

User-Centered Strategy and Service Design for Online Social Networks and Community Engagement

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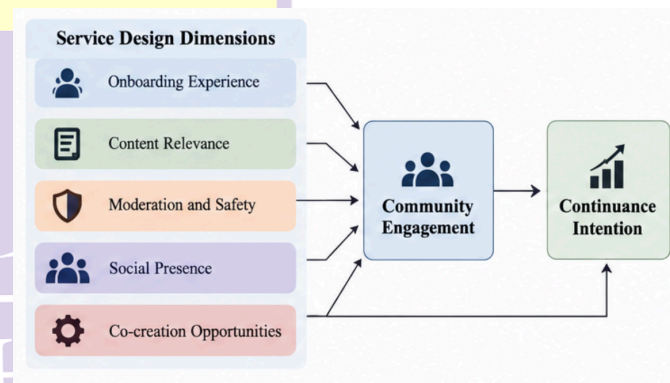
ABSTRACT—In addition to offering features and functionalities, nowadays online social networking and digital communities strive to excel on the dimension of member experience as well. Quite a large number of communities are not able to turn sign-ups into continued usage because of inappropriate service journey design. The current research explores the connections between five user-centered service design factors and community engagement as well as continuance intentions: onboarding process, content relevancy, moderation and safety, social presence, and opportunities for co-creation. Using the data from a survey of 386 active community members from interest-based, professional, brand, and civic online communities and conducting partial least squares structural equation modeling (PLS-SEM), all five factors were found to be significant predictors of community engagement and collectively explained 54.2% of its variance. Social presence ($\beta = .287$) and content relevancy ($\beta = .226$) demonstrated the highest impact among the five factors. Community engagement, in turn, strongly predicted continuance intention ($\beta = .538$) and moderated and safe environment directly influenced continuance intention as well ($\beta = .192$). The current model accounted for 42.5% of variance in continuance intention. Engagement varied greatly depending on whether members were lurkers, occasional contributors, or active contributors ($F(2, 383) = 61.03, p < .001, \eta^2 = .242$).

KEYWORDS—User-centred design; service design; online social networks; community engagement; co-creation; content moderation; continuance intention

INTRODUCTION

Online social networks have progressed beyond mere connection tools to become sophisticated service ecologies. They enable professional learning collectives, hobby forums,

brand communities, and neighborhood networks. Their worth lies in the level of activity of its members because a poorly active community offers only little information, social support, and motivation for repeat visitation. One of the problems prevalent among communities is the presence of a large number of passive consumers in addition to many of them leaving soon after joining the community.



The user-centered design (UCD) and service design provide an approach that can help solve this problem. UCD puts users' goals, context, and constraints into the focus during decision-making (Norman, 2013). Service design takes this approach to the next level and considers the journey from discovery to onboarding to use, contribution, conflicts, and renewal. It makes the entire journey process that forms the user experience visible (Bitner, Ostrom, & Morgan, 2008; Stickdorn, Hormess, Lawrence, & Schneider, 2018). Service-dominant logic argues that the value in communities is co-produced by its members rather than offered only by the platform itself (Vargo & Lusch, 2004).

In this paper, the concepts described above are operationalized into five service-design dimensions and analyzed for their

correlations with community engagement and continuance intention. The research aims are: (a) to measure the perceptions of members regarding the five service-design dimensions; (b) to evaluate the impact of those on the community engagement; (c) to find out whether the engagement and perceived safety affect continuance intention; (d) to compare engagement among participation segments.

LITERATURE REVIEW

User-Centred Design and Sociability

According to Preece (2000), good online communities entail usability, which is effective software design, and sociability, which is effective social policy and purpose design. According to Norman (2013), the availability of affordance, feedback, and conceptual models enables the user to engage effectively in the process. Kraut and Resnick (2012) summarize extensive research and come up with evidence-based claims regarding the design of online communities, including attracting new participants, building commitment, encouraging contributions, and managing behavior. Their conclusions suggest that design choices and not size matter in sustaining participation.

Service Design and Value Co-Creation

Service blueprinting as the method of mapping customer actions, frontstage interactions, and backstage support processes has been proposed by Bitner et al. (2008). Service design practice has been operationalized by Stickdorn et al. (2018) as an iterative process involving research, ideation, prototyping, and implementation phases. Customers have been viewed as co-creators of value by Vargo and Lusch (2004) shifting the focus of marketing from goods to services. Co-creation experiences rooted in dialogue, access, risk assessment, and transparency represent the basis of future value creation, according to Prahalad and Ramaswamy (2004). In online communities, members contribute content, answer questions, and set norms. Therefore, co-creation is inherent to the service itself.

Community Engagement

Hollebeek et al. (2014) have devised a measurement tool for consumer brand engagement on social media in terms of cognitive processing, affect, and activation. Cognitive, emotional, and behavioral dimensions of engagement and the subprocesses like learning, sharing, advocacy, socializing, and co-development in a virtual brand community have been examined by Brodie et al. (2013). In online communities, motivations of members like information-seeking and need for a feeling of belonging have been shown to predict participation (Lampe, Wash, Velasquez, & Ozkaya, 2010). Nonnecke and

Preece (2000) have found that lurkers form a significant fraction of many communities, meaning that engagement design has to accommodate both passive and active members.

Social Presence and Social Capital

According to social presence theory, media are different in their ability to convey other persons' presence (Short, Williams, & Christie, 1976). Features allowing other members to be seen and responded to (replies, mentions, profiles, real-time activity, etc.) are likely to increase engagement. Ellison et al. (2007) have found that social networking site usage relates to bridging, bonding, and maintained social capital. The drivers of knowledge contribution in electronic networks of practice have been identified as reputation, structural embeddedness, and commitment by Wasko and Faraj (2005).

Moderation and Safety

Grimmelmann (2015) describes moderation as the governance mechanism enabling communities to promote cooperation and prevent abuse via means of exclusion, pricing, organization, and norm-setting. Moderation is an essential aspect of platform identity in shaping what users see and affecting their feelings of safety enough to engage, according to Gillespie (2018). Therefore, safety is likely to impact both engagement and members' retention.

Continuance Intention

Continuance intention has been derived as dependent upon satisfaction and usefulness with the system by Bhattacharjee (2001) modifying expectation-confirmation theory to information systems context. Perceived usefulness and perceived ease of use have been found to be the key adoption beliefs by Davis (1989). In the case of online communities, continuance is the strategic outcome because member churn reduces the value of the network.

Research Gap

Previous literature tends to study such isolated factors as motivation, social capital, or moderation. There is a lack of comprehensive analyses combining service design dimensions throughout the entire member life cycle in a single empirical model. Also, evidence covering several community types is rather rare. The present study aims at addressing these two gaps.

Hypotheses

H1-H5: Onboarding experience (H1), content relevance (H2), moderation and safety (H3), social presence (H4), and co-

creation opportunities (H5) have a positive effect on community engagement.

H6: Community engagement has a positive effect on continuance intention.

H7: Moderation and safety have a positive effect on continuance intention.

H8: Community engagement differs among participation segments.

METHODOLOGY

Research Design

A quantitative, cross-sectional survey design has been used. The current study follows an explanatory approach by testing a structural model based on user-centered design (UCD) and service design theory.

Sample and Data Collection

The target population included adults (≥ 18 years) being members of at least one online community for at least three months. An online survey questionnaire has been distributed to members of several community types through community moderators, professional networks, and social media groups applying purposive sampling. Out of 431 responses, 45 ones were rejected because of incompleteness, lack of attention, and too short membership period (less than three months). Thus, 386 valid responses were obtained. On average, respondents have been members for 2.7 years ($SD = 1.9$). The resulting sample size exceeded the minimal threshold of 147 required by the inverse-square-root approach for partial least squares structural equation modeling (PLS-SEM) at a path coefficient of 0.20 and $\alpha = 0.05$.

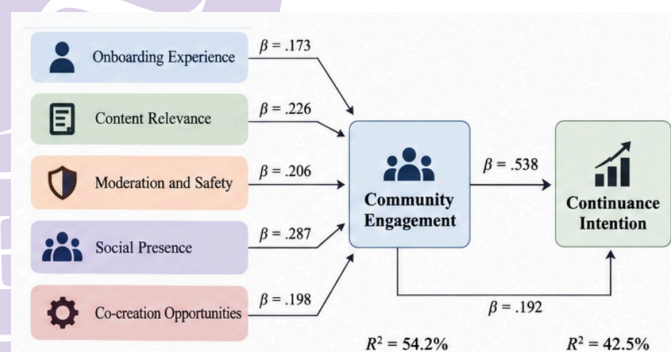
Table 1. Respondent Profile (N = 386)

Variable	Category	Frequency	Percentage
Gender	Female	190	49.2
	Male	190	49.2
	Other / Prefer not to say	6	1.6
Age	18–24 years	124	32.1
	25–34 years	158	40.9
	35–44 years	72	18.7
	45 years and above	32	8.3
Community type	Interest / hobby	142	36.8

	Professional / learning	117	30.3
	Brand product	71	18.4
	Local / civic	56	14.5
Participation segment	Lurker (rarely posts)	158	40.9
	Occasional contributor	149	38.6
	Active contributor	79	20.5

Measures

All constructs were measured on 5-point Likert scales (1 = strongly disagree, 5 = strongly agree) using items adapted from established sources. Onboarding experience (4 items) and content relevance (4 items) were developed from Kraut and Resnick's (2012) newcomer and information-design claims. Moderation and safety (4 items) drew on Grimmelmann (2015) and Gillespie (2018). Social presence (4 items) was adapted from social presence theory (Short et al., 1976). Co-creation opportunities (4 items) reflected Prahalad and Ramaswamy's (2004) dialogue and access dimensions. Community engagement (6 items) was adapted from Hollebeek et al. (2014). Continuance intention (3 items) came from Bhattacharjee (2001). The instrument was reviewed by three UX and service design academics and piloted with 25 community members.



Data Analysis

The assessment of the measurement and structural models was done using SmartPLS 4, in accordance with the instructions of Hair et al. (2019). The convergent validity was checked based on factor loadings, composite reliability (CR) and average variance extracted (AVE). Discriminant validity was confirmed with Fornell-Larcker criterion (Fornell & Larcker, 1981) and the HTMT criterion (Henseler et al., 2015). Significance of path coefficients was estimated using 5,000 bootstrap samples. Differences between segments were assessed with one-way

ANOVA and Games-Howell tests using SPSS 27. No common method bias was confirmed with Harman's single-factor test (31.8%) and full collinearity VIFs (all <2.3).

RESULTS

Descriptive Statistics and Measurement Model

Onboarding (M = 3.64) and continuance intention (M = 3.72) received the highest scores from the participants. At the same time, co-creation opportunities (M = 3.05) and moderation and safety (M = 3.12) received the lowest scores, indicating possible service gaps. All factor loadings were >.70, all CR values were between .86 and .92 and AVE values were >.50.

Table 2. Descriptive Statistics and Measurement Model Assessment

Construct	Items	Mean	SD	Loading range	Cronbach's α	CR	AVE
Onboarding Experience (OE)	4	3.64	0.77	.74–.83	.79	.86	.61
Content Relevance (CR)	4	3.38	0.84	.76–.84	.81	.88	.64
Moderation & Safety (MS)	4	3.12	0.91	.77–.85	.83	.89	.66
Social Presence (SP)	4	3.47	0.79	.75–.84	.80	.87	.63
Co-creation Opportunities (CC)	4	3.05	0.88	.72–.82	.78	.86	.60
Community Engagement (CE)	6	3.41	0.83	.77–.87	.90	.92	.67
Continuance Intention (CI)	3	3.72	0.80	.81–.88	.80	.88	.71

Table 3. Discriminant Validity (Fornell–Larcker Criterion)

Construct	OE	CR	MS	SP	CC	CE	CI
OE	.781						
CR	.42	.800					
MS	.36	.38	.812				
SP	.39	.44	.41	.794			
CC	.34	.40	.33	.47	.775		
CE	.46	.55	.48	.60	.53	.819	
CI	.41	.47	.45	.52	.44	.63	.843

Note. Diagonal values are the square root of AVE. All HTMT ratios ranged from .41 to .74, below the .85 threshold.

Structural Model

The five dimensions of service design had a considerable impact on community engagement, thus providing support for H1-H5. Social presence had the highest impact ($\beta = .287$, $f^2 = .117$), while content relevance ($\beta = .226$) and co-creation ($\beta = .209$) had the second-highest impact. Onboarding had the lowest but still significant impact ($\beta = .123$, $f^2 = .024$). Engagement predicted continuance intention significantly ($\beta = .538$, $f^2 = .387$), thus proving H6, while moderation and safety added a direct impact ($\beta = .192$), providing support for H7. The coefficients of determination were $R^2 = .542$ for engagement and $R^2 = .425$ for continuance intention. Predictive relevance was proved by Q^2 (CE = .38; CI = .29), while SRMR = .058 showed good model fitness.

Table 4. Structural Model Path Coefficients

Hypothesis	Path	β	t-value	p-value	f^2	Decision
H1	OE $\rightarrow$ CE	.123	3.05	.002	.024	Supported
H2	CR $\rightarrow$ CE	.226	5.40	<.001	.077	Supported
H3	MS $\rightarrow$ CE	.163	4.07	<.001	.044	Supported
H4	SP $\rightarrow$ CE	.287	6.67	<.001	.117	Supported
H5	CC $\rightarrow$ CE	.209	5.08	<.001	.068	Supported

H6	CE → CI	.53 8	12.1 8	<.00 1	.38 7	Supporte d
H7	MS → CI	.19 2	4.34	<.00 1	.04 9	Supporte d

R^2 : CE = .542; CI = .425.

Indirect Effects

All service design dimensions had significant indirect effects on continuance intention through engagement. Social presence had the largest indirect effect. Moderation and safety had the largest total effect on continuance intention (.192 direct + .088 indirect = .280).

Table 5. Specific Indirect Effects on Continuance Intention via Engagement

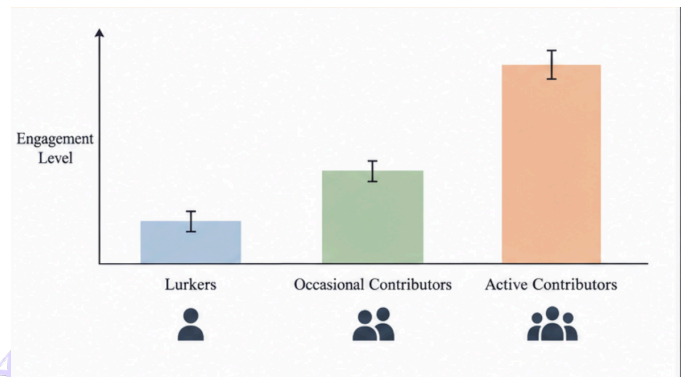
Indirect path	β	95% CI Lower	95% CI Upper	Significant
SP → CE → CI	.155	.103	.211	Yes
CR → CE → CI	.122	.074	.173	Yes
CC → CE → CI	.112	.066	.161	Yes
MS → CE → CI	.088	.044	.134	Yes
OE → CE → CI	.066	.023	.111	Yes

Engagement Across Participation Segments

Engagement differed significantly across participation segments, $F(2, 383) = 61.03$, $p < .001$, $\eta^2 = .242$, which supports H8. Games–Howell tests showed that all pairwise differences were significant ($p < .001$).

Table 6. Community Engagement by Participation Segment

Segment	n	Mean CE	SD
Lurker	158	2.98	0.78
Occasional contributor	149	3.52	0.71
Active contributor	79	4.06	0.64
Total	386	3.41	0.83



Discussion

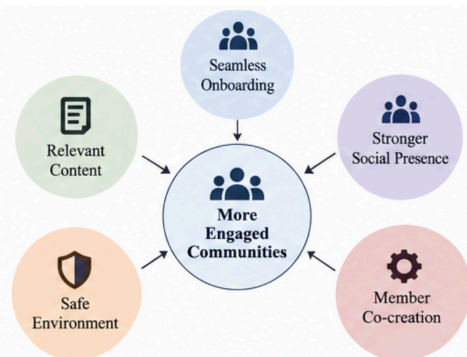
The results show that the engagement in the community is influenced by service design during all stages of the member lifecycle, with social presence being the most influential driver. This result is congruent with the research conducted by Short et al. (1976) and with the results by Ellison et al. (2007) and Wasko and Faraj (2005), according to which members are engaging because others are present and responsive. Content relevance is the second most influential driver, and it is congruent with the results by Lampe et al. (2010), identifying information seeking as one of the primary motivations for participation.

Co-creation opportunities have a great impact although they are relatively lower rated ($M = 3.05$). This discrepancy is quite significant. According to Prahalad and Ramaswamy (2004) and Vargo and Lusch (2004), communities that treat their members passively lose out on value created by them. This result is also congruent with the results by Brodie et al. (2013), where co-development is mentioned as a sub-process of engagement.

Moderation and safety have a significant role both for engagement and as a direct predictor of continuance intention. They have the greatest overall impact on retention. This result empirically confirms the statement made by Gillespie (2018) regarding moderation as a major part of platform identity. Members can live with poorer quality of other dimensions of the service but they cannot stay in an unsafe space. Since moderation is the poorest-rated dimension ($M = 3.12$), it needs to be urgently improved.

Onboarding has a relatively small effect even though it is significant. It can be considered as a gatekeeper—important to get members there and then less relevant to keep them involved in the community. This result agrees with the conclusions made by Kraut and Resnick (2012), differentiating the attraction of newcomers from commitment. Large engagement gap between lurkers and active participants ($\eta^2 = .242$) confirms the claim made by Nonnecke and Preece (2000) about the distinctive nature of lurkers that needs to be addressed.

Finally, strong CE → CI relationship confirms the continuance model of Bhattacharjee (2001).



Strategic and Practical Implications

Design for presence: Increase visibility and responsiveness of other members through the use of methods like notification replies, welcoming posts, member spotlights, and activity indicators.

Personalized content journeys: Develop interest-based streams, topic subscriptions, and curate digests in order to increase relevancy, which was found to be the second strongest engagement driver.

Institutionalize co-creation: Formalize member roles (moderators, mentors, contributors) and give them the opportunity to vote for features and participate in events.

Invest in moderation as a service: Set up clear guidelines, prompt reporting, and enforcement mechanism. Design moderation as an open stage process in service blueprint (Bitner et al., 2008), rather than a hidden back-office expense.

Provide paths for lurkers to become contributors: Give members low-stake actions, like reactions, voting, and introductions, in order to help them move from being passive lurkers to becoming contributors.

Limitations and Future Research

The cross-sectional design makes inferences about causality difficult, and longitudinal tracking of member journeys could strengthen the inferential power. Self-reporting might not fully represent the actual behavior; future research should combine survey data and platform analytics. The sampling strategy and multiple communities might limit generalizability. Future directions might include multi-group analysis, journey mapping research, and field experiments of the design interventions.

CONCLUSION

The results show that user-centered service design is a strategic tool for improving community engagement and retention. Features like social presence, content relevancy, co-creation, moderation, and onboarding together explain more than half of the variance in engagement, and engagement, in turn, explains members' intentions to stay in the community. Online communities based on the design that addresses members' relational, informational, and safety needs and invites them to co-create have the best chances to ensure their sustained engagement.

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