Electronic Networks of Practice as Third Places: Social Embeddedness, Membership Longevity and Contribution Quality

Thomas Mattson
University of Hawaii at Manoa, Honolulu, HI, United States, tmattson@hawaii.edu

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Electronic Networks of Practice as Third Places: Social Embeddedness, Membership Longevity and Contribution Quality

Thomas Mattson
Shidler College of Business
University of Hawai‘i at Manoa
Honolulu, HI 96822
tmattson@hawaii.edu

ABSTRACT

Electronic networks of practice have been investigated from learning and resource exchange perspectives using network analysis methods with connections derived from domain-specific relationships. By doing so, the literature has decentered interpersonal relationships in studies explaining the flow of knowledge throughout the network. I argue that through informal social interactions an individual becomes socially embedded in the network thereby creating strong social bonds with other members. These strong social bonds foster loyalty and attachment to the eNoP creating a symbolically constructed ‘place of significance’ rather than a ‘place of knowledge-sharing.’ Members may find alternative knowledge-sharing places among the many largely undifferentiated eNoP in cyberspace, but it is my conjecture that it is difficult to find alternative places of psychological significance in the virtual world. Utilizing Oldenburg’s (1989) third places as the theoretical lens, I demonstrate empirically that socially embedded members determined by a member’s social valued centrality have greater membership longevity and provide more positively rated contributions to the practice side of the eNoP relative to those members less socially embedded.

Keywords

Electronic networks of practice (eNoP), third places, social embeddedness, social valued centrality, structural embeddedness, relational embeddedness, membership longevity, quality of knowledge contributions

INTRODUCTION

Electronic networks of practice (eNoP) are special types of social structures, which are focused on solving domain-specific problems in question and answer style forums; eNoP typically contain members who are only loosely connected with each other (Brown and Duguid, 2000; McLure Wasko and Faraj, 2005; Vaast and Walsham, 2009). Many eNoP are expanding their repertoire of forums to include off-topic spaces of interaction such as tangentially related blogs, off-topic message forums, Facebook style profile pages, and personal introductory forums in addition to integrating social networking sites such as Facebook and Twitter into their design. The common purpose may be the initial reason why the eNoP forms, but the network now includes a mix of practices and spaces of interaction whereby the spread of knowledge is often coupled with general sociability (Ridings and Gefen, 2004). The purpose of this paper is to empirically investigate the impact that off-topic social ties have on participation within the practice side of the eNoP, specifically on membership longevity and contribution quality.

In order to investigate this relationship, I conceptualize off-topic message forums within eNoP as virtual third places. A third place is an informal place outside of the home (first place) and work (second place) environments where individuals congregate for informal sociability and interpersonal interactions (Oldenburg, 1989; Simmel, 1908/1971). Although Oldenburg (1989) argues that virtual environments may not constitute third places, I propose that off-topic message forums constitute places where norms, routines, and other practices are constructed through continuous, repeated interactions (Sarker and Sahay, 2004). In this sense, places do not have to constitute geographic locations, but, instead, constitute mental representations derived from social interactions (Saunders, Rutkowski, van Genuchten, Vogel and Orrego, 2011) and the psychological processes associated with “experience and meaning that helps to provide human beings with the sense of attachment, stability, and security” (Sarker and Sahay, 2004, p. 4). With this in mind, off-topic conversations in eNoP are situated in symbolically constructed local places, which have many of the characteristics of Oldenburg’s (1989) third places (Soukup, 2006).
Through these informal social interactions, I argue that an individual becomes more connected to the eNoP by being more socially embedded within the network and, consequently, may have a stronger social bond with the other members (Ren, Kraut and Kiesler, 2007). I further argue that this social bond fosters an intense sense of loyalty and attachment to the eNoP creating a ‘place of significance’ rather than a ‘place of knowledge-sharing.’ This is an important distinction because it is relatively easy for members to find a replacement for a knowledge-sharing place as there are countless, largely interchangeable eNoP on all corners of the web, but it is much more difficult to find places of emotional and psychological significance in the virtual world. As such, I hypothesize that greater social embeddedness may result in an increased commitment to the domain-specific portion of the eNoP (which is fundamental to the survival of the network) in terms of membership longevity and contribution quality.

In order to demonstrate this empirically, I performed an in-depth study of the social dynamics, interpersonal relationships formed via off-topic interactions, and knowledge contributions at www.dreamincode.net, an eNoP of software developers. Using standard social network analysis in addition to a measure of social embeddedness derived from Sykes et al.’s (2009) conceptualization of valued network centrality and a series of cox proportional hazard models, I quantitatively demonstrate that a member’s social embeddedness within the third place portions of the site positively impact the quality of domain-specific contributions and membership longevity within the domain-specific area of the eNoP.

The remainder of this paper is organized as follows. First, I review relevant and selected literature on eNoP and third places in order to develop a set of research hypotheses. Second, I discuss the research design and methods used in this study. Third, I present the quantitative results. Fourth, I conclude with a discussion of the implications of my research along with potential areas for future study.

LITERATURE REVIEW

The term embeddedness has many different meanings in the literature beginning with Granovetter’s (1985) initial definition of structural embeddedness, which referred to patterns of interpersonal relationships. Nahapiet and Ghoshal (1998) make the distinction between structural embeddedness and relational embeddedness with the former referring to the configuration of the network and the latter referring to the quality of the network. The concept of embeddedness may also be broken down into structural, cognitive, institutional and political embeddedness (Zukin and DiMaggio, 1990) referring to shared collective understandings, structured regularities of mental processes, and power relationships associated with structural positioning within a network. In this paper, my conceptual definition of social embeddedness refers to a combination of structural (network configurations) and relational (interpersonal relationships) embeddedness.

Networks of Practice (NoP) and Electronic Networks of Practice (eNoP)

The NoP literature is an extension of the community of practice (CoP) literature, but shifts the focus away from the community to the structure of the network while still concentrating on the skill-based craft (Brown and Duguid, 2000). Wenger (1998) argues that CoP are distinct from networks, because CoP focus on what information is shared and not on the structure of the relationships. Yet, social networking theorists argue that it is not possible to separate the knowledge generated from the underlying structure of the network (Hansen, 1999).

As such, Brown and Duguid (2000) extend the CoP concept to include the emergent, informal networks that facilitate the exchange of practice related information and advice. The connections between members in NoP are indirect, typically in large, geographically dispersed networks where members are largely unknown to each other (Brown and Duguid, 2000; Whelan, 2007). The power of a NoP comes from the weak ties that connect members, and it is those weak ties that facilitate knowledge sharing (Brown and Duguid, 2000).

1 It is beyond the scope of this paper to include a comprehensive literature review of communities of practice. However, a CoP generally refers to a group of people engaged in a skill-based craft whereby knowledge is situated in the community, which means that learning may be more of a social practice than an individual practice (Lave and Wenger, 1991). The CoP literature includes core concepts such as legitimate peripheral participation (Lave and Wenger, 1991), mutual engagement, joint enterprise and shared repertoire (Wenger, 1998). See Murillo (2011) for a comprehensive review of the CoP literature.
McLure-Wasko and Faraj (2005) extend the concept of a NoP to a virtual environment by coining the term electronic network of practice (eNoP). They define an eNoP as “a special case of the broader concept of networks of practice where the sharing of practice-related knowledge occurs primarily through computer based communication technologies” (McLure Wasko and Faraj, 2005, p. 37). They argue that the electronic aspect of eNoP alters the social dynamics relative to non-electronic variants. Examples of eNoP are www.codeproject.com or www.dreamincode.net, where thousands of software developers gather to write, share, and debug snippets of code. Within these sites the sole form of communication is electronic, and members rarely know each other outside of the virtual environment.

The primary focus of the eNoP literature is on explaining the flow of knowledge using networking constructs related to ties developed on the practice-side of the eNoP (Vaast and Walsham, 2009; Whelan, 2007). This literature decenters notions of place and community, suggesting mutual engagement, trust and reciprocity are difficult to achieve in massive, electronic networks (McLure Wasko and Faraj, 2005; McLure Wasko, Teigland and Faraj, 2009). However, as some of these eNoP have been in existence for many years, the focus on weak domain-specific ties and emergence may not be as applicable as they originally were. In this regard, it may make sense to bring back concepts of community and place in order to understand the dynamics in more stable, less emergent eNoP, specifically those which have vibrant off-topic forums. In order to do this, I use Oldenburg’s (1989) third places.

**Third Places**

Third places are physical places outside of the home (first place) and work (second place) environments where individuals congregate for informal sociability in order to satisfy individual’s need for interpersonal interaction and to strengthen the local community (Oldenburg, 1989; Simmel, 1908/1971). Examples of third places include neighborhood pubs, traditional cafes (not the modern Internet cafes), and country stores. Oldenburg (1989) argues that there are eight defining characteristics of third places: (1) neutral ground (minimal social obligations), (2) leveler (status neutral environments), (3) conversation (verbal interactivity is the central activity), (4) accessibility and accommodation (easy to access), (5) regulars (frequent participants), (6) playful mood (laughter and wit), (7) low profile (homely without pretension), and (8) a home away from home (warm atmosphere fostering feelings of being at ease).

Although Oldenburg (1989) argues that virtual environments are not substitutes for brick-and-mortar third places, literature on online games and 3D social environments suggest that virtual environments may constitute virtual third places. Steinkuehler and Williams (2006), for instance, argue that gaming environments offer an escape from stratified daily social life, while simultaneously serving to satisfy individual’s needs for sociability, fantasy, and relaxation. They quote one of their interviewees in terms of why he/she participates in online games as saying “you go for the experience [points], you stay for the enlightening conversation” (Steinkuehler and Williams, 2006, p. 895). Moore and colleagues (2009) also argue that virtual hangouts within massively multi-player online gaming environments provide just as authentic sociability as real-life contexts. These findings are not limited to online gaming as, for example, Bruckman and Resnick (1993) report similar third place style social dynamics in MediaMOO, a virtual professional community of media researchers. Soukup (2006) suggests that these virtual environments provide a ‘daily refuge’ from the work and home, which is a primary function of brick-and-mortar third places.

This is applicable to the eNoP literature for three reasons. First, research on eNoP has dedicated a significant amount of attention to the utilitarian aspect of these websites using resource exchange and learning perspectives (Anand, Gardner and Morris, 2007; Vaast and Walsham, 2009). However, these types of communities and places may provide social benefits to membership not adequately explained through the exchange of domain-specific resources (Kraut, Wang, Butler, Joyce and Burke, In Press). A social systems perspective, for instance, puts concepts of place at the center of the analysis, and human behavior is influenced by the setting in which it occurs (Bitner, 1992). As such, the third place literature may inform the existing eNoP literature, because the social ties an individual has to a place may positively or negatively impact his/her desire to contribute and be affiliated with that place. For example, one regular contributor to the off-topic message forums within www.dreamincode.net stated the following concerning the importance of place:

after 10 years, this [off-topic forum] is still where I enjoy coming to hang out and relax. And we're not just a Q&A site, we're a community of developers. You've gotten me interested in living out of
an RV and traveling, others have supported us through hard times, I’ve made good friends, and had great discussions. It’s an important part of Dream.In.Code to me and many others… I think it should be a healthy place that makes Dream.In.Code more than just a Yahoo Answers or Experts Exchange. (skyhawk133, Post #8, http://tinyurl.com/7brfy4y)

Second, an exchange of information and advice may be conceptualized as a transaction, and previous economic sociology literature suggests that the social context surrounding a transaction is an important attribute of the transaction (Granovetter, 1985). Previous literature on eNoP uses social capital theory (c.f. Chiu, Hsu and Wang, 2006; McLure Wasko and Faraj 2005) to account for this factor, but the ties between participants are often professional and not social. Yet, interpersonal social interactions have been found to facilitate the transfer of knowledge at many different levels of analysis by creating a collectivist norm or a sharing culture (Van Den Hooff, de Ridder and Aukema, 2004). Third places have the potential to create this sense of collectivism by creating a symbolic place in which socially embedded participants may share a commitment to the common good (domain-specific practice) (Oldenburg, 1989; Soukup, 2006).

Third, when individuals associate a place as a significant place in their lives, they tend to form an intense attachment and loyalty to that place (Belk, 1992; Rosenbaum, 2006; Sherry, 1998). I propose that it is easy to find an alternative question and answer style eNoP on the web, but it is very difficult to find a place which has social and psychological significance in an individual’s life. As such, I argue that these members will have an increased incentive to see the eNoP be successful, because it will be difficult to find a substitute place of significance. In order to be successful, however, the network requires active membership and quality contributions to the practice side of the site. This leads to the following two hypotheses:

**H1:** Participants who are more socially embedded within the third place portions of the eNoP will be more likely to maintain active membership on the practice side of the eNoP relative to those members who are less socially embedded.

**H2:** Participants who are more socially embedded within the third place portions of the eNoP will contribute higher quality practice-related content relative to those members who are less socially embedded.

**RESEARCH DESIGN & METHODS**

These hypotheses were analyzed empirically in an in-depth study of the social dynamics, interpersonal relationships formed via off-topic interactions, and knowledge contributions at www.dreamincode.net, an eNoP of software developers. This eNoP has been in existence since 2001 and has over 575K registered members as of December 2011, with discussion forums on a variety of programming languages. The site contains both formal message boards where domain specific problems are discussed (on-topic forums) and message boards where members may informally interact through blogs, lounges, and Facebook style walls (off-topic forums). An automated program was written to download all of the non-archived threads from all on-topic and off-topic forums, all thread replies within those topics, all user profiles, and all positive and negative votes related to those threads. The result of this process was a data set that includes 215,573 threads initiated by 69,598 unique members with 1,382,557 replies to those threads from 44,524 unique members between March 2001 and December 2011.

The specific off-topic forum conceptualized as a third place is the caffeine lounge. The site describes the caffeine lounge as a “forum for discussions related to non-programming topics including: sports, current events, games, music, movies, TV, food, drink, geek related (toys & technology), debates, life events, rants, and occasionally religion and politics.” Table 1 illustrates how the caffeine lounge demonstrates the characteristics of a virtual third place.

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2 Description downloaded from http://www.dreamincode.net/forums/forum/1-caffeine-lounge/ on 2/15/2012.
Table 1. Third Place Characteristics and Evidence of Applicability in Caffeine Lounge

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral ground</td>
<td>“I don’t want to see it [Caffeine Lounge] degraded to 4chan, but I also don’t want to see it become real life... where you can’t say anything off-kilter without people making a fuss” (BenignDesign, Post #22, <a href="http://tinyurl.com/7drcsbw">http://tinyurl.com/7drcsbw</a>)</td>
</tr>
<tr>
<td>Leveler</td>
<td>There seems to be an “insider” versus “outsider” dynamic in the caffeine lounge suggesting that it may not be status neutral.</td>
</tr>
<tr>
<td>Conversation</td>
<td>&quot;ok, did I apparently do something I should not have done with this thread?? like not post it in the right forum or something?? for that image reply strikes me as having done something wrong...” (mapmd1234, Post #3, <a href="http://tinyurl.com/7krle63">http://tinyurl.com/7krle63</a>)</td>
</tr>
<tr>
<td>Accessibility and accommodation</td>
<td>The average reputation score of the regulars is roughly 253 (as of 12/31/2010), which suggests that the lounge may be a place for high-status members only</td>
</tr>
<tr>
<td>Regulars</td>
<td>A core group of 65 participants contributed roughly 62% of the discussion replies within this forum between March 2001 and December 2011</td>
</tr>
<tr>
<td>Playful mood</td>
<td>&quot;I used to like the Caffeine lounge. Our resident latino Sloth [supersloth] made me laugh most of the time with his ways. Not having an off-topic area is taking the D out of DIC. This site is fun to use because of the community.&quot; (Sergio Tapia, Post #14, <a href="http://tinyurl.com/7brfy4y">http://tinyurl.com/7brfy4y</a>)</td>
</tr>
<tr>
<td>Low profile</td>
<td>&quot;This site is great in that it has all the flavors of a social site but with the ability to never be a part of it. Anyone can jump into their favorite programming forum and never leave it. But then there are those that prefer the non programming-specific forums that just like the sporadic array of topics” (CharlieMay, Post #15, <a href="http://tinyurl.com/7brfy4v">http://tinyurl.com/7brfy4v</a>)</td>
</tr>
<tr>
<td>Home away from home</td>
<td>&quot;oh, ok, I get it, its a place for everyone to be random like that...ok, that makes sense now...I HAVE FOUND A HOME  lol...and why does that not surprise me on the caffeine thought...but that's what caught my eye and brought me here :3&quot; (mapmd1234, Post #10, <a href="http://tinyurl.com/85du9zf">http://tinyurl.com/85du9zf</a>)</td>
</tr>
</tbody>
</table>

The quantitative analysis involved running two different cox proportional hazard models. The dependent variable in the first model is the length of time it took a participant to become inactive (determined as no posts within a rolling 45 day period) in the domain-specific areas of the eNoP starting on 1/1/2011. The second model predicts the duration of time between positively rated contributions (determined by another member rating the contribution as positive within the peer-to-peer feedback system) in the domain-specific areas of the site also starting on 1/1/2011.
The first hazard model is used to test the first hypothesis and the second hazard model is used to test the second hypothesis.

For both models, social embeddedness was measured using a concept of *social valued centrality* derived from Sykes et al.’s (2009) definition of valued network centrality, which measures the amount of resources controlled by a specific vertex in the network. In this paper, *social valued centrality* is not the amount of domain-specific resources controlled by a specific node in the network as used and defined in Sykes et al. (2009), but instead refers to the amount of social resources that a node in the network controls due to its structural position within the lounge. To determine social resources, dimensions of social ties derived from Marsden and Campbell (1984) and Gilbert and Karahalios (2009) were used. Dimensions used in my operational definition of social embeddedness include relationship intensity, structural similarities, duration, intimacy, emotional support, and social similarity between participants in the caffeine lounge. Table 2 contains the specific measures associated with each of these dimensions.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Number of caffeine lounge discussion threads which two nodes both participated</td>
</tr>
<tr>
<td>Structural Similarity</td>
<td>Number of friends within their profile pages that two nodes have in common</td>
</tr>
<tr>
<td>Duration</td>
<td>Days since first communication in the caffeine lounge between two nodes measured from 12/31/2010</td>
</tr>
<tr>
<td>Intimacy</td>
<td>Days between first and last communication in the caffeine lounge between two nodes using 12/31/2010 as the end point</td>
</tr>
<tr>
<td>Emotional Support</td>
<td>Number of caffeine lounge discussion threads containing positive emotional words (defined by the LIWC) in the title which two nodes both participated</td>
</tr>
<tr>
<td>Social Similarity</td>
<td>A binary comparison of the badges (proxy for social status in the community) between two nodes (1 for same badge and 0 for different badges)</td>
</tr>
</tbody>
</table>

Table 2. Specific Measures for Each Dimension of Tie Strength

The resulting formula for social valued centrality is the following:

$$h_i(t) = \lambda_0(t) \exp(\beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \beta_5 x_{i5})$$

Each term in the above equation was normalized before aggregation in order to account for the different scales between each dimension. Control variables for both hazard models include the norm of reciprocity (number of give help posts greater than the number of get help posts), commitment to the community (posts per day), years programming experience, and degree centrality associated with the knowledge-sharing aspects of the site (ties determined by threads with common participation between two nodes). I am controlling for market relationships because Uzzi (1997) suggests that a combination of market and embedded (social) ties may be the ideal structure for economic transactions. All variables are calculated as of 12/31/2010 and are considered time independent variables in these models.

RESULTS

To test the first hypothesis that those members who are more socially embedded within the third place portions of the site will have a higher propensity to remain active in the practice forums, I ran the following cox proportional hazard model:

$$h_i(t) = \lambda_0(t) \exp(\beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \beta_5 x_{i5})$$
where the hazard for the \textsuperscript{i}th individual is a function of five exponentiated fixed, time independent covariates (social valued centrality, reciprocity, commitment, years of programming experience and market degree centrality). \( \lambda(t) \) is an unspecified baseline hazard function for an individual whose covariates are all equal to zero. In this case, time is measured as the number of days starting from 12/31/2010 until an individual became inactive in the practice-side of the eNoP. Inactivity was measured as having no practice-related posts within one of the programming forums for the previous 45 days. To be included in the sampling frame, the member had to be active within the eNoP as of 12/31/2010. This resulted in 6,702 active members of which 1,500 were randomly selected. For each of these randomly selected members, I determined the date in which they became inactive for the first 275 days in calendar year 2011. The data are singly right censored, so that all censored cases have a value of 275 for days since 1/1/2011. The years since 1/1/2011 related to one of his/her practice related posts. The years programming and commitment to the site variables have no explanatory power in predicting the hazard of inactivity, and the AIC with covariates is worse when these two variables are included in the model so those control variables were dropped. In model 3 (best model of the three), the effect of valued social centrality within the third place is still a significant factor in predicting the hazard of inactivity, although the hazard rate is reduced when controlling for the effects of reciprocity and market degree centrality. Nevertheless, this model indicates that increasing the valued social centrality of a node within the lounge by one unit (normalized scale) reduces the hazard of inactivity by roughly 10%. Interestingly, increasing the number of market ties a node has by one reduces the hazard of inactivity by roughly 4%, but this is less than the hazard rate of increasing a node’s valued social centrality by one normalized unit. Therefore, evidence from the single factor model and the full model support the first hypothesis.

To test the second hypothesis that those members who are more socially embedded within the third place portions of the site will contribute higher quality practice-related content relative to those members who are less socially embedded, a similar set of hazard models were run (same five exponentiated fixed, time independent covariates along with an unspecified baseline hazard function). The difference is the time and event being modeled. In this case, the event is a dichotomous variable indicating if a community member received a positive vote on one of his/her practice-related contributions. A zero indicates that a member did not receive any positive votes between 1/1/2011 and 10/2/2011 related to one of his/her practice related contributions. The time is determined by the days between positively rated content within one of the practice related forums on the site. I assume that all active

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Parameter Estimate</td>
<td>Hazard Ratio</td>
<td>Parameter Estimate</td>
</tr>
<tr>
<td>Valued Social Centrality</td>
<td>0.070 0.85</td>
<td>-0.284*** 0.753</td>
<td>-0.10** 0.905</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>0.47 0.50</td>
<td>0.16** 1.176</td>
<td>0.17** 1.187</td>
</tr>
<tr>
<td>Commitment</td>
<td>0.36 0.96</td>
<td>-0.066 0.936</td>
<td></td>
</tr>
<tr>
<td>Years Programming</td>
<td>3.40 5.06</td>
<td>0.00896 1.01</td>
<td></td>
</tr>
<tr>
<td>Market Degree Centrality</td>
<td>0.036*** 0.965</td>
<td>0.037*** 0.964</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>Censored</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>AIC Without Covariates</td>
<td>19,266</td>
<td>19,266</td>
<td>19,266</td>
</tr>
<tr>
<td>AIC With Covariates</td>
<td>19,194</td>
<td>18,830</td>
<td>18,829</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>74.47 (1 df)***</td>
<td>445.88 (5 df)***</td>
<td>442.31 (3 df)***</td>
</tr>
</tbody>
</table>

*Significant at 0.05, ** Significant at 0.01, *** Significant at 0.001

Table 3. Hazard Models Testing Hypothesis 1
members produced a quality post on 12/31/2010. If, for example, one member received a positively rated contribution on 1/10/2011 and another one on 1/15/2011, then the time for the first event would be 10 (1/10/2011-12/31/2010) and the time for the second event would be 5 (1/15/2011-1/10/2011). In these models, one member may have multiple data points. Therefore, I use the sandwich chi squares to correct the standard errors for dependence.

The sample for these models included 9,958 positively rated contributions across the same 1,500 randomly selected members used in the first set of models. The data are singly right censored, so that all censored cases will have a days value of 275 and an event value of zero if they did not contribute a positively rated contribution in the first 275 days in calendar year 2011.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Hazard Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valued Social Centrality</td>
<td>0.342***</td>
<td>1.408</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>0.726***</td>
<td>2.068</td>
</tr>
<tr>
<td>Commitment</td>
<td>-0.019</td>
<td>0.981</td>
</tr>
<tr>
<td>Years Programming</td>
<td>-0.0011</td>
<td>0.999</td>
</tr>
<tr>
<td>Market Degree Centrality</td>
<td>0.00363***</td>
<td>1.004</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>10,559</td>
<td>10,559</td>
<td>10,559</td>
</tr>
<tr>
<td>Censored</td>
<td>601</td>
<td>601</td>
<td>601</td>
</tr>
<tr>
<td>AIC Without Covariates</td>
<td>171,476</td>
<td>171,476</td>
<td>171,476</td>
</tr>
<tr>
<td>AIC With Covariates</td>
<td>170,591</td>
<td>168,944</td>
<td>168,961</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>887.10 (1 df)***</td>
<td>2541.91 (5 df)***</td>
<td>2521.13 (3 df)***</td>
</tr>
<tr>
<td>Wald (Model-Based)</td>
<td>916.90 (1 df)***</td>
<td>2440.32 (5 df)***</td>
<td>2447.07 (3 df)***</td>
</tr>
<tr>
<td>Wald (Sandwich)</td>
<td>104.64 (1 df)***</td>
<td>213.53 (5 df)***</td>
<td>156.35 (3 df) ***</td>
</tr>
</tbody>
</table>

*Significant at 0.05, ** Significant at 0.01, *** Significant at 0.001

Table 4. Hazard Models Testing Hypothesis 2

The first model using just the valued social centrality within the third place as the only factor in the model was significant. In this case, increasing a member’s valued social centrality by one normalized unit increases the hazard of receiving a positive vote by roughly 40%. Model 2 indicates that commitment to the site and years programming are not significant factors in predicting the hazard of receiving a positive vote. In model 3, the effect of the norm of reciprocity is extremely strong. The hazard of receiving a positively rated practice-related contribution is roughly 206% for those who subscribe to the norm of reciprocity relative to those who do not subscribe to the norm of reciprocity (after controlling for other covariates). The effect of valued social centrality, however, is also still significant and strong (albeit less than the hazard rate associated with the norm of reciprocity). Increasing a member’s valued social centrality by one normalized unit increases the hazard of receiving a positive vote by roughly 20% (after controlling for other covariates). Model 3 also shows that increasing the number of market ties a node has by one significantly increases the hazard of receiving a positive vote, but the expected hazard rate increase is less than 1% (after controlling for other covariates). Therefore, these results provide support for the second hypothesis even after controlling for the effect of the norm of reciprocity and the market degree centrality of a member.

DISCUSSION & CONCLUSION

Previous literature has viewed off-topic discussions as noise, distracting participants from the utilitarian aspects of the site such as learning and the sharing of domain-specific knowledge (Preece and Schneideman, 2009). Yet, off-
topic social interactions such as sharing pictures, discussing personal matters, or having impromptu discussions on current affairs or sporting events may be important mechanisms through which members may derive social value from participation (Ren et al., 2007; Ridings and Wasko, 2010). The results from this study further support the importance of off-topic social interactions to the long term engagement of community members on the practice-side of the eNoP. The hazard ratios for social valued centrality were all greater than the hazard ratios for the market degree centrality control variables in both sets of models, suggesting that eNoP administrators may want to promote sociability in order to increase the quality of practice-related content and membership longevity. Other market centralities such as betweenness centrality and closeness centrality were considered and controlled for, but both either had no statistically significant effect (closeness centrality) on the hazard ratios or an immaterial, although statistically significant, effect size (betweenness centrality) on the hazard ratios in both sets of models.

Conceptualizing off-topic forums as virtual third places enables researchers to analyze these eNoP using a broader theoretical lens. Further empirical work is necessary to refine the results presented here. Nevertheless, this paper provides an initial step in the process by integrating concepts of place and social embeddedness in investigations of membership longevity and contribution quality within eNoP. It highlights how social activities that, on the surface, seem to be distractions from the practice-related activities are not distractions at all when conceptualizing the eNoP as a place of significance rather than as a place of knowledge-sharing. A major function of third places is to bring the community closer together by creating a collectivist norm, which spills over to activities and interactions happening outside of the third place (Oldenburg, 1989).

This study also has implications for managers. In the current business environment, employees are spending more and more time interacting with virtual colleagues instead of interacting with real people. As such, employees have the potential problems of isolationism and loneliness resulting from distributed work environments and the lack of real interpersonal social support associated with these new organizational climates and forms (Lai and Burchell, 2008; Litwin and Stringer, 1968; Marshall, Michaels and Mulki, 2007). There are many escapes in the virtual world such as Facebook, Pinterest or Twitter, but these escapes are generally purely social in nature and managers don’t generally want their employees spending their downtime ‘Facebooking.’ eNoP, however, are different from these other types of social networks, because they offer the opportunity to combine learning, professional networking and general sociability in order to potentially combat workplace loneliness in a more productive manner. Thus, encouraging employees to become socially embedded in a professional eNoP may foster positive emotional feelings, which have been positively linked with job performance and job satisfaction (Wiesenfeld, Raghuram and Garud, 2001; Yilmaz, 2008).

Like all research, this research has its limitations. Attachment to the eNoP may, for example, depend on the stage of development of the eNoP. Is the effect of social embeddedness greater when the eNoP is emerging relative to when the eNoP is more mature or in decline? McCarthy and colleagues (2009) demonstrate that their subjects had more place attachment over time in their investigation of a place-based social networking application within a third place. An interesting future line of research will be to study the impact of third place ties on practice related activities throughout the life cycle of the eNoP. Additionally, this study is focused on practice-related social structures and not on other diverse social structures. Would these results hold for a gaming virtual community or a community service virtual environment such as Kiva or MyCharityWater? Clearly, more empirical work is necessary to test these hypotheses in other environments with other practice-related eNoP outside of the programming context in addition to non-practice related virtual communities. Nevertheless, the results from this study provide empirical evidence that those members who are more socially embedded in the third place aspects of the site have higher propensities to remain active within the practice side of the site and also have higher propensities to contribute higher quality content.

REFERENCES