

Evaluating patient experience in online health communities: Implications for health care organizations

Priya Nambisan

Background: Online communities that focus on health-related matters have rapidly increased in number in the last several years or so. The increasing demand from health consumers for such forums have led several leading health care organizations (HCOs), including Kaiser Permanente and Johns Hopkins, to establish online communities/discussion forums as part of their patient-support services. Patients' interactions in such HCO-led online health communities potentially add another important dimension to the overall patient experience. However, there has been limited research focus on measuring or evaluating patients' experience in such online health communities. **Purposes:** The objective of this study was to evaluate patients' online community experience (OCE) and examine its impact on patients' attitude toward the HCO and its services.

Method: The data collection was conducted using an online questionnaire sent to consumers/patients who participated in the online health communities of three large academic medical centers: the Johns Hopkins Pathology discussion board, run by the pathology department at Johns Hopkins University; the MD Anderson Cancer survivor board, run by MD Anderson Cancer Center at the University of Texas; and the Joslin Discussion Board, run by Joslin Diabetes Center affiliated with Harvard Medical School. Confirmatory factor analysis was done to validate the four dimensions of OCE. Linear regression technique was used to validate the impact of OCE on patient attitudes.

Findings: The results provide support for four dimensions of patients' OCE: pragmatic, empathic, sociability, and usability. Furthermore, all these four dimensions of OCE had a positive impact on patient's attitudes toward the HCO and its services.

Practice Implications: An understanding of the four dimensions of patient experience in online health communities and its implications on patient attitudes could help HCOs to design, deploy, and manage such online health communities more effectively.

Evaluating patient experience/satisfaction with care has been a major focus of research, and it plays an important role in quality-of-care reforms and also in improving the overall quality of health care services

Key words: consumer attitudes, online health communities, patient experience

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(Coulter & Cleary, 2001; Rothman, Park, Hays, Edwards, & Dudley, 2008). However, this line of research has consistently ignored the health care organization's (HCO's) online presence and patient experience with these online offerings. Patients' need for personalized health information, coupled with the increasing incidence of chronic diseases that require long-term management, has made online health communities an important part of many HCO's value-added services (Winkelman & Choo, 2003). Recent research shows that such online communities can be a critical venue for knowledge sharing and transfer and has the potential to deliver socioemotional support to patients, promote more active patient involvement in disease management, facilitate patient education (O'Grady, Witteman, & Wathen, 2008), and improve patient self-efficacy, which in turn

leads to positive health outcomes (Gustafson et al., 1999; Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004; Winkelman & Choo, 2003). Examples of such HCO-owned or -led online health communities include those offered by Kaiser Permanente, Johns Hopkins Pathology Department, Joslin Diabetes Center, Cleveland Medical Center, and MD Anderson Health Center.

In this study, we draw on theories and concepts from various fields (including communication, consumer psychology, human-computer interaction, and usability) and propose a four-dimensional online community experience (OCE) construct to measure patients' experience in HCO-owned and -managed online health communities. The four dimensions are pragmatic experience, empathic experience, sociability experience, and usability experience. We also hypothesize that these four dimensions of patient experience will impact patients' attitude toward the HCO and its services. The study data to validate the previously mentioned model were collected through an online survey from the patients/members who participated in the online communities of three large academic medical centers: the Johns Hopkins Pathology discussion board, run by the pathology department at Johns Hopkins University; the MD Anderson Cancer survivor discussion board, run by MD Anderson Cancer Center at the University of Texas; and the Joslin Discussion Board, run by the Joslin Diabetes center affiliated with Harvard Medical School. The analysis results offer broad support for the research model and hold important implications for HCOs as they establish and manage online health communities.

Theoretical Background

Human experience is well studied in disciplines such as psychology and communication, and researchers have identified two central dimensions of experience—a cognitive dimension and an affective dimension (Blumler, 1979). It has also been a major focus in research in consumer psychology and marketing, and here also, two main dimensions have been identified—pragmatic and hedonic (in the context of shopping experience or product-related experience; Hirschman & Holbrook, 1982; Mathwick, Malhotra, & Rigdon, 2001; Voss, Spangenberg, & Grohmann, 2003). These two dimensions were derived from a previous classification of experience, referred to as “extrinsic” and “intrinsic” dimensions (Mano & Oliver, 1993). Similarly, research in online health communities indicates that the two main functions of such communities are to provide informational support and emotional support (Eysenbach et al., 2004; Gustafson et al., 1999). In addition, studies conducted by surveying the members of online product communities show the relevance of both pragmatic and hedonic experience dimensions (Nambisan & Watt, in press).

The pragmatic dimension relates to the functional goals of the consumer and whether he or she accomplishes that goal—be it information seeking, support seeking, or mere hanging out. The affective/emotional dimension, on the other hand, reflects feelings and emotions derived as a result of the interaction with stimuli from the external environment. The emotional/intrinsic dimension of experience can be hedonic (i.e., fun and happy experience) or a feeling of “emotional fulfillment.” In the health context, emotional fulfillment assumes greater relevance and might be achieved through empathic support, especially for patients who are dealing with chronic/terminal illness (Olson, 2007; Preece & Ghazati, 2001). Many patients describe their situation as “understandable only if you have gone through a similar situation.” This understanding is part of empathy, which naturally stems from going through a similar situation (Hodges, Klein, Veach, & Villanueva, 2010; O’Grady et al., 2008).

Thus, drawing on this extensive research in human experience and research in online communities, we can assume that these two dimensions would be part of the experience in an online health community context as well: (1) pragmatic (usefulness or value of being in the community) and (2) empathic (intrinsic or affective/emotional state of being in the community).

However, an online health community runs in a computer-mediated environment that produces yet another type of experience, namely, usability experience, different from other types of experiences in the community. Users need to navigate through this online environment to meet their goals, which could include a range of computer-mediated tasks (e.g., posting messages, reading the threads, and finding FAQs, as well as more complicated tasks depending on the level of sophistication of the technological interface). Usability has been a major focus in the area of human-computer interaction, and many researchers have focused on developing methods to evaluate the usability of computer and Web interfaces and to prescribe ways to improve the usability and accessibility of these interfaces (Lewis, 1995; Nielson, 2000; Tullis & Stetson, 2004). However, only a few studies have focused on the usability of online communities and specifically on usability experience in online health communities (Nambisan, Gustafson, Pingree, & Hawkins, 2010; Preece, 2000). These studies show the importance of usability experience in an online health community and the impact it can have on users' learning capabilities, confidence, and self-efficacy (Preece, 2000). Recent studies also show that usability experience can have implications for the organization that is running the online community (Nambisan & Watt, in press; Nambisan et al., 2010).

In addition, the human-computer interaction and computer-mediated communication literature also identifies another dimension, sociability, which could be part of the OCE (Nambisan, in press; Nambisan et al., 2010;

Preece, 2000). The term *sociability* has been defined as the perceived support that the online environment provides for, or the extent to which it facilitates the emergence of the social space (Kreijns, Kirschner, Jochems, & Van Buuren, 2004). It does not reflect any particular technological feature or other aspect of the online environment; instead, it reflects how the community members and their activities or interactions shape the sociability potential of the online environment for other customers (Kreijns et al., 2004). Recent studies indicate the potential importance of sociability in the context of online health communities (e.g. Farnham, Zaner, & Cheng, 2001; Nambisan et al., 2010; Preece, 2000) and that sociability in an online community can be improved by clarifying the purpose of the community, having good social policies implemented in the community, and explicitly promoting member participation (Farnham et al., 2001, Preece, 2000). Similarly, activities such as flaming and hazing hinder or lower the sociability experience of the members (Honeycutt, 2005).

Thus drawing on these literature, two more dimensions of experience, (1) usability experience and (2) sociability experience, assume importance in the current context of online health communities.

Theories of Attitude Formation

Attitudes are learned, and this learning could be a consequence of information exposure, consumer's own knowledge or beliefs, or importantly, their experience. Different factors could lead to attitude formation, such as prepurchase and postpurchase attitude formation, one's friends and family, own experience, media, marketers, and others (Eagly & Chaiken, 1993). The process of socialization (social cognitive theory) plays an important role in attitude formation. This includes reinforcement or instrumental conditioning (e.g., practice behaviors that yield positive results and avoid those that produce negative behaviors), imitation or modeling (e.g., imitation of relevant others such as parents and friends), and identification (identifying with one's parents or friends might lead to attitude acquisition from them; Bandura, 1989). Furthermore, homogeneity in external environment may lead to the acquisition of the values and attitudes dominant in that environment (e.g., classroom, office). Attitude formulation may also be driven by reference groups, specifically, as a result of the pressure on members to conform to the norms accepted in a social group.

In the current context, many of the previously mentioned attitude formation theories assume relevance as patients interact with one another, read the conversations or discourse, form friendships, and formulate attitudes that are influenced by the members in the HCO-provided online community.

Research Model

Patients' OCE

Drawing on the discussion so far, we propose that patients' experience in participating in an online health community will be comprised of four dimensions: pragmatic experience, empathic experience, sociability experience, and usability experience. Next, we formally define and describe each of these experiences.

Pragmatic experience: Pragmatic experience is defined as the pragmatic or utilitarian value that the patient experiences from his or her interactions in the online health community. This experience is related to the functional aspect of the online health community. Many online health communities seem to fill a gap in the life of health consumers, mainly, information exchange, especially personalized information, social and emotional support, 24-hour access, anonymity, and opportunities for self-help (Eysenbach et al., 2004).

Empathic experience: Empathic experience in this context is the perceived empathy felt by the patient in an online health community when one posts a query and gets responses from other community members or reads other patients' postings. It is defined as an individual member's (i.e., patient's) perceptions regarding other members' feelings of compassion, warmth, sincerity, and sensitiveness toward oneself and toward the health problems that one has narrated or posted in the online health community.

Sociability experience: Sociability experience is defined as the social experience that patients derive from their interactions in the online health community. It captures patients' perceptions regarding the overall openness, friendliness, and politeness of the community members. Positive sociability experience may deliver positive social experiences that facilitate establishing strong network ties and relationships (Preece, 2000). On the other hand, when negative interactions dominate the online community—for example, flaming or rude and inappropriate postings—it lowers the sociability experienced by community members (Honeycutt, 2005).

Usability experience: Usability experience is defined as the patients' experience in navigating and using the online community environment. As such, this experience captures the ease of use and clarity of the technological features of the online community. Positive usability experience reflects an interface that allows users to navigate and participate in the online community environment smoothly and effortlessly and without any obstructions or annoyances that might distract them from their goals or interest in the community. On the other hand, negative usability experience implies technological and other types of navigational

distractions that affect patients' interactions and information acquisition processes.

Based on these, we propose the following hypothesis regarding the composition of patients' experience in online health communities.

Hypothesis H1: Patients' experience in an online health community will be comprised of four dimensions: (a) pragmatic, (b) empathic, (c) sociability, and (d) usability.

Impact on Attitude Toward the HCO and Its Services

As noted previously, HCOs provide online health communities to their patients as a value-added service. Such online communities may be a part of the organization's customer relationship strategy or it could be part of their patient-support services. It should be noted that merely providing the community may not be sufficient to improve patient attitudes; rather, it will be their experience in such online health communities that will shape their attitudes toward the HCO and its services.

Here, we suggest that positive OCE will likely lead patients to conclude that the HCO affiliated with that particular online health community is also endowed with similar positive attributes. On the other hand, negative interaction experiences will potentially induce the patients to blame such experiences on the HCO affiliated with the online community and thereby contribute to the development of more negative perceptions about the HCO and its services. Hence, the following hypotheses:

Hypothesis H2: Patients' experience in online health community, (a) pragmatic, (b) empathic, (c) sociability, and (d) usability, will be positively associated with their attitude toward the host HCO.

Hypothesis H3: Patients' experience in online health community, (a) pragmatic, (b) empathic, (c) sociability, and (d) usability, will be positively associated with their attitude toward the services offered by the host HCO.

Methodology

Study Design

The study data were collected from members of the three online health communities run by the following three major medical centers in the United States—Johns Hopkins Pathology, MD Anderson Cancer Center at the University of Texas, and Joslin Diabetes center affiliated with Harvard

Medical School. The criteria for selecting the study context were twofold: first, it should be an online patient community owned and run by an HCO, and second, it should allow open (public) access. Data from open-access online communities are more generalizable than those from online communities that allow only patients of a particular HCO to access the community. In addition, open-access online communities have much more interactions than do closed-access communities and as such offer a better diversity in data. In all these three online communities, the nature of the consumer interactions was similar—patients posted queries related to a particular disease or treatment and these queries were answered by peer health care consumers who have had experiences with the same disease/treatment (either direct experience or indirect experience through their loved ones).

A Web-based questionnaire survey was used to collect data from the members of the three online communities. The respondents were people who had interacted in that online community in the past 1-month time frame. The e-mail addresses of these online community members were taken from their postings in the community.

Approximately 800 consumers who had interacted in the three online communities in the 1 month prior to the study period were identified. These respondents were sent e-mails inviting them to participate in the Web-based survey. A sample of 215 responses were obtained—a response rate of 26.8%, which is greater than the average 10% response rate evidenced in prior Web-based surveys (Watt, 1999). However 32 incomplete responses had to be thrown out. Nonresponse due to technical factors, lack of interest, and/or boredom is considered common in Web-based surveys (Watt, 1999). In addition, in this study, participation was voluntary, and there were no incentives for completing the surveys. Thus, a final set of 183 usable responses was retained for data analysis, and the final usable response rate of the study is 22.8%.

A majority of the respondents (41%) belonged in the 50–60 years age group. The participants were mostly female (70%). With regard to educational background, 37% of the respondents had an undergraduate degree, 27% had a master's degree, and 26% had completed high school. The respondents were more or less equally distributed among the four income levels specified: 27% had an income of \$100,000 or above, 11% had between \$80,000 and \$100,000, 26% had between \$50,000 and \$80,000, and 25% had less than \$50,000. The majority of the respondents (65%) had been member of one of the three online health communities for at least more than 1 year.

Scale Development and Variable Operationalization

Online community experience. A multi-item, 7-point semantic scale was used to collect data on patients' OCE.

For measuring pragmatic, sociability, and usability dimensions, we used prior validated scales that were used to measure customer experience in general online customer communities (Nambisan et al., 2010; Nambisan & Watt, in press). For measuring empathic dimension, we created a new scale.

Specifically, for the pragmatic dimension of OCE, we used a scale adapted from measures that were developed for evaluating online customer experience in static Web sites (e.g., Mathwick et al., 2001; Voss et al., 2003). This scale included a set of eight items: valuable/not valuable, unsatisfying/satisfying, not useful/useful, informative/not informative, not productive/productive, impractical/practical, worthwhile/worthless, and relevant/irrelevant. For measuring usability experience, a scale with six items was used from a previous study that measured customer's usability experience in online communities (Nambisan et al., 2010; Nambisan & Watt, in press). This six-item scale was originally developed based on studies on usability in the human–computer interaction literature (Brooke, 1986; Lewis, 1995; Tullis & Stetson, 2004) and was also tested in a health community (Nambisan et al., 2010). The six items were complicated/simple, easy/difficult, not stressful/stressful, confusing/not confusing, consistent/inconsistent, and tiring/not tiring. For the sociability dimension, a set of five items were used—social/unsocial, polite/impolite, inviting/not inviting, unfriendly/friendly, and unpleasant/pleasant. These items were adapted from a scale that measured sociability in an online collaborative learning environment and was tested in general online customer communities and health communities (Gunawardena, 1995; Nambisan et al., 2010; Nambisan & Watt, in press; Tu, 2002).

For measuring empathic experience, we reviewed the literature and developed a scale appropriate for capturing the experience of “perceived empathy” in an online community. Empathy research, so far, has been very much focused on measuring individual's empathy toward others. For example, several instruments have been developed, including the Barrett-Lennard Relation Inventory (1981) for measuring nurse's empathy, Davis' (1983) Interpersonal Reactivity Index for measuring an individual's empathy, and the Jefferson Scale of Physician Empathy (Hojat et al., 2001) for measuring physicians' empathy. All of these are self-reported scales that measure only a person's capability for feeling empathy toward others. In this study context, perceived empathy reflects a patient's perception of other members' empathy toward him or her, and hence, these scales are not appropriate. Recent studies have developed scales to measure patients' perceived empathy from their physicians (Kim, Kaplowitz, & Johnston, 2004) and from their nurses (Olson, 2007). There are no existing scales that measure perceived empathy in an online community context. Hence, a new scale was developed for this study to specifically measure perceived empathy in an online health

community. The scale was developed by closely examining the definition of perceived empathy in an online community (Kim et al., 2004; Olson, 2007; Plank, Minton, & Reid, 1996; Preece & Ghazati, 2001). The scale had nine items: unsympathetic/sympathetic, not compassionate/compassionate, insensitive/sensitive, considerate/inconsiderate, not heartfelt/heartfelt, cold/warm, sincere/insincere, tolerant/intolerant, and supportive/not supportive.

An exploratory factor analysis (principal component method, Varimax rotation with Eigenvalues >1) of the data related to the experience items revealed four distinct dimensions (Table 1). The first factor (empathic dimension) included eight items that loaded well (loadings greater than 0.6). One item (considerate/inconsiderate) did not load well and was dropped from the scale. The eight-item measure for empathic experience had a reliability of $\alpha = .95$. The second factor, pragmatic dimension, included eight items, all with loadings greater than .6. The resulting eight-item measure had a reliability of $\alpha = .95$. The third factor (usability) had six items with strong loadings. The six-item usability measure had a reliability of $\alpha = .92$. Finally, the fourth factor (sociability) had five items that loaded well. This five-item measure had a reliability of $\alpha = .93$. Table 1 also provides cross-loadings that show that we can rule out the possibility of multicollinearity in the data. Thus, a final 27-item experience scale was adopted for the study. And, as noted previously, all the four dimension measures had reliability scores greater than the suggested threshold level of .70 (Fornell & Larcker, 1981; Hair, Black, Babin, & Anderson, 2010).

Attitude toward HCOs. Attitude toward HCOs was measured using a standard validated scale used for measuring “attitude toward organization” (Bruner & Hensel, 1992). This measure was assessed on a 7-point semantic differential scale and the included items were quality conscious/not quality conscious, distinctive image/not distinctive image, impressive/not impressive, positive opinion/negative opinion, and customer friendly/not customer friendly. After factor analysis, one factor was found to select all the five items. Table 2 provides the factor loadings for all the items included for this variable. The measure was found to have a reliability of $\alpha = .99$.

Attitude toward HCO's services. Attitude toward service was measured using a standard prevalidated scale (Bruner & Hensel, 1992). This measure's items were assessed on a 7-point semantic differential scale and the items were good/bad, important/unimportant, distinctive/common, useful/not useful, valuable/not valuable, poor quality/high quality, unsatisfactory/satisfactory, positive opinion/negative opinion, pleasing/annoying, inferior/superior, interesting/boring, like extremely/dislike extremely, and impressive/not impressive. Survey participants were asked to fill this set of questions, even if they were not patients or

Table 1
Factor scores, standardized estimates, and CFA results for OCE

Items	Factor scores from EFA				CFA estimates (standard estimate)
	OCE Emp	OCE Prag	OCE Usab	OCE Soc	
Empathic experience					
Unsympathetic/sympathetic	.890	.193	.100	.143	.901
Sincere/insincere	.847	.174	.177	.179	.868
Not compassionate/compassionate	.839	.178	.114	.264	.897
Not heartfelt/heartfelt	.821	.193	.108	.190	.797
Tolerant/intolerant	.816	.164	.181	.166	.825
Insensitive/sensitive	.811	.234	.068	.192	.852
Cold/warm	.776	.089	.025	.302	.767
Supportive/not supportive	.616	.182	.205	.417	.743
Pragmatic experience					
Valuable/not valuable	.167	.887	.039	.081	.895
Unsatisfying/satisfying	.170	.877	.032	-.009	.889
Not useful/useful	.276	.863	.082	.078	.901
Informative/not informative	.143	.842	.071	.089	.807
Not productive/productive	.144	.834	-.040	-.027	.774
Impractical/practical	.216	.831	-.071	-.098	.790
Worthwhile/worthless	.097	.799	.110	.021	.776
Relevant/irrelevant	.018	.799	-.077	.022	.754
Sociability experience					
Complicated/simple	.059	.035	.886	.084	.790
Easy/difficult	.056	-.025	.872	-.020	.860
Not stressful/stressful	.231	-.020	.871	-.035	.909
Confusing/not confusing	.023	.005	.868	.078	.791
Consistent/inconsistent	.280	.046	.791	.039	.831
Tiring/not tiring	.070	.051	.726	.090	.610
Usability experience					
Social/unsocial	.182	.026	.001	.898	.894
Polite/impolite	.171	.016	.052	.866	.870
Inviting/not inviting	.296	.070	.092	.850	.876
Unfriendly/friendly	.290	-.084	-.012	.800	.804
Unpleasant/pleasant	.412	.043	.115	.736	.731

Note. $n = 183$; $\chi^2 = 389.08$ ($p > .001$); $df = 250$; RMSEA = .05; CFI = 0.973; NFI = 0.929; normed $\chi^2 = 1.56$. CFA = confirmatory factor analysis; EFA = exploratory factor analysis; OCE = online community experience; OCE Emp = OCE empathic; OCE Prag = OCE pragmatic; OCE Usab = OCE usability; OCE Soc = OCE sociability.

Bold scores indicate the highest loadings.

undergoing treatment at the particular HCO. They were told specifically that the objective of this question is to measure their general impression about the HCO's services. After factor analysis, one factor was identified, which included 11 items. Two items, positive opinion/negative opinion and inferior/superior, had to be dropped due to poor loadings. Table 2 provides the factor loadings for all the items included for this variable. The measure was found to be reliable ($\alpha = .97$).

Data Analysis

Table 3 shows the descriptive statistics including the correlations among the study variables. The reliability co-

efficient (α) for the various measures ranged from .92 to .97, well exceeding the recommended minimum of .70 set by Fornell and Larcker (1981; Table 3). Thus, all of the constructs indicated good internal consistency. To check for discriminant validity, a pairwise correlation test was conducted among all the study constructs. We found that the correlations between items belonging to different constructs were all below .3, thereby demonstrating the discriminant validity of the measures. Another indicator of discriminant validity is when the average variance extracted for each construct is higher than the squared correlation between the constructs (Fornell & Larcker, 1981). This was evaluated for each pair of constructs in the model, and it was found that all constructs satisfy this

Table 2**Factor analysis of attitude toward the HCO and its services**

Score

Attitude toward HCO items	
Impressive/not impressive	.927
Positive opinion/negative opinion	.911
Distinctive image/not distinctive image	.911
Quality conscious/not quality conscious	.873
Customer friendly/not customer friendly	.804
Reputed/not reputed	.773
Attitude toward HCO services items	
Worthless/valuable	.932
Like extremely/dislike extremely	.925
Distinctive/common	.911
Impressive/not impressive	.911
Good/bad	.909
Useful/not useful	.888
Poor quality/high quality	.873
Interesting/boring	.858
Unsatisfactory/satisfactory	.852
Pleasant/annoying	.852
Important/not important	.830

Note. $n = 183$. HCO = health care organization.

criterion, thus providing further evidence of the discriminant validity of the measures used.

A confirmatory factor analysis was done using AMOS 17.0 to test hypothesis H1. Linear regression technique was used to test the study hypotheses related to patient attitudes (H2 and H3). The regression analysis also incorporated a dummy variable, termed HCO, to control for the effect of the HCO that owned or managed the online commu-

nity (e.g., Johns Hopkins, Joslin Diabetes Center, or MD Anderson Cancer Center). Before conducting the regression analyses, normality assumption tests were conducted. Specifically, the Shapiro-Wilkes W test was conducted on the data for each of the study constructs, and it was found that the test statistic W was not significant in each of those cases; thus, the normality assumption was found to hold for the study data.

Results and Discussion

The results from the confirmatory factor analysis indicate four distinct dimensions. The overall model fit estimates were as follows: $\chi^2 = 389.08$ ($p > .001$) with $df = 250$. The p value was significant using a Type 1 error rate of .05; however, for a sample size of 183 and with 27 observed items, this is within reasonable limits (Hair et al., 2010) if other goodness-of-fit indices provide good support. The first goodness-of-fit indicator is the root mean square error of approximation (RMSEA), which is an absolute fit index, and the value for this is .05 (which is less than .06, indicating good model fit). An RMSEA value this low, especially for this sample size and large number of items, is considered to be good support for the model fit. The second indicator is comparative fit index (CFI), which is 0.973, and the third is normed fit index (NFI), which is .929 (both values over .90, indicating very good model fit). In addition, the normed χ^2 , which is χ^2 divided by the degrees of freedom ($389.08/250 = 1.56$), which is less than 2, indicating very good fit model. The path estimates were all above .6 (Table 1 provides the standardized estimates), confirming the four dimensions of OCE and thereby validating hypothesis H1. Thus, The OCE construct for measuring patient experience in online communities provided by an HCO has four

Table 3**Correlations, means, SDs, and reliability (α)**

Variables	M	SD	α	1	2	3	4	5	6
1. OCE emp	5.8	.96	.95	1					
2. OCE prag	6.1	1.09	.95	.374**	1				
3. OCE usab	5.7	1.14	.92	.288**	.068	1			
4. OCE soc	5.1	1.23	.93	.550**	.098	.146*	1		
5. Att HCO	6.1	0.99	.93	.577**	.470**	.251**	.310*	1	
6. Att serv	6.2	0.92	.97	.464**	.296**	.277**	.214*	.578**	1

Note. $n = 183$. OCE emp = online community experience empathic; OCE prag = online community experience pragmatic; OCE usab = online community experience usability; OCE soc = online community experience sociability; Att HCO = attitude toward the health care organization; Att serv = attitude toward the health care organization's services.

*Correlation is significant at the .05 level (two tailed).

**Correlation is significant at the .01 level (two tailed).

Table 4
Regression results

Variables	Attitude toward HCO			Attitude toward HCO services		
	β	SE	p	β	SE	p
Constant	.287	.141	.056	.023	.182	.898
HCO (control variable)	.130	.068	.068	.017	.086	.828
OCE empathic	.460	.057	.000	.406	.075	.000
OCE pragmatic	.381	.057	.000	.209	.074	.005
OCE usability	.198	.057	.001	.233	.071	.002
OCE sociability	.187	.058	.001	.022	.077	.767
R^2			.432			.268
Adjusted R^2			.416			.241

Note. $n = 183$. HCO = health care organization; OCE = online community experience; SE = standardized estimates.

distinct dimensions, specifically, pragmatic, empathic, sociability, and usability.

Table 4 shows the results of the linear regression. As predicted, hypotheses H2a, H2b, H2c, and H2d were all supported. All the four dimensions of OCE, pragmatic ($\beta = .381, p < .001$), empathic ($\beta = .460, p < .001$), usability ($\beta = .198, p < .05$), and sociability ($\beta = .187, p < .05$), had significant positive impact on patients' attitude toward the HCO.

Hypothesis H3 also had overall support, except for one dimension. Three dimensions of OCE, specifically, pragmatic ($\beta = .209, p < .05$), empathic ($\beta = .406, p < .001$), and usability ($\beta = .233, p < .05$), had a significant positive impact on patients' attitude toward HCO's services. However, hypothesis H3d was not supported—sociability experience did not have any impact on patients' attitude toward HCO's services.

These results provide strong support for our broader study thesis regarding the composition of patients' OCE and its impact on patient attitudes. The only unsupported relationship was that of sociability experience with the attitude toward HCO's services. It could be that patients attribute sociability experience to be a quality of the community members or as a quality of the organization that attracts these members and not necessarily as an indicator of HCO's service quality.

Study Limitations

A few limitations of this study are briefly noted. First, the study sample included only online communities that were run by HCOs such as Johns Hopkins, MD Anderson, and Joslin Diabetes center, which are highly reputed and large HCOs, and this might limit the generalizability of the study

findings to online communities run by lesser known and smaller HCOs. Second, the data were collected only from those members who had publicized their e-mails in these online communities. This is a constraint for all studies that attempt to collect data from publicly accessible online communities; however, it also implies a potential sample bias and, as such, a study limitation here. Although this potential limitation is acknowledged here, it must also be noted that members who publicize their e-mail addresses are likely to be repeat visitors (compared with those who do not publicize) and, as such, form the most appropriate study participants for this study.

Implications and Conclusions

Research Implications

This study introduces the concept of patients' OCE and emphasizes the need to evaluate OCE in online health communities. As noted earlier, when an HCO offers access to an online health community, it becomes another point of interaction for patients and thereby yet another space where they can have a positive or negative experience. This online space becomes part of the broader HCO–patient interaction context, and there needs to be more research to understand how experience from the online community may supplement or interact with patients' offline experience with the HCO. A number of prior studies have emphasized the importance of patients' online support and how it impacts their overall treatment outcomes (Eysenbach et al., 2004; Gustafson et al., 1999). However, there has been limited focus on actually measuring this experience or on empirically showing how such experience can impact patients' attitude toward the HCO and its services. This study provides a theoretical and empirical foundation for future research in this area.

Practice Implications

The different dimensions of OCE—pragmatic, empathic, sociability, and usability experience—give practitioners a more holistic view of what patients are experiencing and how HCOs can enhance and facilitate positive experiences in the online community. The online community can be designed to improve the pragmatic experience, for example, by providing FAQs and archives of messages, clustering similar topics, and providing links to reputed patient education sites. In addition, features like “ask a nurse” or “ask a doctor” can also significantly contribute to the information needs of this population and thereby improve the pragmatic experience. The design can also incorporate features that will enhance empathic experience, for example, special forums within the community that bring together people with similar diseases or health

backgrounds. Many social networking sites such as Facebook use such design features to enhance members' networking potential. In addition, the designer can also incorporate statistical tools that the members can employ to better understand the disease demographics of the online community. This will enable the member to gain a bird's-eye view of the number of people who have similar disease or health background as themselves. Health communities such as "Patients-like-me" (Wicks et al., 2010) have deployed such a feature to enhance the potential for empathic communication and thereby enhance empathic experience.

Similarly, the designer can also add features that will enhance the sociability and usability experience of its members. Features that will allow members to form their own groups—groups that share a purpose, such as weight loss or treatment adherence—can enhance sociability potential. Many people find that difficult-to-adhere-to treatments are easier to achieve as a group than alone, and hence, the use of social media for this purpose is increasing rapidly (Hawn, 2009). In addition, social media features such as Twitter can be embedded into the design to enhance not only the sociability experience but also the usability experience. Making the community accessible through mobile telephones is another way to improve the usability experience.

Finally, the study findings also imply the potential for HCOs to improve their image and reputation among patients. Results from this study show that one main outcome of managing an effective online health community is the shaping of patients' positive attitudes toward the HCO and its services. This can be further enhanced by allowing more open conversations between patients and the HCO and by using the online community as a forum to educate patients on the different services offered by the HCO. From knowledge management research, we know that these patient discussions can also be mined to extract important information regarding ways to improve HCO's services (Winkelman & Choo, 2003).

In conclusion, evaluating patients' experience in HCO-run online health communities is important and should not be ignored, as it has the potential to shape patient attitudes toward the HCO and its services. Many HCOs carefully measure and evaluate patient experiences within the hospital (Coulter & Cleary, 2001; Rothman et al., 2008) and also collect feedback regarding the usability of their Web sites but neglect to monitor patients' experiences in their online community. This study proves that it is critical to include OCE as part of the overall patient experience within the HCO.

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