

“Digital Sanctums of Empowerment”: Exploring Community and Everyday Resilience-Building Tactics in Online Professional Communities for Women

Subhasree Sengupta
Syracuse University
susengup@syr.edu

Zhasmina Tacheva
Syracuse University
ztacheva@syr.edu

Abstract

Work and learning are essential facets of our existence, yet women have and may continue to face multiple restrictions that hinder and impede their professional outcomes. These restrictions are especially pronounced in the technical domains of Information technology and Computer science. This paper explores the power of informal online communities to act as collective shields of care in the context of professional development, especially for women. Using a mixed-methods comparative investigation of 400,268 conversational traces from three professional development communities on Reddit, we report resilience and communal empathy-building tactics, as well as calls for inclusivity and belongingness, which drive the collective identity of these online channels. The long-term goal of this work is to address the way in which such channels can be designed and curated to offer spaces for enrichment, empowerment, and advocacy with a focus on the professional development of women, especially those engaged in technical domains.

Keywords: Resilience building and support, Online community norms and support, Gender in the workplace, Comparative mixed-methods analysis, Reddit.

1. Introduction

Work, learning, and establishing one’s professional footprint can be integral to our day-to-day lives. However, the ability to sustain one’s professional footprint might be contingent upon one’s social standing and identity (Ellemers et al., 2004). This consideration is particularly pertinent to women who have traditionally faced multiple sociocultural impediments to their professional aspirations (Hatmaker, 2013). In this context, social constructivist frameworks have helped to illuminate how the construct of gender emerges in practice. One particularly helpful

framework is Pierre Bourdieu’s conceptualization of the gendered habitus which highlights how a structure emerges around the construct of gender that affects the agency of women. Such structural subjugations are further magnified in the technical domains of information technology and computer science, which historically have had an organizational cultural tradition that has placed women and other marginalized groups at the periphery despite their pivotal role in the development of technology (D’ignazio and Klein, 2020). The presence of these structurally embedded exclusionary forces may cause disruption and crisis in professional women’s lives which highlights the need to find channels and avenues for everyday resilience-building (Semaan, 2019). Thus, crafting one’s professional footprint may entail not only the need for access to knowledge and information, but also for giving and receiving extended communal support, mentoring, understanding, and care (Wheeler and Dillahunt, 2018).

In addition to acting as information and knowledge-sharing hubs, social media platforms have recently emerged as collectives of resilience that offer a safe haven for those who might face multiple intersecting social hindrances and stigmas (Ahmed et al., 2019; Lucero, 2017). Several studies show how such channels help build community and provide multiple dimensions of support which may lead to developing collective endurance and shared visions of empowerment (Andalibi et al., 2018; Sengupta and Tacheva, 2022). Yet, the conversational practices and values in these virtual collectives may also serve as an example of a performative habitus that is created and sustained through the emergent community norms of reciprocity and exchange (Martey and Stromer-Galley, 2007). Feminist technology studies have highlighted how this habitus may also create a form of gendered practice regulating the way women can participate and express themselves online (Wajcman, 2010). While extant digital gender research offers powerful frameworks for detecting systems of oppression and

evaluating their harmful effects, the ways to counter these oppressive elements especially in the context of professional development have been under-researched, which leads to a need for a systematic investigation of the tools and practices that can help women to collectively unite and empower one another. Motivated by the social premise of community-building in online channels, this study offers a mixed-methods comparative analysis of several professional development forums using content analysis, network analysis, and linguistic markers. Given that Reddit has emerged as a powerful avenue for communal exchange and deliberation on a wide cross-section of topics, the study focuses on the following three subreddits: *r/cscareerquestions* (*r/csc*) (created in 2011, with a total of 832,000 members) - a general forum focused on technical careers, and *r/girlsgonewired* (*r/ggw*) (created in 2012, with 22,300 users) and *r/careerwomen* (*r/cw*) (created in 2013, with 4,479 users) - two women-centric career forums (Anderson, 2015). These online communities have been selected because they allow us to unpack, on the one hand, the community dynamics, support provisions, and resilience-building tactics in each community, and how women-centric forums may offer additional avenues for resisting and subverting gendered tensions associated with professional development, especially in technical domains, on the other.

2. Theoretical motivation and related work

2.1. The Habitus framework & applications to work and gendered expression

The theoretical grounding of this work is rooted in Bourdieu's conceptualization of the habitus, which states that one's disposition - expressed in terms of one's values, beliefs, instincts, and moral convictions - is shaped by, and in turn shapes, one's embeddedness or social position (Bourdieu, 2001). This habitus can be observed in the organizational context as well, where one may have to negotiate as they carve their professional identity, calling for the need to find avenues to network, seek knowledge and guidance for career advancement and identity development (Caza and Creary, 2016). An important extension of the habitus concept is the notion of the gendered habitus, which in Bourdieu's view is something that happens subconsciously and is so deeply etched into cultural practices that it becomes a routinized, internalized, and normalized act resulting in a gendered social condition Bourdieu calls "doing gender" (Dillabough*, 2004). Yet, imbued in this gendered habitus are also implicit and explicit norms of social inequity,

which may result in acts of symbolic violence and domination of women manifesting in the workplace (Peterson, 2007). In the context of the technical workplace specifically, prior scholarship has shown how sociocultural barriers may restrict professional enrichment which may erode women's self-esteem (Herman, 2015). These findings warrant the need to look into communal avenues of support-seeking and resilience-building such that women may find refuge and guidance and identify pathways to navigating professional crises and transitions (Sengupta and Semaan, 2021).

2.2. Subverting the Habitus: Cultivating collective agency and empowerment through virtual channels

A parallel stream of scholarship highlights the use of social media as a source of support for a diverse spectrum of issues. Specifically, constructivist frameworks have sought to understand how an emergent structure arises amidst the unregimented patterns of engagement, creating a kind of performative habitus driven by norms and values and imposing a schema of participation and action (Rosenbaum and Shachaf, 2010). Thus, collaborative identity and affinity play a pivotal role in the type of experiential sharing, learning, and support mechanisms nurtured (Liu et al., 2020). Studies have shown how such spaces' collective identity may drive their purpose. For example, some may retain a more lightweight model of attachment serving primarily informational needs, while others may, additionally, create a community of support, empowerment, and care, rooted in a more interpersonal model of trust (Tausczik et al., 2014). Pertinent to the first type of online attachment models, prior research has highlighted how open online forums can help provide knowledge, and peer mentoring from a more informational perspective associated with professional development (Tomprou et al., 2019).

Another burgeoning arc of investigation has pointed to how such channels can act as avenues of refuge by offering safe spaces to discuss stigmatized topics (Lucero, 2017). Thus, online communities can help shape a collective purpose aimed at dismantling structures of systemic and symbolic oppression (Yang, 2016). Critical in such community-building activities is the notion of social capital, which captures the potential of social connectivity for affording collective goals, outcomes and purposes (Steinfeld et al., 2013). Studies have also shown how the gendered habitus and its obstruction to social equity can impact the social capital one can access, highlighting the need

for collective communal enterprise to foster unity and facilitate social capital creation and maintenance (Burt, 1998; Fiesler et al., 2016). Different forms of social capital may activate different types of narrative agency, which may further help to raise awareness and help boost cooperative outcomes (Tacheva et al., 2021). Such collective activities can engender a sense of communal affinity which can become a key vehicle for seeking and providing guidance, support, and care. One is thus enabled not just to grow their professional footprint, but also to cultivate ways to tackle the structural barriers to expression, especially in the workplace (Schuschke and Tynes, 2016).

3. Research framing

The goal of this study is to illuminate the form of support and resilience-building tactics different types of professional communities offer comparatively. Particularly, we seek to understand how the gendered habitus is formed in online communities. This investigation is therefore guided by the following three questions:

1. *What forms of habitus emerge in the online communities of interest, as indicated by the content themes, psychosocial cues, and emergent social network structure?*
2. *What kind of support and resilience building mechanisms are indicated through the communal practices of the forums of interest?*
3. *How do the three forums differ in the nature of habitus they engender and the type of support and resilience strategies they nurture?*

4. Methods

To understand the performative habitus that emerges in these virtual spaces, we conducted a mixed methods investigation, triangulating inferences from content analysis, social network analysis (SNA), and linguistic analysis (Kou et al., 2018). This methodological choice is motivated by the fact that, given the self-organizing practices and adhoc participation tendencies present in virtual forums, the nature of use can be volatile, flexible, and highly malleable, calling for the need to conduct multiple levels and types of investigation for a rigorous exploration (Godara et al., 2009). This section details the data collection and analysis procedures as part of the methodological framework.

4.1. Data collection and processing

The dataset was compiled using a combination of existing Reddit databases (PSAW) and Python API wrappers (PRAW), for each of the three subreddits. A three-year time span ranging from January 2018 to January 2021 was selected for analysis. Given that the forums have different churn rates in terms of total number of threads and total number of responses associated with each thread, the total number of threads collected from the forums in this time frame greatly differs. The number of all threads in the specified time frame was prohibitively high for r/csc - a general computer science career forum with a high turnover rate - and approximately half of all conversational threads were collected and analyzed. Following best practices in the study of Reddit, conversational threads that were removed or deleted, were excluded from the analysis (Chandrasekharan et al., 2018). Cumulatively, across all the three forums, there were 400,268 conversational units (top-level posts and comments), with a mean score (the number of upvotes) value of 6.21 and 61,746 unique users.

4.2. Analysis

A three-way mixed methods approach offers a more granular understanding of the typology and habitus of gendered practices among members of the virtual communities (Bourdieu, 2001). Specifically, SNA allows us to unpack the interactions between different social positions, while content and linguistic analysis help uncover community members' dispositions (Kou et al., 2018). The results obtained through these research techniques are then validated by means of econometric models to establish the significance of the findings (Wooldridge, 2015). Further, given the differences in the total number of conversational traces and total number of users across the three forums, results were normalized and then validated for comparison.

Since textual conversation is the primary mode of collaboration and knowledge construction in these online discussion channels, content analysis serves as a chief mechanism of inferring the community norms and conversational habits developed over time (Kou et al., 2018). Building on prior scholarship, our primary goal was to delineate the emergent habitus in these spaces based on the level of communal functions and collective affinity (Ren et al., 2012; Sengupta, 2021). In doing so, we categorized the data set into two types of conversational orientations - (1) Informational and (2) Communal, since these two dimensions have been highlighted in extant literature as the primary

factors shaping emergent conversational perspectives depending on members' commitment and attachment to an online community (Haythornthwaite, 2009). In the context of natural language processing (NLP), this two-way thematic separation can be viewed as a binary classification task to be solved by means of a machine learning classifier - an approach further motivated by the prohibitively large size of the text corpora to be annotated across the three subreddits (Dhar et al., 2021).

Computational categorization using BERT Due to the large number of conversational traces to be categorized (a total of 400,268 posts and comments across the three Reddit communities), we employed a supervised machine learning approach using the state-of-the-art bidirectional encoder representations from transformers (BERT) model architecture for text classification (Devlin et al., 2018). To train the model, we manually annotated a sample of 150 threads with 2064 total conversational traces from r/ggw. We used this forum as the initial basis for the two-way categorization, since it stands at the intersection of the two other forums, sharing attributes of both: r/csc's technical orientation on the one hand, and the women-centered focus of r/cw, on the other. In the first part of the computational categorization task, we built a binary learner trained on 1383 randomly-selected manually annotated conversational traces from r/ggw, reserving the remaining 681 annotated traces (33 percent of the manually encoded data) for testing. Following best practice recommendations, we used 4 epochs with a learning rate of $2e-5$ and batch size of 6 (Devlin et al., 2018). The accuracy rate of the model was 86 percent. Following best practices for validating BERT results, we further ascertained the classifier's quality by selecting a sample of classified posts at random to make sure the model's classification was satisfactory (Zeng et al., 2020). In the second stage of the task, we used the pre-trained classifier to automatically assign a label (communal or informational) to the remaining 398,204 conversational traces. The resulting data set of classified conversational traces showed that while the majority of the posts in r/csc are of informational nature (52 percent), in r/cw and r/ggw most posts are communal - 64 and 63 percent, respectively.

Content category derivation Akin to prior investigations that indicated an interweaving effect of informational and communal characteristics shaping conversational outcomes, the computational analysis outlined above also appears to indicate such a combined knowledge production process emerging in each of the three subreddits (Sengupta, 2021). While computational

models constitute a powerful way of analyzing data at scale, these models remain limited in terms of being restricted to capturing only semantic characteristics and similarities that manifest in the data; thus, they may fail to identify deeply embedded nuance and contextual meaning (Podkorytov et al., 2021). Therefore, to glean more nuanced insights into the patterns of conversation, we conducted a qualitative investigation using a thematic coding approach (Chapman et al., 2015). Since qualitatively coding the full data set is beyond the scope of the present investigation, we report the initial insights drawn from a randomly sampled set, characteristics of which are detailed in table 2. First, an initial set of ten exploratory themes were developed using the data sample from (r/ggw) (selected due to its mutual overlap in orientation with the other two forums). Next, these themes were further refined, reframed, and pruned when applied across the two other data samples (r/csc) and (r/cw). The authors discussed and validated the final schema comprising six themes, mentioned in subsequent sections.

Social Network analysis (SNA) Content analysis helps capture community members' disposition, based on insights drawn from conversational traces. Complementing these inferences, SNA helps establish the social structure and interaction patterns of each emergent community by representing each community member as a node whose connections to other members, or edges, denote comments issued or received. Theoretically, this approach helps understand the positions that community participants occupy which in turn impacts their participation and the disposition they exhibit when engaging in conversational spaces (captured through the content and linguistic markers) (Kou et al., 2018). This type of analysis allows us to survey and compare each virtual enclave in terms of community-building, resilience, and social support (Andalibi et al., 2018). While SNA can be performed at varying scales, for this study, we focus primarily on the communal level to gain insights into the emergent dyadic associations established and maintained (Haythornthwaite, 2009). Further, we use the metrics of diameter (the longest shortest path between two nodes), number of connected components (number of connected subgraphs, such that a path exists between any two nodal pairs) and aggregate node level attributes of clustering coefficient (the propensity of cluster formation), eccentricity (the maximum distance to any other node), and centrality measures of betweenness (the propensity of bridging subgraphs), closeness (a measure of proximity to other nodes in the network), and eigen-centrality (a measure of the influence of a

node) to better understand the characteristic features of the three Reddit community networks (Rabbany et al., 2014).

Linguistic analysis A habitus is a structural schema that is implicitly etched into one’s demeanor and behavior. Thus, prior scholarship has shown that emotions and psychosocial attributes are essential correlates that help define and characterize the habitus within which one operates (Reay, 2015). In line with these findings, we conduct a linguistic analysis using Linguistic Inquiry and Word Count (LIWC), a common technique for text analysis in social science. LIWC helps distil meaning from large corpora of unstructured text by identifying words associated with multiple psychosocial categories such as emotion and affect, social, cognitive, and biological processes, and personal concerns related to work, money, and family, among others (Boyd et al., 2022; Tausczik and Pennebaker, 2010).

5. Results

This section details the inferences drawn from the three-part methodological investigation, using the combined approaches of content, network, and linguistic analysis.

Table 1. Network metrics from the three forums

Network insights	r/ggw	r/cw	r/csc
Number of nodes	2071	332	57406
Number of edges	4,711	454	262,726
Average degree	2.28	1.37	4.58
Network diameter	16	16	14
Connected components	24	27	288
Average clustering coeff.	0.04	0.02	0.02
Average betweenness	3916	213.48	6012.95
Average closeness	0.29	0.45	0.02
Average eigencentrality	0.04	0.10	0.01

Table 2. Content analysis from the three forums

Data sample features	r/ggw	r/cw	r/csc
Number of conversations	367	397	269
Content categories	(%)	(%)	(%)
Survival & Empowerment	34	32	27
Resource development	20	22	38
Community preservation	14	23	12
Navigating toxicity	8	7	6
Reflections on ethics	16	10	11
Impression management	8	6	6

5.1. Content themes

In this section, we outline the six emergent themes (as tabulated in Table 2) uncovered as part of the qualitative investigation in order to better understand how the informational and communal outlooks of the communities blend and intertwine (Sengupta, 2021).

Resource development: Posts in this category provided instrumental and practical guidance towards resources one can use to grow their careers, as well as opportunities to network and develop expertise in technical domains. Posts in this category also included resources related to training camps and online materials for self-enhancement. Thus, this category highlights the knowledge capital and professional expertise such online channels may offer. In essence, this category helped capture more of an informational outlook, with some communal perspectives as well, aimed at enriching the knowledge capital of these spaces (Hall and Graham, 2004). An example conversation thread from r/ggw inquiring about remote training resources to sharpen one’s technical ability detailed: *Im searching bootcamps and if anyone can share their experience of one that is online?*

Reflections on ethics: These conversations questioned, contested, and critiqued the organizational ethos. Such posts highlight how online communities emerge as collectives of collaborative purpose and scaffold conversations that advocate for justice in the workplace. This theme provides important and pertinent distinctions between the forums inspected. For example, in r/csc this category entailed discussions pertaining to how the technical field operates, whereas in r/ggw this theme aimed to capture the struggles that underrepresented groups may face in tackling the demands of the technical workforce regime; casting a similar but broader light, conversations in r/cw under this theme discussed issues such as wage disparity, culture, and proper understanding of gendered exclusions. An example conversation from r/csc stated: *Even an average data scientist should come to the table with data and visualization to back up their assertions*, on a discussion regarding the expectations and necessary skill sets organizations need from data science professionals. In contrast, a post from r/ggw sharply criticizing the focus of training resources for women in technology stated *The few female bootcamps here need to focus more on hard skills, the tools, and field of interest and not just the issue of diversity*. Such discussions show that this theme also serves as a provocative arena of speculation around how diversity should be embraced and performed in the workplace. Thus, in essence, while in r/csc, this theme depicts a

more informational orientation, in the women-centric forums, this theme encompasses a stronger commitment to community - particularly aimed at enhancing and addressing issues concerning diversity and inclusion, especially in technical fields.

Survival & Empowerment: The central goal of this category was to share tacit skills and tactics such as prescriptions of conduct to better acclimatize to organizational expectations. It aims to facilitate greater social integration with others in the workplace. In the context of r/cw and r/ggw, this theme primarily depicts how experiential wisdom can help to tackle the combined effect of the organizational and gendered habitus. In r/csc, this theme is more generic and aimed at self-development strategies that do not necessarily involve gendered tensions. For example, in r/csc a conversation related to this topic detailed strategies to improve communication with coworkers about work commitments: *Whatever you care about most, you should ask about. If being able to work from home .. then you should find out if that's possible now..* In contrast, a conversation under this category in r/cw, entailed inspiring and motivating other community members to not lose hope in tackling gendered exclusions, specifically the conversation stated: *On days when it is extra hard being a career women, I think of how hard it was for the women before us .. Keep doing what you're doing, we will all be an inspiration to someone one day.* This theme captures how the spirit of community differs among the three forums.

Community preservation: These posts were aimed at invoking and upholding community values and beliefs. Including posts of affirmation and appreciation, another emergent theme was an attempt to foster bonds through humor and philosophical stances related to the workplace (particularly in conversations on r/ggw & r/cw). This shows a stronger thrust to community formation and maintenance. An example from r/cw stated: *Thanks, I admire of the work you are doing, congrats,* appreciating the way a community member contributes to the community and inspires others. Interestingly, the kind of conversations present in this category had considerable thematic synergy across the three forums.

Navigating toxicity: These include disclosures around obstacles faced in adverse workplace regimes and cultures (an example of a habitus of domination). These posts often invoked a petition for help and sought advice in cases where an individual's moral values did not align with organizational norms and hegemonic regimes (Hatmaker, 2013). Particularly, in the context of the women-centric forums (r/cw & r/ggw), these posts typically depict struggles with self-belief and aimed to

capture the invisible strains induced by the symbolic violence that may exist in these technical domains (Reay, 2015). An example post under this category from r/cw stated: *As a women, I want to power through and fight the system, but I don't know if I want to put myself through that,* indicating the strain and trauma induced by symbolic forms of oppression and exclusion in the workplace. This theme highlights a stronger communal orientation imbued in trust and belief in the community as a safe space (Lucero, 2017).

Impression management: Every habitus constructs and imposes a behavioral schema that characterizes one's disposition and identity and thus this category chiefly exemplifies the struggle and strife that comes along the path of crafting one's voice and self-worth when aligning one's value system with organizational expectations (Peterson, 2007; Reay, 2015). An example conversation from r/cw stated: *I do find it difficult to be assertive when it conflicts with my desire to be nice ... it is very difficult to do things that would make me seem rude.* This theme captures a deep sense of trust and fellow feeling with others in the community.

5.2. Linguistic insights

Linguistic dimensions of analysis add additional nuance to the way in which the narrative identity of the communities is performed and maintained (Tausczik et al., 2014). Regression analysis on the LIWC results revealed that, compared to r/csc, the women-centric forums (r/cw, r/ggw) exhibit language associated with fewer markers of anxiety ($p=0.001$, 0.001), anger ($p=0.001$, 0.001), certitude ($p=0.001$, 0.001) and achievement ($p=0.001$, 0.001). Further, the women-centric forums (r/cw, r/ggw) have a greater presence of prosocial behavior ($p=0.001$, 0.001) and social references ($p=0.001$, 0.001). Thus, aligned with the BERT model results, these findings indicate a greater sense of communal integrity, affinity, and collective bonding in the women-centric forums as compared to the general technical space of r/csc (Ren et al., 2012). Comparing r/ggw & r/cw, the most significant differentiating linguistic markers indicate that r/ggw depicts a greater sense of moral identity ($p=0.03$), collective curiosity ($p = 0.04$), and an overall greater positive tonality ($p=0.001$). This indicates that the women-centric forums do not act as a monolith and while there are similarities in their overall characteristics, an axis of separation emerges in the type of unified voice, values, and goals nurtured and performed (Weld et al., 2021).

5.3. Network insights

The network metrics (detailed in table 1) provide a deeper sense of how community emerges in these forums, thereby also offering a more micro-level view of these collectives through the dyadic interactions studied (Rabbany et al., 2014). Compared to *r/csc*, both *r/cw* & *r/ggw* have higher eccentricity ($p=0.001$, $p=0.001$), greater harmonic closeness centrality ($p=0.001$, $p=0.001$), lower betweenness centrality ($p=0.001$, $p=0.001$), and higher eigenvector centrality ($p=0.001$, $p=0.001$). These centrality measures indicate that *r/ggw* & *r/cw* have denser networks, whereas *r/csc*'s network structure is fragmented and comprised of many smaller cliques, demonstrating a lack of a focal community orientation. The stronger unified collective in the women-centric forums can be essential for social support and resilience, and help in developing a collective voice and identity among community members (Ren et al., 2012). Further, between *r/ggw* and *r/cw*, we find that *r/cw* has a lower closeness centrality, eccentricity, and clustering coefficient ($p=0.001, 0.001, 0.001$). The greater number of connected components in *r/cw* also suggests that in comparison with *r/ggw*, *r/cw* is more disjointed and less tightly bound as a community. This observation is further supported by the fact that in *r/ggw*, the top five actors based on outdegree, i.e. the most prolific commentators, create predominantly communal content (based on the BERT classification model), demonstrating greater communal association and commitment (Haythornthwaite, 2009).

6. Discussion

The mixed-methods analytical approach detailed above provides insights into the way the gendered habitus, organizational habitus, and the emergent habitus of online community practice intersect, creating a unique perspective, goals, and values for each online community. Specifically, with regard to the women-centric forums *r/cw* & *r/ggw*, similarly to perspectives drawn from offline contexts, it is evident that these online enclaves help bolster collective resistance stances and discussions as a form of everyday resilience. Further, the themes of navigating toxicity and managing self impressions depict a form of moral struggle as one attempts to learn and imbibe the norms of the dominant habitus (Herman, 2015; Ryan, 2015). The anecdotal sharing based on personal experiences depicts a strong sense of fellow feeling, expressions of peer parity and overall commitment to the community (Sengupta and Semaan, 2021). Thus,

a key underlying force in the creation of this online habitus of support and resilience is the essence of instilling empowerment through social learning in the form of peer-to-peer knowledge sharing and gradual development of collective wisdom (Cummings et al., 2003). Such kind of experiential sharing and healing also serves as a proxy for the nature of social capital cultivated in such spaces (Steinfeld et al., 2013). Bridging capital is captured through themes such as resource development and reflection on workplace norms that highlight a focus on providing a platform for knowledge growth related to more instrumental and actionable guidance. Bonding capital is chiefly captured in the themes of community building and preservation and survival tactics and empowerment. This also highlights how the nature of social capital may impact the way in which the conversational orientation develops in such spaces (Sengupta, 2021). Maintaining community and preserving the habitus norms is another key facet of such forums portraying a keen sense of protection and community maintenance that develops in these channels (Weld et al., 2021).

Yet, the habitus in each of the forums depicts a unique form of collective purpose and mission. *r/csc* represents a form of virtual enclave that acts as an informational hub based on a weak-tie model of attachment, whereas the other two forums demonstrate a strong sense of community, collective action and shared understanding of trauma and struggles faced by women in navigating their careers (Dillabough*, 2004). In conjunction with the feminist conceptualization of technology, which reveals how gender shapes and is in turn shaped by technology use, we see how the construct of gender emerges in the habitus developing in these online communities (Wajcman, 2010). For example, given the more informational outlook of *r/csc*, a form of gendered silencing associated with muting discussions around socio-cultural barriers and challenges in the workplace, manifests in the conversational norms of the community. In sharp contrast, the women-centric forums attempt to empower women and other marginalized groups and advocate for reclaiming equivocality and dignity across multiple contexts of expression (Dillabough*, 2004; Wajcman, 2010). Further, through the SNA investigation, we find that while both *r/csc* and *r/ggw* have strong connected components in which the central stream of conversation revolves around aiding individuals to navigate organizational policies and ethical standpoints, the one in *r/ggw* particularly is centered on issues of recognition, solidarity, and gender parity in the technical workforce (Peterson, 2007). The themes of empowerment and advocacy central to the

women-centric communities in this study point not just to the qualitatively different content in these forums compared to the general r/csc one - they invoke a completely different form of relationality among community members. The mode of relationality in these communities is based not simply on brief transactional information exchanges regarding specific technical challenges in information technology or conversations around navigating the industry's job interview process, but rather on establishing lasting relationships and building communal solidarity. Thus, this relational model of communication can be seen as exemplifying an ethic of care through its focus on mutuality, support, and interpersonal relationships (Gilligan, 1993). Extending this notion of support and resilience-building for suppressed voices, we further note a critical distinction between the nature of advocacy supported by r/ggw and r/cw. In particular, content themes indicate that r/ggw invokes a sharper critique of the symbolic manifestation of dominance in technical spaces which has been captured through concepts such as technochauvinism (Broussard, 2018). These patterns are indicative of the distinction between a feminine ethic of care and a feminist ethic of care orientation (Gilligan, 1995). While the former emphasizes inter-relationality and mutual support, the latter adds to them a specific layer of explicit resistance to the technopatriarchal social order operating in the IT sphere. This demonstrates that in dismantling the gendered habitus, additional dimensions of relational labor are practiced around care, support, and empowerment, which adds a unique purpose and collective moral and ideological stance to the emergent habitus in these women-centric spaces and especially that of r/ggw (Seraj, 2012). In summary, r/cw represents an alliance of professional women united by a mutual desire and commitment to networking, inspiring, fostering unity, and providing a ground for community building and support. While a similar spirit exists in r/ggw, it exhibits an additional dimension of opposing the habitus of exclusion and cultural oppression through collective community endeavors and narrative crusades, giving such online collectives a unique purpose, vision, and voice centered on empowerment and resistance.

7. Conclusion and Future work

In conclusion, through a combined analysis using multiple methodological frames, this paper provides an initial exploration into how online communities help to provide ground for informal learning and collaborative empowerment practices around professional development. These practices can help underrepresented voices (such as women)

develop a collective vision to subvert tensions induced by the sociocultural barriers to their identity formation and self-expression. This study contributes to theory by integrating the concept of the gendered habitus with feminist frameworks of gendered practices and resilience-building to elucidate the mechanism of navigating everyday crises for historically underrepresented communities. On a practical and empirical level, the themes identified by our analysis indicate ways in which online communities offer extended mentoring and support beyond institutionalized resources. Such resources can also provide additional peer support in times of crisis which can disrupt standardized work and learning practices, and challenge regimes of domination in the workplace (Aristeidou and Cross, 2021). Additionally, these insights may offer recommendations for the design of online forums and community moderation practices to further boost the collective and cooperative efficacy of such channels. Future work can computationally expand the content themes presented, while complementary qualitative work may further investigate the mechanisms of participation and engagement that help sustain these spaces.

References

- Ahmed, Y. A., Ahmad, M. N., Ahmad, N., & Zakaria, N. H. (2019). Social media for knowledge-sharing: A systematic literature review. *Telematics and informatics*, 37, 72–112.
- Andalibi, N., Haimson, O. L., Choudhury, M. D., & Forte, A. (2018). Social support, reciprocity, and anonymity in responses to sexual abuse disclosures on social media. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 25(5), 1–35.
- Anderson, K. E. (2015). Ask me anything: What is reddit? *Library Hi Tech News*.
- Aristeidou, M., & Cross, S. (2021). Disrupted distance learning: The impact of covid-19 on study habits of distance learning university students. *Open Learning: The Journal of Open, Distance and e-Learning*, 36(3), 263–282.
- Bourdieu, P. (2001). *Masculine domination*. Stanford university press.
- Boyd, R., Ashokkumar, A., Seraj, S., & Pennebaker, J. (2022). The development and psychometric properties of liwc-22. *Austin, TX: University of Texas at Austin*.
- Broussard, M. (2018). *Artificial unintelligence: How computers misunderstand the world*. mit Press.

- Burt, R. S. (1998). The gender of social capital. *Rationality and society*, 10(1), 5–46.
- Caza, B. B., & Creary, S. (2016). The construction of professional identity. In *Perspectives on contemporary professional work*. Edward Elgar Publishing.
- Chandrasekharan, E., Samory, M., Jhaver, S., Charvat, H., Bruckman, A., Lampe, C., Eisenstein, J., & Gilbert, E. (2018). The internet's hidden rules: An empirical study of reddit norm violations at micro, meso, and macro scales. *Proceedings of the ACM on Human-Computer Interaction*, 2(CSCW), 1–25.
- Chapman, A., Hadfield, M., & Chapman, C. (2015). Qualitative research in healthcare: An introduction to grounded theory using thematic analysis. *Journal of the Royal College of Physicians of Edinburgh*, 45(3), 201–205.
- Cummings, S., Heeks, R., & Huysman, M. (2003). Knowledge and learning in online communities in development: A social capital perspective. *Development Informatics Working Paper*, (16).
- Devlin, J., Chang, M.-W., Lee, K., & Toutanova, K. (2018). Bert: Pre-training of deep bidirectional transformers for language understanding. *arXiv preprint arXiv:1810.04805*.
- Dhar, A., Mukherjee, H., Dash, N. S., & Roy, K. (2021). Text categorization: Past and present. *Artificial Intelligence Review*, 54(4), 3007–3054.
- D'ignazio, C., & Klein, L. F. (2020). *Data feminism*. MIT press.
- Dillabough*, J.-A. (2004). Class, culture and the 'predicaments of masculine domination': Encountering pierre bourdieu. *British Journal of Sociology of Education*, 25(4), 489–506.
- Ellemers, N., De Gilder, D., & Haslam, S. A. (2004). Motivating individuals and groups at work: A social identity perspective on leadership and group performance. *Academy of Management review*, 29(3), 459–478.
- Fiesler, C., Morrison, S., & Bruckman, A. S. (2016). An archive of their own: A case study of feminist hci and values in design. *Proceedings of the 2016 CHI conference on human factors in computing systems*, 2574–2585.
- Gilligan, C. (1993). *In a different voice: Psychological theory and women's development*. Harvard University Press.
- Gilligan, C. (1995). Hearing the difference: Theorizing connection. *Hypatia*, 10(2), 120–127.
- Godara, J., Isenhour, P., & Kavanaugh, A. (2009). The efficacy of knowledge sharing in centralized and self-organizing online communities: Weblog networks vs. discussion forums. *2009 42nd Hawaii International Conference on System Sciences*, 1–10.
- Hall, H., & Graham, D. (2004). Creation and recreation: Motivating collaboration to generate knowledge capital in online communities. *International Journal of Information Management*, 24(3), 235–246.
- Hatmaker, D. M. (2013). Engineering identity: Gender and professional identity negotiation among women engineers. *Gender, Work & Organization*, 20(4), 382–396.
- Haythornthwaite, C. (2009). Crowds and communities: Light and heavyweight models of peer production. *2009 42nd Hawaii international conference on system sciences*, 1–10.
- Herman, C. (2015). Rebooting and rerouting: Women's articulations of frayed careers in science, engineering and technology professions. *Gender, Work & Organization*, 22(4), 324–338.
- Kou, Y., Gray, C. M., Toombs, A. L., & Adams, R. S. (2018). Understanding social roles in an online community of volatile practice: A study of user experience practitioners on reddit. *ACM Transactions on Social Computing*, 1(4), 1–22.
- Liu, S., Xiao, W., Fang, C., Zhang, X., & Lin, J. (2020). Social support, belongingness, and value co-creation behaviors in online health communities. *Telematics and Informatics*, 50, 101398.
- Lucero, L. (2017). Safe spaces in online places: Social media and lgbtq youth. *Multicultural Education Review*, 9(2), 117–128.
- Martey, R. M., & Stromer-Galley, J. (2007). The digital dollhouse: Context and social norms in the sims online. *Games and Culture*, 2(4), 314–334.
- Peterson, H. (2007). Gendered work ideals in swedish it firms: Valued and not valued workers. *Gender, Work & Organization*, 14(4), 333–348.
- Podkorytov, M., Biś, D., & Liu, X. (2021). How can the [mask] know? the sources and limitations of knowledge in bert. *2021 International Joint Conference on Neural Networks (IJCNN)*, 1–8.
- Rabbany, R., Elatia, S., Takaffoli, M., & Zarane, O. R. (2014). Collaborative learning of students in online discussion forums: A social network analysis perspective. In *Educational data mining* (pp. 441–466). Springer.
- Reay, D. (2015). Habitus and the psychosocial: Bourdieu with feelings. *Cambridge journal of education*, 45(1), 9–23.

- Ren, Y., Harper, F. M., Drenner, S., Terveen, L., Kiesler, S., Riedl, J., & Kraut, R. E. (2012). Building member attachment in online communities: Applying theories of group identity and interpersonal bonds. *MIS quarterly*, 841–864.
- Rosenbaum, H., & Shachaf, P. (2010). A structuration approach to online communities of practice: The case of q&a communities. *Journal of the American Society for Information Science and Technology*, 61(9), 1933–1944.
- Ryan, C. (2015). Everyday resilience as resistance: Palestinian women practicing sumud. *International Political Sociology*, 9(4), 299–315.
- Schuschke, J., & Tynes, B. M. (2016). Online community empowerment, emotional connection, and armed love in the black lives matter movement. In *Emotions, technology, and social media* (pp. 25–47). Elsevier.
- Semaan, B. (2019). 'routine infrastructuring' as 'building everyday resilience with technology' when disruption becomes ordinary. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), 1–24.
- Sengupta, S. (2021). A tale of two virtual communities: A comparative analysis of culture and discourse in two online programming communities.
- Sengupta, S., & Semaan, B. (2021). 'a guiding light in a virtual haven': A preliminary analysis of conversations around navigating and repairing self-worth in an online professional community for women. *Companion Publication of the 2021 Conference on Computer Supported Cooperative Work and Social Computing*, 158–162.
- Sengupta, S., & Tacheva, J. (2022). Flames of justice in a virtual garden: An analysis of a digital campaign on twitter surrounding the death of an indian celebrity. *International Conference on Information*, 243–258.
- Seraj, M. (2012). We create, we connect, we respect, therefore we are: Intellectual, social, and cultural value in online communities. *Journal of Interactive Marketing*, 26(4), 209–222.
- Steinfeld, C., Ellison, N. B., Lampe, C., & Vitak, J. (2013). Online social network sites and the concept of social capital. *Frontiers in new media research*, 122–138.
- Tacheva, Z., Krsova, L., & Ivanov, A. (2021). Examining the social media antecedents of racial justice: Evidence from twitter. *Proceedings of the 54th Hawaii International Conference on System Sciences*, 2617.
- Tausczik, Y. R., Kittur, A., & Kraut, R. E. (2014). Collaborative problem solving: A study of mathoverflow. *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing*, 355–367.
- Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: Liwc and computerized text analysis methods. *Journal of language and social psychology*, 29(1), 24–54.
- Tomprou, M., Dabbish, L., Kraut, R. E., & Liu, F. (2019). Career mentoring in online communities: Seeking and receiving advice from an online community. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–12.
- Wajcman, J. (2010). Feminist theories of technology. *Cambridge journal of economics*, 34(1), 143–152.
- Weld, G., Zhang, A. X., & Althoff, T. (2021). Making online communities' better': A taxonomy of community values on reddit. *arXiv preprint arXiv:2109.05152*.
- Wheeler, E., & Dillahunt, T. R. (2018). Navigating the job search as a low-resourced job seeker. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–10.
- Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach*. Cengage learning.
- Yang, G. (2016). Narrative agency in hashtag activism: The case of # blacklivesmatter. *Media and communication*, 4(4), 13.
- Zeng, K., Pan, Z., Xu, Y., Qu, Y., et al. (2020). An ensemble learning strategy for eligibility criteria text classification for clinical trial recruitment: Algorithm development and validation. *JMIR Medical Informatics*, 8(7), e17832.