.7 times as large as that of the later (78.610). It indicated that users of QuitNet Forum participated more frequently and interacted with others more closely in the discussions on average.

QuitNet Forum had a higher density (0.365) than QuitNet Facebook (0.236), from which we could conclude that users of QuitNet Forum interacted more actively. But the network centralization of QuitNet Facebook (10.174%) was as more than three times as that of QuitNet Forum (2.959%). So users of QuitNet Facebook had a greater variation in their activeness of participation.

Response Immediacy Analysis
A T-test showed that there was significant difference of average response time between users of the two channels. On average, users of QuitNet Forum (with the mean of average response time of 10768.24 seconds, nearly 3 hours) responded faster than users of QuitNet Facebook (19765.38 seconds, nearly 5 hours), which indicates that discussions on QuitNet Forum could quickly attract its users, who had

<table>
<thead>
<tr>
<th></th>
<th># of Actors</th>
<th>Average Degree Centrality</th>
<th># of core actors</th>
<th># of periphery actors</th>
<th>Density</th>
<th>Network Centralization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forum</td>
<td>1169</td>
<td>213.406</td>
<td>46</td>
<td>1123</td>
<td>0.365</td>
<td>2.959%</td>
</tr>
<tr>
<td>Facebook</td>
<td>664</td>
<td>78.610</td>
<td>67</td>
<td>597</td>
<td>0.236</td>
<td>10.174%</td>
</tr>
</tbody>
</table>

Table 1. Results of social network analysis.

<table>
<thead>
<tr>
<th></th>
<th># of users</th>
<th>Percentage</th>
<th># of users</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forum</td>
<td>&lt;600'' (10 minutes)</td>
<td>68</td>
<td>6.55%</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>601''-1800'' (30 minutes)</td>
<td>195</td>
<td>18.79%</td>
<td>286</td>
</tr>
<tr>
<td></td>
<td>1801''-3600'' (1 hour)</td>
<td>226</td>
<td>21.77%</td>
<td>226</td>
</tr>
<tr>
<td></td>
<td>3601''-7200'' (2 hours)</td>
<td>116</td>
<td>11.18%</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>7201''-18000'' (5 hours)</td>
<td>14</td>
<td>1.35%</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>&gt; 86400'' (1 day)</td>
<td>37</td>
<td>5.59%</td>
<td>37</td>
</tr>
<tr>
<td>Facebook</td>
<td># of users</td>
<td>Percentage</td>
<td># of users</td>
<td>Percentage</td>
</tr>
<tr>
<td></td>
<td>&lt;600'' (10 minutes)</td>
<td>92</td>
<td>13.90%</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>601''-1800'' (30 minutes)</td>
<td>103</td>
<td>15.56%</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>1801''-3600'' (1 hour)</td>
<td>123</td>
<td>18.58%</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td>3601''-7200'' (2 hours)</td>
<td>118</td>
<td>17.82%</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>7201''-18000'' (5 hours)</td>
<td>37</td>
<td>5.59%</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>&gt; 86400'' (1 day)</td>
<td>37</td>
<td>5.59%</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 2. User groups based on average response time.
paid more attentions to the discussions.

For each of the community, we divided users into seven groups according to their average response time. Table 2 shows user numbers and percentages of different groups in each channel. Figure 1 and Figure 2 depict the distributions of users in different groups with histograms. Most users of QuitNet Forum concentrated in the fourth groups, who had the average response time of 1 hour to 2 hours. But for QuitNet Facebook as shown in Figure 2, users distributed equally across groups of different average response time.

CONCLUSION
In this study, we compared user behaviors of QuitNet Forum and QuitNet Facebook from the perspectives of social network analysis and user response immediacy analysis. Generally, users of QuitNet Forum performed more actively than Facebook users. Forum users had a higher average degree centrality and network density in social network analysis. They also responded to posts faster on average. Users of QuitNet Facebook acted differently from each other. The social network built on QuitNet Facebook had a high network centralization. Facebook users distributed equally across different groups of average response time. But Forum users concentrated in the group of average response time of 1 hour to 2 hours, which indicates that they had similar behavior patterns of response immediacy.

The features of QuitNet Forum and QuitNet Facebook provide possible explanations for the differences of user behavior between the two social media channels. In the future study, we will carry out detailed analysis for explanations.

REFERENCE


