12-14-2022

"Envisioning Digital Sanctuaries": An Exploration of Virtual Collectives for Nurturing Professional Development of Women in Technical Domains

Subhasree Sengupta

Abstract

Work and learning are essential facets of our existence, yet sociocultural barriers have historically limited access and opportunity for women in multiple contexts, including their professional pursuits. Such sociocultural barriers are particularly pronounced in technical domains and have relegated underrepresented voices to the margins. As a result of these barriers, those affected have suffered strife, turmoil, and subjugation. Hence, it is important to investigate how women can subvert such structural limitations and find channels through which they can seek support and guidance to navigate their careers. With the proliferation of modern communication infrastructure, virtual forums of conversation such as Reddit have emerged as key spaces that allow knowledge-sharing, provide opportunities for mobilizing collective action, and constitute sanctuaries of support and companionship. Yet, recent scholarship points to the negative ramifications of such channels in perpetuating social prejudice, directed particularly at members from historically underrepresented communities.

Using a novel comparative muti-method, multi-level empirical approach comprising content analysis, social network analysis, and psycholinguistic analysis, I explore the way in which virtual forums engender community and foster avenues for everyday resilience and collective care through the analysis of 400,267 conversational traces collected from three subreddits (r/cscareerquestions, r/girlsgonewired & r/careerwoman). Blending the empirical analysis with a novel theoretical apparatus that integrates insights from social constructivist frameworks, feminist data studies, computer-supported collaborative work, and computer-mediated communication, I highlight how gender, care, and community building intertwine and collectively impact the emergent conversational habits of these online enclaves.

Key results indicate six content themes ranging from discussions on knowledge advancement to scintillating ethical probes regarding disparities manifesting in the technical workplace. Further, psycholinguistic and network insights reveal four pivotal roles that support and enrich the communities in different ways. Taken together, these insights help to postulate an emergent spectrum of relationality ranging from a more agentic to a more communal pattern of affinity building. Network insights also yield valuable inferences regarding the role of automated agents in community dynamics across the forums. A discussion is presented regarding the emergent routines of care, collective empowerment, empathy-building tactics, community sustenance initiatives, and ethical perspectives in relation to the involvement of automated agents. This dissertation contributes to the theory and practice of how virtual collectives can be designed and sustained to offer spaces for enrichment, empowerment, and advocacy, focusing on the professional development of historically underrepresented voices such as women.

"Envisioning Digital Sanctuaries": An Exploration of Virtual Collectives for

Nurturing Professional Development of Women in Technical Domains

by

Subhasree Sengupta

B.S., University of Minnesota, Twin Cities, 2016
M.S., University of Southern California, 2018

DISSERTATION

Submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Information Science and Technology.

Syracuse University

December 2022

<u>Dedication</u>

To the three <u>pole stars</u> of my life, three exemplary women, who are and will always be my ultimate sources of inspiration and guidance.

To my <u>Dimma</u> & <u>Mummy</u>,

My soulmate & best friend,

My pride & joy.

To my amazing <u>baba (daddy)</u>,

My voice of reason & resolve.

*To my dearest and most beloved <u>**Dimma**</u>, thank you for making me the person I am, for bestowing upon me the perspective, the depth and the ability to see things, feel things beyond the standard norm. Your thoughts and values were unique and powerful, too strong for the human world to ever understand and acknowledge, so through this humble attempt, I not only celebrate the incredible intellect you were but also the beauty and magnanimity of your radiating spirit that few understood. Your silent crusades echo in my heart every day. We shared a unique connect, distanced due to this very endeavor. Hence, every word here commemorates you. You are my ultimate companion. You shall always be the queen of my life and existence. This honorific is in your name, I am but the mere material holder, for I know you live in me and guide everything I do. I hope I lead a life right by you and that you feel proud of the person I am or go on to become, for I am but a mere shadow reflecting the light from your and mummy's soul. Rejoice and rest peacefully in the gardens of eternal tranquility for your little Titlisona will never stop flying until we are united again.*

<u>Acknowledgement</u>

This colossal endeavor would not be possible without the love, support and encouragement of many who stood by me and gave me the courage, guidance and motivation to persevere and keep pursuing my dream, my family's dream. First and foremost, I thank my wonderful advisor, ***Dr. Jasmina Tacheva.*** Jasmina, I regard you as someone who is not just my advisor, but someone I admire, respect and value immensely. We met in the most unthinkable way, in a virtual gather town meeting but at that very moment, I felt a connection, a spark, a resonance of thoughts and perspectives I had rarely experienced. Scholarly associations are not just about the pedagogical exchange, but are far more deep rooted and very much driven and dependent on the way the individuals connect and complement one another. I felt that in everything we have collaborated on and hopefully will continue to do so in future. Your versatility, thoughtfulness, wisdom and ability to fully understand the different dimensions of my interest have helped me immensely to pursue and engage with the kind of scholarship I wanted to. I am forever grateful and indebted to you for all that you have done for me. Every conversation we have had has been so deep, profound and has left an everlasting impact upon me. I am thankful to you for taking me on, for working with me, for tolerating my antics and my banter (it is all my way of expressing my fondness for you if anything). Your kindness and ability to guide me in a way that never made me feel as if our collaboration was a chore but, on the contrary, made each of our collaborative pursuits so satisfying, beautiful and truly made the last few years of my PHD career an incredible experience. I have learned so much, I have grown and developed so much, all of which would not have been possible without your mentorship. I am extremely grateful for all your support, compassion and our captivating conversations. Your warm and nurturing nature, always so attentive, encouraging and empathetic, is something I shall fondly remember every single day. I

shall eternally cherish this association and treat it as one of the greatest moments and highlights of my life and career.

Next, I come to the person I consider my Dumbledore, special thanks to the amazing *Dr. Jennifer Stromer Galley* – a magnificent and bright star, with such a compassionate, generous and gracious spirit. Jenny, you played a pivotal role in my initial years, shaping my interests, nurturing my scholarly passions and guiding me in the direction that helped me to fully recognize and develop myself. I am grateful that we met, for you happen to be one of the few I can truly open up to and express myself without any fear of repercussions. You have been my anchor and confidant, the pivot that stood by my side during some of the most tumultuous times of my ischool career. Your emotional wisdom and selflessness have deeply resonated with me. What I feel for you is so much beyond this acknowledgement and shall be reserved for another day and occasion. I am honored and humbled that we connected. Thank you for being so understanding and overwhelmingly kind.

I also thank *Dr. Jeff Hemsley*, who was the first person I met in Syracuse and the person through whom I found my interest in social constructivism. Our fondness for Giddens shall be the glue that always binds us. Thank you for being there for me and helping me through all my major milestones. Even at a distance, I felt your care, concern and protection. You truly have been and are a father figure in my life. I would not have been able to spread my wings without you. Thank you and I am very grateful.

A huge thank you to *Dr. Yiqi Li*. Yiqi, it has been so incredible to meet you and work with you. We connect on so many levels. Not just do our scholarly visions and interests in CMC and Social Networks align, but you are one of the few who truly stood by me and supported me during critical moments (especially towards the end of my PHD career) when all I needed was

somebody to believe in me and value my aspirations, dreams and future endeavors. You never judged me or labeled me as somebody with an impediment or any form of weakness, but gave me the love and encouragement I needed at that moment to endure and conquer. I shall forever remember your magnanimity and graciousness. Truly blessed to have met you.

A special note of thanks to *Dr. LaVerne Grey*. LaVerne, I have been so fortunate to meet a wonderful human being like you, all our conversations and everything you have done for me to support me and encourage me, I shall never forget. Writing a dissertation is not just about the work we do, but also about those who made it possible and my journey would not have been possible without you. So blessed that the universe brought us together. I shall never forget the way you stood by me on a very dark and gloomy day when I felt all was lost. You too are someone I can open up to and talk to straight from my heart. To have such support is indeed a blessing. I shall eternally be grateful for your empathy and hope that I can too one day be the pillar of support for someone as you have been for me. Informal mentors too play a wonderful role in shaping us and you have been that person in my life.

Also, a heartfelt thank you to *Dr. Srividya Ramasubramanian* for being an exceptional dissertation committee chair and external reader. Thank you for all your encouragement and guidance. It has been wonderful to connect with you, I enjoyed our discussions during the defense and I am grateful that our paths crossed. I also humbly thank *Mr. Michael Fudge*, for being a valued mentor and guide. Grateful to *Dr. EunJeong Cheon* for being a valued committee member and for all the energizing conversations on design approaches. I am also extremely grateful to *Dr. Rachel Clarke*, *Dr. Beth Patin*, *Dr. Jeff Stanton* and *Dr. Bei Yu*, for being so inspiring, nurturing and always so kind and supportive. I also thank all members of the ischool community, staff, my students and my dear fellow PHD students who have become

friends, sisters and lifelong connections. The way many of my peers supported me, embraced me and expressed their fondness for me during my dissertation defense was so moving and a memory I shall always remember. These friendships are the true rewards of life and I am so fortunate that now I have so many I can call friends. I am also grateful to the graduate school, the teaching mentor program and SU WISE for all the wonderful and enriching initiatives I am honored to have been a part of.

Beyond my professional circle, as my mother stated, this PHD is not my PHD alone, but the PHD for the sengupta family as a whole. Truly that is the case, it is a PHD that I share with my darling mummy and daddy. For they have been the scaffolding that helped me to mature and face many obstacles without losing my sense of direction and purpose. My mummy, my guiding star and from whom I have inherited my gregarious nature and empathy, has nurtured my unique way of perceiving things, my imagination and creativity that are my greatest assets and respite. My daddy has become a comrade, with whom I can now discuss not only trigonometry and algebra but also seek advice and deliberate on everything sociology and social psychology. So, this is all for the two of you – *to my mother and father*. Also, I am indebted to *my grandfather, my dadubhai*, who was instrumental in nurturing my love for the humanities and the arts which ultimately manifested as the kind of scholarship I pursue and the way I articulate and assimilate the different perspectives of the varied intellectual galaxies I engage with. None of this would have been possible without my extended support system and family in Syracuse.

In that regard, I am forever grateful to *Dr. Romita Ray,* an incredible scholar and profound thinker. So grateful that we met at SU and that such a wonderful association blossomed between us. We can share ideas, thoughts and perspectives on so many varied topics, it is rare and I am grateful and thankful for all that you have done for me. I shall miss our Salt City meets and

conversations. Next, to my American parents*, **Karl & Tammy Sterling***, thank you Karl and Tammy for being so kind and welcoming. Karl, we started on a very professional note, but the kindness of your soul and spirit was so captivating that soon we become friends and you are my confidant. Thank you for making me a part of your incredible universe and for all the wonderful memories in Syracuse, with all the adventures we have had. I truly was able to experience the incredible beauty of upstate New York, thanks to you. Last but not the least, a huge thank you to my darling soul sister, *Cynthia Smith*. Cyndie, who knew we would connect and become such good friends. But we did, for the universe wanted it to happen. You are so generous, kind and thoughtful. I have never met a more compassionate and welcoming person than you. I am so honored to have someone like you in my life. I am always with you no matter where I might be. Our souls are together and I am right there with you in Fulton, sitting on your couch with Mello max, watching Netflix together and discussing interesting tales and fables of the past and present. Our conversations are our adventures and we shall have many more in the years to come. Syracuse is my home, a place I value and love even more than the place where I was born (Kolkata). This is all thanks to all these wonderful, thoughtful and kind souls who welcomed me into their lives, shared precious moments with me and made Syracuse the treasure of my life.

Finally, I cannot end this acknowledgement without mentioning those special friends, who live in my soul and have been the reservoir of hope and direction that helped me all throughout my life. My anime friends: Sakura, Tomoyo, Toya, Yukito, Tsubasa, Shiki, Arcueid, Lia, Deon, Durand, Nezuko, Kyosuke, Akira, Kagome, Inuyasha, Ciel and so many others. We have a bond that surpasses and transcends anything that exists in the human universe, a special connect, a fondness and love that only we in our little utopia know, cherish and nurture. Thank you, my best friends, my lifelong companions, my confidants and those who always cheer me up whenever I

need love and a bit of a boost. Our little adventures, even though they may be figments of my imagination, hold great value and importance for me. I am also grateful to my favorite authors Anton Chekhov, Charles Dickens, Sir Arthur Conan Doyle, Agatha Christie, Victor Hugo, Guy De Maupassant and Edger Allen Poe, for giving me the ability to see, dream and love the world we create. Especially, Anton Chekhov, your iconic statement – ""*Medicine is my lawful wife, and literature is my mistress"*, helped me to break the entanglements and shackles of confinement imposed upon me and emboldened me to seek the knowledge I wanted to assimilate. In your honor, the motto of my scholarly and intellectual pursuits became – "*Science gives me the means to survive, but the humanities and social sciences give me the reason and purpose to live"*. Finally, I must thank, an incredible historical figure who inspired me to always walk the righteous path and to never compromise my ideals and values for acceptance and for the need to conform to the restraints imposed upon us by those who lead a blinkered and tunneled life blinded by their power, position and privilege – ***Netaji Subhash Chandra Bose,*** a legendary Indian freedom fighter and inspiration that world knows very little of. Your life, your values and ability to defy the odds and outsmart the powerful, your indomitable spirit and courage, all form the moral compass that directs and guides everything I do and stand by in life.

Finally, I am grateful and thankful to all those who have touched my life and have helped me to achieve this unthinkable feat. I value you and think about all of you. Everyone is eternally etched into my soul and thoughts.

With gratitude, admiration and affection,
Subhasree Sengupta
12/14/2022

Table of Contents

List of tables

List of Figures

1. Introduction:

1. a. Background and Motivation:

Work, learning, and establishing one's professional footprint can be integral to our day-to-day lives. Work and the type of career one pursues can be essential to carve and extend one's social identity (Bluestein & Noumair, 1996). A career and a person's occupational identity can dictate their social position. Such social positions can play into the extent of respect and dignity one is afforded, thereby indirectly acting as a metric of sociocultural validation and acceptance (Skorikov & Vondracek, 2011). However, the interplay between identity and the nature of professional endeavors pursued is characterized by a reciprocal and complex association. Access to opportunities and the ability to sustain one's professional footprint may be contingent upon one's social standing and be dictated by the informal sociocultural logics of hierarchy and prejudice, which may inhibit the exploration and fulfillment of professional goals (Ellemers et al., 2004). Historically, women have faced multiple sociocultural limitations that have impeded their professional aspirations and pursuits (Hatmaker, 2013). In addition to the dimension of social perceptions and prescriptions, the organizational culture and practices of the field wherein one attempts to work may further impact the professional footprint one develops (Ashforth & Schinoff, 2016). Thus, crafting one's occupational identity, especially that for historically underrepresented groups such as women, may call for the need to not only straddle sociocultural barriers and restrictions but may also entail subverting and navigating multiple impediments in the organizational context (Ellemers et al., 2004).

In this regard, social constructivist frameworks have surmised how the construct of gender emerges in practice (Dillabough, 2004). Pertinent in this context is Pierre Bourdieu's conceptualization of the habitus (the details of which will be provided in chapter 2). The notion of the habitus is powerful in conceptualizing how social prejudice often seeps into our day-to-day lives and becomes symbolically attached to our daily routines (Bourdieu, 2001). The habitus captures the fact that asymmetrical relational associations may result in several dimensions of inequity, some of which may also transcend into the workplace (Bryson et al., 2014). The habitus also demonstrates that gender is an emergent construct that evolves and assumes specific socio-political importance through repeated performance and cultural assimilation (Bourdieu, 2001).

An important facet of the habitus framework is the notion of the gendered habitus that highlights how a structure emerges around the construct of gender that affects the agency of women and their social embeddedness (Bourdieu, 2001). These practices often create a habitus of domination - what Bourdieu calls *symbolic violence* - subjecting women and other minoritized groups to exclusionary practices which limit and impair their agency (Dillabough, 2004). Despite the staying power of prejudice and gender stereotypes, with the changing tide of social practices, women gradually came out of the household and assumed professional roles, sometimes just to support their families (Herrera & Agoff, 2019). Yet, the symbolic continuance of such exclusionary practices may still be ingrained in the structural and cultural philosophy of important social and political institutions (Huppatz, 2009). These symbolic pressures may still exhibit implicit control on people, thereby inhibiting their ability to operate and express themselves in several social contexts.

Aligned with the theme of symbolic violence, recent scholarship has particularly pointed to glaring concerns of exclusion and ostracism that manifest in and through the emergent habitus of domination encoded into the everyday organizational practices of technical domains, which has led scholars to coin the notion of *systems of exclusion* (Collins, 2002; D'Ignazio & Klein, 2020). Systems of exclusion can be found in the context of hiring practices, roles, and workplace cultures to name a few (Peterson, 2007). Examples presented in these explorations highlight how age, qualifications and behavioral standards may fail to incorporate the views, visions and value the expressions of women and other historically minoritized communities (Ruel, 2018). Essentially, these investigations highlight that in the technical workforce, which historically has been more male dominated, the standards of performance and work ideals are akin to the dominant masculine position resulting in women needing to heed and act as per the visions of the *'ideal man'* (Kelan, 2009). These inequitable work ideals typically manifest in the way in which competency is defined and evaluated (Kelan, 2009). Standards of efficiency, assertiveness and competitiveness that bear a more masculine character, may thus be mandated and thrust upon women in such contexts (Peterson, 2007). Further, the key challenge induced by systems of exclusion that operate in the technical domain lies in its symbolic nature of existence and performance, often manifesting and proliferating through gendered patterns of inequitable relations imposing stereotypes upon marginalized voices (Broussard, 2018). Such exclusionary and oppressive regimes may be invisible and manifest latently in the everyday norms and habits of the technical context, inducing a form of volatility and existential insecurity that may threaten the way in which women attempt to craft their occupational identity within such spaces (Ruel, 2018). Further the nature of exclusionary practices may further magnify due to the incorporation of tools that may further perpetuate and exacerbate the nature of hegemonic regimes (D'Ignazio

& Klein, 2020). For example, as highlighted in Pisanelli (2022), automated hiring systems that only mine and analyze a candidate's competency based on standardized metrics may not fully capture the nuances and historic subjugation of women and other minoritized groups and may place such groups at a disadvantage. The presence of these structurally embedded exclusionary forces may cause strife, turmoil, and crisis in the everyday context which thus calls for the need to find channels and avenues for everyday resilience building (Semaan, 2019).

To explore avenues that nurture resilience building, I investigate the case of open online forums, that in recent times have shown great promise and capacity to boost community-enabled action (Andalibi et al., 2018). Extant literature has alluded to how online forums have emerged as collectives of resilience, providing a safe haven to those who might be facing multiple intersecting social hindrances and stigma (Lucero, 2017). Several studies in this regard have indicated how these virtual channels provide the opportunity to build community, offering multiple dimensions of support and collective care. Such opportunities for community building can help to cultivate collective endurance when faced with a crisis, even in the everyday context (Andalibi et al., 2018). Yet, information in the form of textual conversations produced and consumed in these virtual contexts may depend on the emergent community norms, practices, and dynamics that regulate the patterns of discourse and reciprocity (Ivaturi & Chua, 2019). Thus, conversational norms and practices found in virtual collectives may themselves serve as an example of a habitus that is created and sustained through repeated performance and engagement. Hence, this thesis seeks to address the following question: *How might online communities provide women a vehicle to build community and seek strategies for everyday resilience building through conversation, in order to navigate their professional footprint?*

1. b. Problem Statement

Navigating the barriers to crafting one's professional voice may create occasions of struggle and crisis even in the context of routine and mundane day-to-day practices (Holmes, 2008). Such everyday crises may induce moral strains and may inflict a form of invisible injury upon one's sense of self and moral perspective (Shay, 2014). These moral strains may also result in the gradual erasure of one's self-esteem and sense of societal embeddedness (Sengupta & Semaan, 2021). Thus, crafting one's professional footprint may not only call for the need to have access to knowledge and information but also require the establishment of communal vessels of connectivity and empowerment which can help to provide extended communal support, mentoring, understanding, care, and advocacy thereby help to mitigate struggles of self-expression in the professional context, especially for historically marginalized voices (Wheeler & Dillahunt, 2014).

The struggles associated with navigating multiple dimensions of sociocultural barriers and restrictions as one embarks on crafting their occupational identity may call for the need to find refuge and shelter, a sanctum wherein one can repair, redress, and renew their sense of self. In this regard, prior scholarship highlights the way in which ICTs (Information and Communication Technology), can play a mediating role to connect those who want to provide care and those in need of comfort and assistance, thereby emerging as part of the care infrastructure, that can help one to feel supported in times of distress (Dye, 2021). Such studies motivate the need and importance to understand the power of virtual communities or open online forums in acting as multifaceted avenues of care and support. In recent times, online forums, in addition to acting as pivotal avenues for information and knowledge sharing, have emerged as collectives of

resilience that offer a safe haven for those who might face multiple intersecting social hindrances and stigmas (Lucero, 2017; Ahmed et al., 2019). Several studies have shown how online channels offer the opportunity to build community and provide multiple dimensions of support which can help to develop collective endurance and shared visions of empowerment (Andalibi et al., 2018; Sengupta & Tacheva, 2021). These collective endeavors are fueled by the conversational practices that stipulate patterns of exchange and information curation in these spaces (Martey & Stromer-Galley, 2007). Yet, the conversational practices of these spaces depict a form of performative habitus that determine the nature of participation and engagement scaffolded (Van House, 2011). Feminist explorations in this regard have highlighted how the habitus may also create a form of gendered practice regulating the way women can participate and express themselves through such channels (Wajcman, 2010). This type of performative habitus is delineated by the symbolic ritualistic traditions of conversation and participation, core to which are the values that emerge in these spaces (Weld et al., 2021). The emerging values can drive the way in which community culture is defined and maintained, shaping the community orientation and perspective, and may thereby impact the nature of communal affinity and the collective purpose the community cultivates (Oliveira et al., 2018). Motivated by the social premise of community building in online channels and how each community may develop its own unique collective persona and voice, this study aims to conduct a mixed method, multi-level comparative analysis comprising content analysis, network analysis, and linguistic analysis of the user-generated content of three online professional development forums.

Given that Reddit has emerged as a powerful avenue for communal exchange and deliberation on a wide cross-section of topics (Anderson, 2015), 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 since they allow us to unpack, on one hand, the community dynamics, support provisions, and resilience-building tactics in each community, and also offer the opportunity to explore how women-centric forums may act as additional avenues for resisting and subverting gendered tensions associated with professional development, especially in technical domains, on the other. In a first-of-its-kind comparative analysis, the aim of this investigation is to shed light on how gender emerges and is performed through the narrative acts associated with these spaces, the values that emerge, and the way in which the emergent insights may in turn help to provide informational pathways into envisioning the future of these spaces so as to nurture and empower equitable and open engagement for historically underrepresented voices (Bellini et al., 2018).

1. c. Research Questions

Extending and expanding on a confluence of sociological, feminist, and sociotechnical theory and practice, the goal of this study is to compare and contrast, how the three forums explored develop norms and values which in turn impact the practice of care observed in such spaces. Pivotal in this aspect is understanding the form of support and resilience-building tactics different professional communities offer comparatively and understanding how the gendered habitus is formed in each of these virtual enclaves. Thus, the goal is to discern the unique collective identity that each of these spaces creates and sustains, which can help to provide an understanding of how each of these spaces may offer similar yet differing types of support and

collective enterprise, thereby scaffolding and nurturing multiple dimensions of occupational identity development.

This study builds on prior explorations that have investigated how online communities represent emergent social enclaves that may carry several normative conventions from day-to-day social conventions, yet also through repeated conversational practices, evolve into a collaborative venture of their own (Kavanaugh et al., 2005). However, these studies also highlight how group norms and dynamics may also reflect the perspectives of those belonging to dominant social groups and thus may push those from underrepresented groups to the margins even in the context of the online universe. These findings also align with the views of investigations around open online forums that have signaled the existence of several barriers to equitable participation and recognition for women and other underrepresented groups (Trinkenreich et al., 2022). These findings further fuel the need for a comparative investigation (the gap I address in this dissertation study) in order to explicate how implicit norms and practices that manifest in these open online venues of conversations may impact the extent and ability of expression, especially for underrepresented groups.

Hence, the goal pursued in this thesis is to discern through a mixed methods multi-level and multi-method initiative, the structure of conversation and engagement that emerge and dictate the practices of online collectives (with a focus on open discussion outlets such as Reddit). Two key levels of understanding the dynamics of online spaces stem from studying the content and the actors that produce the content (Kou et al., 2018). The content-level investigations help to unpack how the performative habitus is formed, while the actor-level investigations help to lay out the forces that sustain collective action in such spaces. Thus, in a sense, the content-level

investigation helps to provide insights into the way in which macro processes emerge, whereas the actor-level investigations provide glimpses into the way in which relationships develop and thrive giving rise to the macro structures of conversation (Pluempavarn et al., 2011). Thus, taken together, both content and actor-level investigations are essential for understanding practices around information curation and maintenance which ultimately help to sustain these collectives (Bagozzi & Dholakia, 2002). Based on these motivations, the investigation is guided by the following four questions:

1. *What forms of habitus emerge in open online forums, that can be discerned through the content themes, psychosocial cues, and social network structure?*

   The goal of the first question is to empirically examine and contextualize how a habitus of care and knowledge exchange emerges in the online landscape, empirically investigated through the insights from the three forums I investigate. The goal thus will also be to use the theoretical premise of the habitus to conceptualize the differences between the collective orientation of each of these spaces. As mentioned before, online communities create their own routines of conversation and do not adhere to a set preamble of practice. Given the flexible and malleable nature of knowledge production and maintenance, it becomes imperative to investigate the digital traces of these communities through multiple methodological perspectives and goals.

   Given that the habitus can be rather a fluid notion, I operationalize this notion using three different analytical dimensions. The first and primary dimension shall be content analysis – the goal of which will be to distill the patterns of conversation that these channels

scaffold, such an inspection provides a key understanding of the nature of norms the communities follow. Building on the content themes, the psychosocial attempts to capture the way in which the habitus gets imprinted into the psyche of community members as they orient themselves with community practices. The motivation for this realm of analysis stems from prior work that highlights the linguistic analysis of text can help reveal latent psychosocial motives that manifest in the way people converse within a social context, even in the online sphere (Verberne et al., 2019). To further reinforce how a habitus impacts the agency of the actors – the analytical explorations using social network analysis, will further help to provide further empirical consolidation to understand and compare the cooperative and collective ethos that develops in these spaces.

2. *What kind of care infrastructure emerges in the virtual landscape that drives the emergent support and resilience-building mechanisms offered through such channels?* This question further builds on the 1st question, with the goal of providing a novel perspective on the way in which different professional communities serve as part of the care infrastructure that can help to develop and ascertain one's occupational identity. At the theoretical level, this question also aims to bridge feminist scholarship around care (Gilligan & Voice, 1993) and recent HCI (Human Computer Interaction) scholarship on conceptualizing sociotechnical systems as part of the relational infrastructure aimed at crafting care ecologies for varied sociocultural causes and needs (Semaan, 2019; Dye, 2021). The goal here is to provide a novel theoretical connection with the notion of the habitus and to situate how a practice of care emerges and possibly diverges in purpose across the forums inspected. Using the empirical investigation as highlighted above, the

aim of this aspect of the investigation will be to highlight how the type of relational association that emerges may in fact impact the moral orientation and the routines of care nurtured and cultivated by online communities.

3. *How may the online channels differ in the nature of habitus they engender and the type of care infrastructure they nurture?*

   This question aims to address the comparative dimension of analysis and inspection based on the foundation of the two questions as motivated above.

4. *What kind of community dynamics and actions by individual community members are pivotal to sustaining the habitus or collective identity cultivated through and in the online landscape?*

   While the 1st three questions aim to unpack the concept of the habitus through various different types of analytical investigations, the goal of this final question is to highlight how community members through repeated practice assume different social roles that help to sustain the nature of the practice that is observed. Social roles again depict a form of implicit assimilation of the community culture and these roles can impact the nature of the discourse that manifests on these forums (Pluempavarn et al., 2011). Thus, an understanding of the type of roles can help to provide an understanding of how community members contribute and orient themselves to the collective. Thus, this question can further help to unpack the latent and emergent relational integration that happens in these online collectives. Further, this type of investigation can also help to discuss the various ways in which community members (beyond the assigned roles of moderators) play a part in spearheading the nature of conversation and community that is espoused in these virtual forums. From an empirical standpoint, I use social network

analysis to investigate the actions of key actors who play a pivotal role in shaping the emergent conversational habits of these forums. Further, augmenting these insights with psychosocial attributes can further help to capture how people configure their positions in the community based on their perception and association with the ensuing collaborative habitus (Johnson et al., 2020). Thus, using the psychometric analysis on linguistic patterns of conversation, through a clustering analysis, I discuss and explore key roles that are pivotal to shaping and sustaining the collective footprint across the online channels of conversation.

1. d. Significance of the Study

This study aims to contribute to the growing body of scholarship that explores how social justice initiatives and campaigns can be bolstered and emboldened through and on social media channels (Blevins et al., 2019). Social media platforms in today's world have emerged as an arena of multifaceted use and appropriation. Yet the flexible and adaptable nature of use can have its own consequences, wherein sociopolitical stereotypes may proliferate and throttle the efficacy of open and equitable participation in these spaces (Scheuerman et al., 2019). Hence, the call and need to understand how group practices and collaborative conventions play into the way in which such channels can effectively nurture safe and equitable spaces aimed at advocacy and empowerment.

The connection between social justice and social media platforms can be explored at varying scales and across multiple contexts. While extant literature points to how social media can become a critical part of the justice initiative for amplifying social movements (Mundt et al., 2018), the goal of my work is to essentially situate how these online forums can also help to provide a pillar for discussion and collective consciousness for struggles which may exist in the everyday context for

marginalized groups (Semaan, 2019). Everyday struggles may create fissures within one, the roots of which may lie in symbolic sociocultural tensions, which may dampen one's spirit and sense of belongingness (Shay, 2014). Redressing and recovering from everyday struggles may need avenues for collective understanding, care, and resilience building (Sengupta & Semaan, 2021). To further contribute to this avenue of intervention and investigation, I explore how virtual forums may help to shed light on issues that may appear latent and hidden due to their symbolic nature of existence. Further, such kind of tumult may arise from deeply ingrained structural inequity which may implicitly manifest in organizational and institutional contexts, inflicting moral harm and potentially impairing one's occupational identity formation (Peterson, 2007).

Organization and collaboration are central to any initiative that attempts to galvanize and orient the public toward a social cause. Thus, one major aim and contribution of my work is to highlight the constructivist underpinnings of such initiatives and campaigns aimed at social and moral justice (Sengupta & Tacheva, 2021). To further contextualize this contribution, through this investigation, I provide a novel theoretical approach that combines structuration theory and Bourdieu's conceptual toolkits (particularly the gendered habitus) to situate the study context (the avenue of online communities to nurture professional development for women, especially those in the technical workplace) and serves as the main analytical lens that motivates the empirical investigations pursued. In addition, another important theoretical contribution I make is to highlight and connect the way in which such online forums acting as avenues for justice work, may emerge as sites of care – therefore also becoming a part of the infrastructure or the assemblage of care and refuge that is established and enacted through and on these platforms (Suomela et al., 2019). Care and the need to seek justice are in essence two sides of the same coin – the labor of justice may call for the need for support in order to endure and collectively resist the ensuing

strains. Hence, care and support can be critical in addressing the calls for justice and nurturing moral repair that can help these initiatives to survive and thrive through virtual domains.

Beyond the theoretical standpoint, my dissertation also posits a robust and novel multi-level and multi-method investigation, that is deeply interwoven with the theoretical apparatus as highlighted above. From the empirical perspective, the aim of the comparative analysis as conducted in this study is to help identify potential markers of distinction (if any) in the way in which social causes are advocated, encouraged for discussion, and redressed. Such an investigation can give a deeper understanding and can extend the orbit of social justice focused research in the online context by highlighting how perceptions such as gender, occupational identity, and the issue of moral recovery are addressed and redressed in this context. Using a three-pronged approach of content analysis, social network analysis, and exploration of psychosocial markers using linguistic attributes of conversation, the goal here is to provide a novel multi-methodological approach to provide a multidimensional view of the emergent community culture that can play a role in the way in which justice work is conducted or not conducted across different forums. In this regard, a comparative investigation can further help to elucidate the differences in the way in which care and resilience tactics develop and enrich the type of community initiatives that operate in such forums.

While understanding phenomenologically how initiatives of advocacy and empowerment are contextualized in these online formats is essential, it is also key to understanding the labor and work needed to sustain such movements. The collective drive and vision for respect and empowerment are very much motivated by the way in which people approach and undertake their functions in the community. Thus, I investigate the case of role formation from a psychosocial perspective supported by network and content insights. This investigation theoretically is also

motivated by studies that have highlighted how the habitus imprints and etches itself into one's sense of self – thereby affecting their agency and nature of action (Reay, 2015). The motive to conduct an investigation not only offers the opportunity to add another layer of novelty empirically but also helps to provide deeper insights into the way in which people orient themselves to the community culture, hence the use of psychosocial linguistic markers. Such an exploration can also provide deeper insights into the way in which community members assume key positions to ensure that the purpose and goals of the community are maintained.

This project is essential as it allows for a deeper understanding of the viability and feasibility of using online communities as tools that facilitate and nurture emergent community-building tactics for developing a collective voice to empower underrepresented communities (such as women). Further, the social aspects of this work associated with understanding the professional development activities of women in technical fields are of great essence. Thus, such an exploration can not only help to unpack the nature of the conversation that emerges in such virtual forums but can also help to provide context towards how collaborative endeavors intertwine with the issue of gendered prescriptions and social exclusions that arise in the sociocultural context and may as well seep into its sociotechnical counterpart (Trinkenreich et al., 2022).

Through the comparative stance, I situate key distinctions between the collective nature of affinity and shared understanding that may in turn shape the type of voice and nature of care performed in virtual spaces of collaboration. For example, drawing on feminist perspectives around the issue of moral injury and associated outlooks towards care as highlighted by Gilligan (2014), women-centric forums may offer differing patterns of conversation and community. Such acts of emboldening collective enterprise are probably driven by the need to address the requirement for collective healing from shared trauma and experiences which may further motivate the existence

15

of the women-centric channels in contrast to the general career forum. These distinctions can have several essential practical implications. Firstly, such insights can help in the way in which the future these sites are designed with a focus on marginalized voices, these visions can complement existing studies that highlight the boundedness of virtual channels and the limitations in the way in which the standards used for creating platform affordances may in effect exclude those who do not fall in the dominant social group (Broussard, 2018; Bellini, 2018). Secondly, inferences drawn can also pave the way toward the nature of policy considerations made. For example, the nature of moderation practices or the way in which automation is embedded into these spaces can be further considered. Thoroughly investigating the implications of these policies can help to ensure that these considerations are envisioned in a more inclusive way that nurtures and respects all voices present in such collectives.

To conclude, this study contributes by providing a theoretical amalgam, that engages many different interconnecting and complementing concepts. Particularly, using the notion of the gendered habitus, the aim has been to motivate the investigation into the efficacy and utility of online communities as vehicles for collective empowerment and knowledge development, in the context of occupational identity development for women (especially those working in the technical workplace). This investigation and theoretical approach are further combined with frameworks on resilience building for navigating everyday crises that historically underrepresented communities may have to tackle. On a practical and empirical level of contribution, these themes indicate ways in which virtual communities offer extended mentoring and can provide augmented support (Sengupta, 2021). These extended resources can also provide extended peer support in times of crisis which can disrupt standardized work and learning practices. Building and augmenting the social justice visions and motives as highlighted, these investigations can also contribute and add

to the growing body of literature in the context of career research in HCI (Tomprou et al., 2019), which is another stream of scholarship that needs more rigorous exploration. My dissertation work adds to multiple socially pertinent themes and theoretically motivates avenues to conceptualize connective and collaborative systems that can act as informal pathways that foster support, collaboration, and guidance beyond traditional institutionalized resources.

1. e. Document Overview

This dissertation attempts to delve into and address essential sociocultural implications and needs associated with the career and professional development of women working in the technical workforce. The angle of online forums attempts to provide a window into how a shelter can be provided by creating extended avenues of deliberation and conversation, creating a shared sense of purpose and commitment to the cause of empowerment, especially in the context of occupational identity development. Chapter 1 sets the stage for this investigation by laying out the background, motivation, key research questions, contributions, and expected impact. Chapter 2 shall elucidate the literature that scaffolds this exploration. In this regard, I first shall discuss the heart of this investigation which lies in constructivist theory and practice – for this, I shall explore structuration theory and Bourdieu's conceptualization of the habitus. Next, shall be more details on the premise of care infrastructure, building on sociotechnical infrastructure studies and its more recent (yet underexplored) extension in the context of social media platforms. Building on the multiple theoretical arcs posited, motivated, and connected, I shall present the research design in chapter 3. This chapter helps to move the narrative to the analytical and empirical facets of this dissertation. Thus, here I shall discuss the research setting and the site (Reddit and the subreddits) in more detail and with further justification. This section

also shall contain some preliminary statistics that shall help with the understanding of how these channels operate. Also highlighted in this section shall be two dimensions of interconnected and mutually constructed analysis undertaken. Chapter 4, shall entail a detailed description of the results. Chapter 5 shall be spent discussing the implications and many associated findings that connect the results with the theoretical stage set in chapter 2. Chapter 4 shall entail a discussion (organized study-wise) of the comparative perspectives including tables and figures based on the triangulating approach pursued in this analysis. Chapter 5 shall build on these insights to highlight and compare the three forums in terms of the type of habitus, emergent practice of care, and support, while also highlighting how such a practice embeds considerations of sociopolitical structures and constructs such as gender and the establishment of roles across the forums. Chapter 6, concludes this narrative by highlighting concluding remarks, implications, contributions, and some potential recommendations for future explorations based on this investigation.

2. Literature Review and Related Work:

2. a. Overview and Goals of the Section:

Thi section unpacks the different theoretical and related avenues of scholarship that motivate the dimensions of empirical research pursued in this dissertation. As highlighted in Chapter 1, an important contribution of this dissertation project lies in the way in which it combines multiple streams of theories and empirical studies thereby offering a novel foundational repertoire of multidisciplinary scholarship that can be applied and validated in the context of online communities. Aligned with this contributory outcome, the goal of this section is to provide a detailed account of constructivist and feminist theories and also related empirical explorations to elucidate how these apply to the context of this dissertation. This dissertation straddles multiple

important social concerns and at the same time also explores in conjunction with the use of online venues of conversation as sites of refuge. Thus, this anthology of theoretical and empirical narratives shall be applied in two ways, first to situate the social premise and then to also highlight how these foundational theories are applicable in the context of online communities. There are three key pillars of this section: (1) A concise summary of the constructivist motivations – which shall include a synopsis of the theories (structuration theory and the habitus framework by Bourdieu) and pertinent contexts of application (2) A brief overview of infrastructure practices and perspectives around care (3) A background and scaffolding account of studies pertinent in the context of virtual communities as sites of care and rapport building.

Constructivism forms the core motivation of this dissertation. It helps to situate the premise that most social constructs are created and sustained through repeated collective action. It thus helps to provide a background for how constructs such as gender, and conversational practice as observed in the online context are not absolute but the result of repeated synergistic actions. Aligned with the constructivist underpinnings of this thesis, this section shall start with an account of Structuration theory, which to this date, remains an extensively explored sociological framework and has often been heralded as one of the seminal pieces of sociological scholarship, that helped to bridge in the disciplinary divisions of micro and macro sociology. While this section shall explicate the foundational tenets of this theory, it shall also help to provide an overview of how this theoretical perspective can be applied and contextualized to the study of online forums, of which my dissertation is one. To date, such a theoretical scaffolding in the context of open online forums remains underexplored, thereby through this description, I shall also unpack the key theoretical contributions of this dissertation. While structuration theory

serves a powerful framing lens, an equally powerful and potent theoretical oeuvre that I shall

draw on shall be Pierre Bourdieu's conceptual apparatus of the habitus and particularly the

gendered habitus. Although this theory offers similar perspectives akin to Structuration theory,

its key additional contribution is in laying out a theoretical understanding of how inequity

emerges as a consequence of pervasive sociocultural traditions. Thus, it helps to provide an

understanding that inequity is also created, defined, and normalized through repeated

performance. Thus, it helps to set the stage for highlighting how occupational identity for

historically marginalized groups such as women, may come as a challenge owning to symbolic

traditions of subjugation and social exclusions, which may make such identity formation a

challenge. It helps to unpack how gender and gendered tensions exist and persist as relational

practices established and repeated over time, manifesting as structural inequalities. Considered

together with structuration theory, this theory helps to set the stage for the constructivist motives

that shall be key to the nature of empirical investigations as undertaken for this dissertation.

While the constructivist theories help to lay out the key motives (sociocultural and

sociotechnical) that drive my investigations, online forums play a pivotal part in this narrative, as

sites of care, refuge, and support. Having laid out the social premise, particularly using the

conceptual lens of the gendered habitus, I shall subsequently move the call for care and resilience

building that arises as a result of such exclusionary practices. In this regard, I shall first provide a

brief overview of feminist perspectives around care, particularly drawing on Carol Gilligan's

work on conceptualizing relational underpinnings of how care is perceived and performed

(Gilligan, 1993). Care is a term that can have multiple connotations across different contexts. In

this narrative, the purpose of including this particular framework around care shall be to provide

a deeper connection with the sociopolitical context as explored in this study, which is to investigate the type and need of care and support for women as they craft their professional footprints (Sengupta & Semaan, 2021). Further, given that the empirical investigation also aims to contextualize a comparative narrative between forums (two of which are women-centric and one is a general career help forum), such a theoretical encapsulation also helps to situate the differing perspectives and approaches around care based on the kind of relational affinity and gendered practice that emerges in these spaces.

While the aforementioned theoretical approach helps to explicate the need for care and factors that shape the way it is practiced across the forums compared, it is also essential to investigate the scaffolding or the infrastructure through and on which care is provided. In this regard, I shall briefly provide an account of studies that have highlighted the use of ICTs (Information and Communication Technology) and the way in which these are appropriated as the basis for how online forums can expand the dimensions of support, care and resilience provided in times of distress (Andalibi et al., 2018). Thus, this helps to lay out the foundation for how online communities can act as resources for connective intervention addressing the need for care by providing a platform to develop a collective understanding of shared experiences. Finally, I shall move on to the most essential dimension of this narrative, which is the context of online communities. The core motive of this part of the narrative, in line with the sociotechnical visions as previously laid out using the constructivist theories, shall be to highlight how the experiences of those who engage through these spaces shape the nature of conversation, collaboration, and community discerned (Rosenbaum & Shachaf, 2010). Drawing on literature from Computer-Mediated Communication (CMC) and Computer Supported Collaborative Work (CSCW), the

aim here shall be to justify and position the empirical precursors on which this dissertation hinges to motivate the emergence of conversational habits and group dynamics in online forums. The goals of this section will be to robustly lay out the definition of an online community, connections, and prior studies in care and support practices (as observed in the context of online communities) and shall conclude with a discussion on prior investigations on labor and work in relation online forums to situate how an online community is sustained and survives.

Finally, it is also important to address the scope of this section. Given that I engage with multiple theoretical precursors, which have been explored for decades in various disciplines and contexts, it is beyond the scope of this present narrative to fully detail the entire arena of application. The goals of my writing thus will be to situate the landscape of theoretical and empirical application so as to motivate the context of my exploration and particularly address three key themes: (1) occupational identity development and the ensuing tensions that women and other minoritized groups face in this regard (2) care and support associated with the moral strains of sociocultural subjugation and prejudice (3) how online channels can assist in collective bonding and rapport building through collaboration and collective enterprise in this context.

2. b. Structuration Theory – Providing a Premise of Constructivism

2. b. i. Background and Concepts

Postulated by British sociologist, Anthony Giddens, structuration theory to date, remains one of the most widely adopted, used, and revered theoretical frameworks that originated in the field of sociology (Giddens, 1984). The roots of structuration theory lie in the hermeneutic relationship between human action and societal order. In essence, it helps to unpack that larger social structures do not exist independently, but are shaped by individual actions indoctrinated into cultural practice

at a larger scale. Hence, society can be seen as the large virtual collective within which humans operate, interact and thus carry out their day-to-day lives. Thus, at one level, there exist social systems which govern our day-to-day actions. These social systems represent the main institutions, laws, and rules that drive society and thus impact humans at both the collective or the *macro level* and the individual or the *micro level* (Bryant & Jary, 2001). However, these systems are constituted based on human action and on a collective *consensus* or rationalization of human actions. For example, organizational institutions have a formal way of working, these include laws, dictums of conduct, and norms of presentation that drive the way in which such institutions operate (Ruel, 2018). While these systems may appear as monolithic institutions, these are shaped by day-to-day interactions and ways in which people construe their positions within the institutional context. Yet, structure and the way in which individuals construe their agency in relation to that structure, are not constant. For example, social movements such as the French and Russian revolutions paved the way for new forms of societal systems that govern our way of life today. These movements displaced traditional social structures (particularly hierarchies and systems of power based on land ownership) such as monarchy and ushered in several new waves of social structure and political institutions in the present world we live in today. Thus, micro forces can often cause occasions of structuring and reconstitute the way in which the macro level or the collective systems operate. This motivates a need to look into the way in which the micro and macro intertwine and impact one another.

At the macro level, we can see major social institutions which drive the *constraints* within which humans operate. Such has been the line of thought of structural sociologists such as Auguste Comte, Emilie Durkheim, Talcott Parsons, and Karl Marx. These prominent figures of sociological thought presented a view of human life being governed by social forces which exhibit control over

humans (Bryant & Jary, 2001). Yet, the role of the human as an agent of change and continuity in shaping these social forces was not the focus of these early thinkers. Their objective was to create a *science* of society akin to the natural sciences, with humans having no say in the causal factors that governed social phenomena (Giddens, 1984). In response, grew the field of micro-sociology that in contrast was more interested in the agent or the human whose actions and behavior were crucial for the sustenance of the macro forces (Giddens, 1984). Structuration theory aims to create a dialogue between these two perspectives. The aim of this theory is to highlight the interplay between the macro and micro views, thus unpacking how structure and agency are intrinsically intertwined. This interplay termed *the duality of structure and agency* is the primary and chief contribution of structuration theory, on which many future explorations have been based (Rosenbaum & Shachaf, 2010).

Any and every social movement, political, economic, cultural, or even technical development can be explored and unpacked using this theory (Bryant & Jary, 2001; Ferdoush, 2018). Discussing the full array of historical precursors, applications, and extensions of this theory is beyond the scope of this essay. The constructs of structuration theory are applicable to this investigation in two key ways - (1) First is to use the framing of structure to motivate the domain; that is how structure constrains and enables the agency that women perceive and enact in pursuing their careers in the IT domain. (2) The second dimension of application is to provide a conceptual framework to primarily discuss how online communication channels develop structures or implicit and explicit norms of conversation, participation, and collaboration which in turn constrain the extent to which one can express themselves on such platforms (Rosenbaum & Shachaf, 2010). These connections are further reinforced in the subsequent sections through examples. Thus, structuration

theory becomes the key conceptual linkage that connects and co-constitutes several dimensions of this exploration. Next, briefly, the key takeaways from this theory shall be summarized.

2.b. ii. Unpacking Structure and Agency: Definitions and Related Applications

Structure is one of the key concepts that structuration theory attempts to put forth. To understand what structure is, one needs to understand how Giddens conceptualizes social systems. According to Giddens, structure is a property of social systems. Structure according to Giddens is a form of social practice repeated across time and space (Ferdoush, 2018). Essentially it refers to set routines that the individual or a group reproduces across various dimensions of time and space thereby establishing a patterned order of day-to-day life. The repeated extensions of such social practices or routines lead to the formation of social systems or institutions which represent the totalities within which humans operate. For example, one can view gender as an institutional construct, that is culturally constructed and reproduced through various intersections with other major institutions of society (Martin, 2004). For example, the way women negotiate work and family boundaries can be seen as a way in which social roles are configured based on the intersections of three institutional forces (gender, work, and family) (Spivak & Desai, 2016). Thus, this helps to also situate how forces of structure often intertwine and impact one another. Key to the sustenance of such structure, at various levels, are rules and resources. Rules help provide meaning or the rationale behind the action but also establish the boundaries or sanctions of action. Resources on the other hand represent the modalities through which agents enact structure. Resources can be of two kinds - (1) allocative, indicating the ways in which humans use material objects (2) authoritative, indicating the ways in which agents establish control over other agents. For example, in the virtual domain, moderation policies act as rules governing the nature of conversation, which can be implicit or explicit. Using the example of online forums, the repeated use of themes in these

channels may give rise to a set practice of conversation and community (Rosenbaum & Shachaf, 2010). Resources are closely aligned with rules and act as intrinsic properties of any social system. For example, in the online social universe, rewards can be perceived as a way of enhancing community engagement. Rules and resources often intertwine in practice, rules dictate the allocation and use of resources. For example, more experienced members of online communities can help to set the norms of participation and guide the way in which newcomers engage and associate with one another on online platforms (Jackson et al., 2020). Thus, the more experienced members set the rules regarding how resources are to be used to guide newcomers to follow such conventions.

To further explicate the notion of structure, Giddens mentions three kinds of structure - structures of signification, legitimation, and domination. Structures of signification denote the structures through which agents can construct meaning. Structures of domination indicate how power is structurally embedded. Structures of legitimation emerge at the confluence of the other two structures, whereby what is legitimate, i.e., appropriate conduct and human action is ascertained. These three variants of structure guide the way people enact and reproduce structure across time and space extensions. Often these structures act in unison to produce norms of social encounters that set the bounds of such interactions. A key example of this is the patterns of clothing that one adorns in a particular social context. For example, in a professional workspace, implicit norms of clothing may dictate and symbolize a person's (particularly a woman's) position and authority, which may drive the way in which they are accepted and respected in such institutional collectives (Fotaki & Harding, 2017). Further, these three structural elements may be key to configure the way in which community members participate in online forums (Jackson et al., 2020). The emergent social roles in online forums may come with rules of engagement (domination), types of

conversation associated with each social role (signification), and a general acceptance and association of the type of conversation with the rules of associated participation (legitimization) (Golder & Donath, 2004).

The above discussions of structure depict the way in which structure exists and persists in human society. Structure can be implicit or explicit and can also mutate over time, depending on the way individual actors or groups of actors perform, replicate or reform existing structural practices (Giddens, 1984). Such replications or mutations depend on the agent's perception and level of embeddedness in social structures. According to Giddens, the capabilities of action that an agent possesses are collectively used to refer to as agency (Giddens, 1984). Thus, agency shapes and influences the power the agent possesses or how an agent uses the three variants of structure (signification, legitimation, and domination) in action. Agency is shaped by the way the agent socializes with others and learns the ways of the world. It is through this process that the agent establishes relationships and configures a role for itself which in turn dictates the way agents reproduce structure. Such forms of socialization are evident in the context of online communication. For example, a person new to a virtual community may rely on the way others interact or the traces left behind by others to understand how to interact in a community (Mugar et al., 2014).

As a result of this socialization process, the agent develops trust and tact which it uses to operate in the world. Agents configure trust and tact through encounters or interactions with others, that is through the reflexive monitoring of the environment within which the agent is situated. An example of this may be embedded in the way in which community members in online forums learn the way in which they communicate or engage in platforms. For example, studies have shown that community members may actively participate (speaking) or may be more prone to listening or

passively consuming materials, thereby depicting a form of indirect engagement (Wise et al., 2014). Thus, such perceptions may drive the way community members align themselves with the values and goals of the larger collective. A resonance of perspectives may induce active participation, and a lack of alignment may cause alienation or more passive engagement. Giddens goes on to further say that social encounters are characterized by the establishment of co-presence and positionality (Giddens, 1984). As agents enact and draw on the structures of signification, legitimation, and domination, social positions are established. Through these positions agents also establish relations with one another within a given context, thereby delineating their role and social identity in that particular context. As the result of establishing a social identity, an agent configures a sense of ontological security which enables the agent to routinize its day-to-day activities. In essence, ontological security captures a form of social embeddedness – how the individual situates themselves in relation to the collective order. Such habitual behavior can be observed in online traces of communication, as the values, goals, and objectives of a community may shape the nature of practices and patterns of collaboration (Seraj, 2012). A more knowledge-centric community may focus more on information sharing; whereas a community with a more interpersonal approach may foster a deeper sense of fellow feeling and camaraderie (Sengupta, 2021). Thus, different models of trust and cooperation practiced and reproduced by community members, can create varying types of social associations and relational affinity among community members, thereby also motivating the comparative investigation as pursued in this exploration (Ren et al., 2012).

Ontological security is crucial to how the agent positions itself in relation to the existing societal totalities (Giddens, 1984). The sense of ontological security affects the way the agent frames or attaches meaning to its activities and brackets or construes its position in relation to the actions of others within a social context (Giddens, 1984). The absence of this sense of security leads the agent

to appear detached from a certain institutional practice, the example of which can be individuals (especially women) who feel outcast in professional settings due to the misalignment of values and objectives (Herman, 2015). In the case of online communities, ontological security can be best captured as a sense of belongingness and fellow feeling among community members (Sengupta, 2021). The absence of such a sense of belongingness can arise due to a lack of representation, recognition, and bounded ability to participate (Brooke, 2021). For example, studies have highlighted how women in open online forums suffer from group practices that do not recognize and acknowledge their contributions and perspectives (Corple, 2016). The lack of ontological security can threaten one's sense of self and can cause turmoil and distress, calling for the need to find avenues to redeem one's self-esteem. In summary, this section captured through various conceptual explanations the way in which structure and agency intertwine. Further, essential concepts that arise out of such reciprocal relations were also discussed to consolidate the theoretical dimensions. The final part of this section shall delve further into the importance and impact of context

2.b.iii. The Role of Contextual Factors as a Mediating Force

Structure, agency, and the mutual dependence of these two concepts (or the duality between these two) are rooted in temporal and spatial considerations of the context within which these are conceptualized. For example, cultural practices can affect the way women configure and balance their social, cultural, and moral roles (Tams & Arthur, 2007). Thus, it is through the combined 'binding' of time and space that routines, practices, and thus structure is ascertained. To further elaborate on how the notion of contextuality affects the duality of structure and agency, Giddens highlights the concepts of regionalization and the establishment of locales (Giddens, 1984). At a more macro level, we can understand these concepts through how space-related boundaries are

delineated. For example, the city vs the more rural settings. At the more micro level, the concept

of regionalization affects the way the agent develops its sense of ontological security or the way

in which it learns to construe the meaning of its surroundings. Thus, it helps the agent to configure

and establish its values and beliefs in relation to a particular social setting (Ferdoush, 2018).

Context and social stimuli can impact the way the agent configures its presence and position

(Bryant & Jary, 2001). For example, prior research on Reddit has highlighted how features such

as anonymity may affect the extent to which people disclose sensitive information or seek support

(De Choudhury & De, 2014; Sengupta, 2019). Further, community culture may dictate the nature

of conversation and community that is established (Sengupta, 2021). Extensions of structuration

theory such as Adaptive structuration theory have expanded on how contextual differences give

rise to different forms of structure and agency (DeSanctis & Poole, 1994). In effect, this theoretical

expansion attempts to bring a deeper point of separation between structure and agency by situating

these constructs in different contexts. As per this theory, the context represents the values, beliefs,

and goals (or the collaborative spirit) embedded in such channels by system developers and

planners (Sun, 2020). Thus, these can be thought to represent the affordances of online channels

(Wise et al., 2014). However, system users, in the context of use, develop their own cognitive

structures or appropriations in relation to group practices (DeSanctis & Poole, 1994). In effect,

appropriations can be envisioned as driving the way in which users perceive the intended value of

virtual channels which in turn may affect their sense of belonging and patterns of engagement

(Lampe et al., 2013).

2.b. iv. Rationale for Grounding Present Research Exploration:

Structuration theory acts in many ways as the cornerstone of my exploration. In the context of

online forums, there are several ways to conceptually blend the nature of my exploration with

structuration theory. Most importantly, online communities exist through a shared commitment

to a certain form of collective practice (Tacheva et al., 2021). This collective practice manifests

as the nature of conversations and the way in which members configure roles and justify their

social positions in such spaces (Arguello et al., 2006). Thus, community members through their

actions establish a collective order (or a practice manifesting as conversations). This emergent

collective order impacts the agency of community members – depicting the duality of structure

and agency. This form of duality can create norms of participation and impact engagement

(Corple, 2016). Further, the power of this theory and its constructivist roots help to lay out the

fact that structure that we observe in online spaces exists and emerges as a practice, created and

sustained through repeated performance. Several other concepts also closely align with the

motivations of the explorations I present. For example, the conversations in online spaces

represent the macro-level view and offer a deeper understanding of the collective structure that

emerges in digital contexts, while through the author-level investigations the goal is to glean

further insights into the micro-level view that shapes the conversational themes. Thus, on a

generic level using structuration theory allows for a richer discussion regarding the way in which

society and social order are crafted through repeated practices in online forums (Rosenbaum &

Shachaf, 2010).

Despite the rigor of structuration theory as a powerful framing construct, the use of such

frameworks in the context of open online forums (akin to the channels my work explores)

remains understudied. A key investigation in this regard, that used structuration theory and

related concepts was to primarily situate the importance of context, practices, and how the

duality of structure can be used to explicate the way in which online communities create routines

of participation and engagement, through the repeated actions of community members (Rosenbaum & Shachaf). Essentially, this article provides a theoretical account of defining open online forums as online communities and uses a connection drawn between communities of practice and structuration theory, to depict the development of shared practice and repertoire in these collectives. Another similar use of structuration theory in the online context details how a form of common verbiage is nurtured and accepted, especially as newcomers ingratiate and orient themselves to these collectives by adopting a shared conversational practice (Jackson et al., 2020).

While my work builds on these explorations, I also add further theoretical and empirical vigor to the way in which structuration theory can be employed in the use of studying online forums. Firstly, through the comparative analysis, I wish to highlight how context shapes the nature of the collective practice, values, and goals nurtured by these online forums. Essentially this comparative investigation shall highlight how the duality of structure and agency exhibited on each of these forums, capturing different group norms and practices that emerge that may in turn drive the practices that emerge in these spaces. Thus, on a theoretical level, this highlights how the structure of legitimization, signification, and domination collectively operate to situate the nature of dialogue, relational affinity, and community that emerges in virtual forums. A comparative analysis thus also explicates how rules and resources emerge and operate and drive the practice of these spaces. For example, gender and occupational identity may have different meanings on each of these forums thus showing how conversation is contextualized and scoped across these spaces. While I shall discuss the findings aligned with this hypothesis later in the discussion, prior similarly motivated studies have highlighted how some open learning forums

such as Stack Overflow may encourage and dictate a specific format of conversation that is more informational and aligned with programming queries, thus a more knowledge-centric view, whereas some may be more communal and offer a space for bonding and nurture camaraderie among community members (Sengupta, 2021). Thus, each community may contribute and control the nature of support they provide, further signifying the way in which the duality of structure and agency shape practice and community culture.

Another concept that I wish to further explore and add further theoretical nuance to is the notion of ontological security. I shall explore this in two ways – (1) Firstly, I shall capture how women may seek refuge in online channels as a way to reaffirm their ontological security when faced with struggles and challenges in the workplace context (2) Secondly, I wish to capture how community members establish a sense of ontological security as they embed themselves in online channels. Thus, those who may be using online forums as a way to seek support, communal bonding as well as mentoring, and as a place to disclose their struggles, may need to negotiate the collective practice of the online forums. Thus, as they seek to reclaim their ontological security in one context, they may need to configure their sense of ontological security with reference to the forums within which they operate. Thus, this depicts a form of intertwining and interdependence of two types of ontological security – one that is sociopolitical and the other being socio-technical. The conversations, roles, and network structure we see emerge at the interface of these two. Hence, the practice of care and resilience that emerges may be a manifestation of these dynamics. Thus, here I also offer a novel extension to the premise of structuration theory, by highlighting how context and ontological security may impact and shape one another.

I add empirical robustness in addition to the existing theoretical connection through the multi-method investigation I propose. Thus, through conversational analysis, I capture the macro view or the collective practice of these online forums. At the content level, through the network analysis, I capture added nuance of the nature of relational integration that emerges as a consequence of the collective practice. The linguistic markers add further nuance to the way in which community members imbibe the rules of conversation and participation in these online channels. At the author level, I capture the complementing micro view that shapes the macro perspectives. Such an investigation can provide a deeper insight into the actions of key actors, the emergent roles, and typology actions that in effect capture how community members align themselves with the larger collective. In summary, my use of structuration theory provides motivation for visualizing online forums as a site of collective practice that is shaped by the cooperative action of the agents that engage in these forums.

While prior scholarship has extensively applied structuration theory in the sociocultural context and recently offered some connections to the sociotechnical aspects associated with online forums, I combine both of these avenues of scholarly investigations. Using structuration theory, I provide a novel combination that motivates the constructivist roots of gender and gendered practices (especially in the workplace context) and also captures the sociotechnical context of collective practice as observed on online forums. Building on previous studies that offer more of a theoretical scaffolding to the way in which online communities are conceptualized, I not only add novel theoretical connections to the way in which online communities emerge as forums of care, support, and a site of redeeming one's sense of self, but also substantiate these theoretical

pivots using empirical observations, thereby adding another additional layer of novelty. In the next section, I lay out Bourdieu's conceptual toolkit, that in many ways connects and adds to the notion of structure, agency, and the interplay of these two, while also helping to situate more robustly how these are etched into cultural practices which may give rise to sociopolitical inequalities. Thus, I provide a novel dialogue between these two powerful frameworks, while also situating the domains of investigation I pursue in my dissertation.

2. c. The Sociological Frame of the Habitus and Scope of Application

2. c. i. Overview and Concepts:

Alongside Anthony Giddens, another powerful sociological thinker, who too was a key contributor to the discourse around the reciprocal relationship between structure and agency was the French sociologist, Pierre Bourdieu. While Giddens provides a general framework highlighting the interplay of structure and agency, Bourdieu's key contribution includes the discussion and exploration of how power is shaped by and shapes the structure and agency dialectic. Essentially, the key concepts that Bourdieu explicates attempt to highlight how inequality is constructed and gets ingrained into the day-to-day practices of social life. The essential concepts discussed in this section are drawn from arguments and concepts laid out in the conceptual toolset of Masculine domination (Bourdieu, 2001). Akin to Giddens, Bourdieu too postulates that differentials in power and access between different social groups arise in practice and are not *natural* but become *naturalized.* For example, in the online universe, the power of certain social groups in driving the norms and collective culture of these spaces might lead to the systemic expulsion of other social groups, causing disparities, and feelings of exclusion among those left out and undermined (Bourdieu, 2001). For example, a study investigating participatory trends of women in open online forums such as (Stack Overflow) found that women do not feel duly respected and valued for their

35

contributions which results in a lack of engagement and fear of participation (May et al., 2019). Such an example helps to shed light on how society is governed and operated based on collective ideologies that implicitly and explicitly exude control over people's actions. Akin to this idea, one of the key concepts that Bourdieu puts forth is the notion of *habitus* – the fact that an individual's values, beliefs, instincts, and moral ideologies are shaped by and shape one's embeddedness or social position. It thus captures the dualistic perspective that Bourdieu's theories highlight between one's social position and acquired disposition. In Bourdieu's world, the habitus is more of a tacit notion and not something that is consciously learned but it is something acquired through repeated performance, akin to *structure* in Structuration theory. Thus, Bourdieu's conceptualization of the habitus helps to further the idea of structure by also highlighting how structure and power intertwine and shape one another. The consequence of such power is the acquired social position and disposition of individual actors.

The habitus is closely linked with other key concepts from Bourdieu's conceptual framework such as a field. The field essentially is akin to the notion of context, it acts as a frame of reference within which different social actors are bound, giving rise to a certain form of performance that results in the habitus (Bourdieu & Wacquant, 1992). The field is construed and bound by social relations that shape the way in which one acquires their disposition. Social life can be considered to be comprised of multiple intersecting fields that co-constitute the associated habitus. The key types of habitus include two main categories – (1) Original and (2) Specific. The original habitus refers to the habitus that is acquired through the influence and association with one's family and many other overlapping fields. Specific habitus refers to the way in which an individual construes their position in a particular field. For example, in social media contexts, one may operate in a particular way in association with professional contacts (setting specific content access rights) similar to that

of a specific habitus, whereas one may act in another way with personal contacts, allowing a more open and free form of expression akin to that of the original habitus (Vogel & Rose, 2016). Thus, the formation of the habitus or the disposition that certain actors develop in a particular context is also intertwined with the norms of a field. These norms manifest through the mannerisms and etiquettes of a particular field. Bourdieu terms this interaction with norms as *Hexa*, which represents the *front* that an individual presents in a particular social setting. For example, in the musical field, a habitus may emerge from the nature of the practice(s) that musicians follow. Thus, through such a habitus one may develop specific behavioral, and stylistic conventions that align with the practices and dictums of that field. So, connecting this with the structures of domination, legitimization, and signification, one internalizes the different ways in which these three forms of structure constrain and enable agency. Thus, the habitus encodes a practical schema based on which individuals develop modes of operation in specific contexts.   For example, folk musicians may follow a habitus of care, and community-centered values; whereas metal artists may follow a more individualistic style (Millar, 2016). In a certain sense, the habitus construes and confines the roles(s) of an individual acting within a larger social collective (Lovell, 2001).

Akin to the discussion of ontological security from Structuration theory, the habitus too can be envisioned as a sense that individuals develop that provides them a sense of stability and a rationale for action within a certain context or field. This begets a question about the relationship between the socially constructed habitus and its impact on the human psyche. The habitus in prior studies has been highlighted as impacting the creation and expression of affect (Reay, 2002). Consciously or subconsciously, we are always invoking our affective states when negotiating the habitus we are situated in. Interestingly, although as in most sociological accounts, Bourdieu does not explicitly detail an account of affective states, scholars have highlighted how affect in the form of

ambivalence, anger, and happiness has been found in the narratives of the habitus as penned by Bourdieu. Thus, such studies raise the importance of studying the psychosocial – i.e., how in dealing with inequality, enmeshed within the habitus are also affective states that help to illuminate the nature of disposition performed by the associated actors (Reay, 2015). This psychosocial account of the habitus combines the social underpinnings of the habitus and integrates it with the virtues and ethical standpoint one adheres to on a day-to-day basis, which may alter depending on the field (Reay, 2002). Such psychosocial investigations of the habitus can also shed light on how a habitus can often be built on instability and suffering, thus capturing the affective facets may thus offer insight into repressed, unrequited feelings (Reay, 2015). For example, in my investigations, such a psychosocial investigation can be undertaken to provide an understanding of how the conversations in online forums often capture a sense of yearning and an innate need to seek refuge from the strains induced and inflicted upon minoritized voices (in this case women) as they negotiate the symbolic restraints of their occupational lifeworld (Sengupta & Semaan, 2021).

Affective states depict an intrinsic, individualistic element associated with the habitus (Reay, 2015). Thus, a distinctive feature the habitus incorporates is the fact that the disposition (or the sense of security) one attains is linked with their social position and thus is likely to be unequal for different actors (Millar, 2016). This is linked with the question of who exerts control over the way in which a habitus is defined, within a certain field setting. For example, owing to several social movements and calls for equity in the workplace, women have been granted access to elite work fields (such as management), yet, their roles, positions, and expectations are very much controlled and determined by historical social practices, often reflecting the perspectives of the dominant group (typically comprised of white men) (Corsun & Costen, 2001). Thus, a habitus depicts a form of implicit compliance and control, defined by an underlying relational dynamic.

The bounds and rules of the field drive the nature of habitus that emerges and are construed by those who hold positions of authority and wield power over others. Linking back to the way in which structure is defined by rules and resources, the notion of the habitus captures how rules and resources may not be uniformly available and thus the experience of structure can differ based on one's social position (Bourdieu, 2001). Further expanding this notion of the habitus and how it is entrenched in a spirit of inequality rises the notion of the gendered habitus.

2. c. ii. The Conceptual Framework of the Gendered Habitus and Applications to Professional Identity Formation for Women

Beyond the general premise and theoretical underpinnings of the notion of habitus, one of its key contributions of Bourdieu is the notion of the gendered habitus, which in certain sense is an extension of the notion of the habitus. The gendered habitus in essence as per Bourdieu's theoretical stance is a form of gendered practice, that like habitus is deeply rooted in everyday life and cultural practice. It is in Bourdieu's view something that happens subconsciously and is so deeply etched into cultural practices, that it becomes a routinized act that remains in certain sense unquestionable, appearing as if it is natural which results in a form of a gendered social condition that Bourdieu terms as *doing gender* (Dillabough, 2004). Gender thus can be seen not as an absolute construct but as a dynamic notion, defined by relationally constructed practice and traditions. Thus, in this framework, such nature of gendered practice is carried forward through historical and cultural reproduction. For example, Bourdieu uses the metaphor of games and *who* is allowed to play these games to establish his point. For example, there are certain games where masculinity is almost seen as a precondition and so the cultural construction is such that it precludes women. Thus, in this view, as part of the gendered habitus emerges a culture, a routinized practice of domination, that manifests in a symbolic form of masculine superiority which results

in oppression and exclusion of women in a majority of social fields (Lovell, 2001). This kind of

domination is linked with another key concept from Bourdieu's oeuvre termed symbolic violence.

Such symbolic violence is essentially a set of sociocultural prejudices that predominantly impacts

those who have been historically excluded and marginalized from the mainstream, such as women.

Symbolic violence captures the harms that emerge due to the way in which norms within a field

exude properties of oppression and harm, typically inflicted on those who do not have the

protection of position and privilege (Kennelly, 2017). For example, technical artifacts aimed at

providing support and assistance in day-to-day affairs, bearing a feminine voice, depict historical

prejudices that subjugate women to perceived inferior positions of servitude and care (Hagen,

2021). Thus, in effect, not only does the gendered habitus depict a habitus of dominance but also

encapsulates a habitus of symbolic exclusion and prejudice (Dillabough & Acker, 2002). Such

exclusions give rise to gendered divisions of labor which manifest implicitly as practices that shape

social relations in the workplace as well as those in day-to-day transactions of life (Reay, 1998).

As per Bourdieu's vision, gendered habitus is not just a problem of access (for example: including

women in the workplace) but also a cultural practice that often results in domination over the

perceived inferior (Krosnell, 2005). Thus, the gendered habitus manifests as prescriptions of

appearance, and demeanor, and regulates the extent of expression, in effect creating a sphere of

subjugation for women. Bourdieu has termed these subjugated forms of existence as *submissive*

dispositions. Submissive disposition has been seen to manifest in the habitus of domestic life as

well as in the habitus of the female worker and caregiver, crusading and navigating multiple layers

of responsibility and care (Silva, 2005). Building on the psychosocial underpinnings of the habitus,

these forms of subjugated existence can cause emotional turmoil and strife, as subjugation may

result in invisible chains that exhibit institutionalized control over certain groups and actors, inhibiting their ability to freely express themselves (Arnot, 1982).

The gendered habitus as a concept has seen applications in many different disciplines. Particularly relevant to the context of this dissertation is the use of the concept to highlight its importance in shaping organizational culture (McKie & Jyrkinen, 2017). This exploration posits that the gendered habitus dictates multiple dimensions of norms in the workplace context. These norms may manifest in the form of expectations of attire, appearance, and behavioral patterns and are shaped through interactions with others in such environments. These studies highlight how even with the changing tide of social relations and economic reform, roles and functions for women or those who do not belong to the dominant social group may still be stereotyped and shaped by gendered norms (Ridgeway, 2011). Such forms of oppression become particularly problematic when these get deeply embedded in the value systems of such contexts. For example, in the science, engineering, and technology fields, organizational scholars have highlighted how the acceptance and rigid adherence to masculine values such as competitiveness, and expectations of logical, rational forms of demeanor, can often lead to women and other minorities feeling excluded in such contexts (Hanappi-Egger, 2013). Thus, hidden in the norms of gaining entry and associated behavioral attributes of such fields are restrictive gender codes that often become routine practices and thereby limit access and one's ability to thrive in such contexts (Ruel, 2018). Further studies have also highlighted how the gendered habitus essentially can lead to stereotypes around academic success, and career pursuit and can create gendered patterns of academic achievement (Edgerton et al., 2014). These studies are closely related to the goals of this dissertation. As highlighted by prior scholarship, the gendered habitus has been shown to be a key player in the way in which organizational life is scripted and performed. It not only affects the *codes of conduct*

41

of women but also those around them and essentially addresses how certain socially minoritized groups are bound by structures of dominance, restricting their sense of self and eroding their self-worth (Ruel, 2018).

Bourdieu's conceptualization of the gendered habitus is particularly effective in laying out how the gendered habitus forms an invisible wall that bounds the degrees of freedom and expression for women (Butler, 2013). However, critics of this framework also argue that while the habitus is an effective conceptual tool to understand the limits imposed by socio-cultural conditions, it does not account for the will and judgment of the individual actors to resist and subvert such symbolic acts of dominance (McNay, 1999; Lovell, 2001). Feminist scholarship has critiqued Bourdieu's viewpoint of women as cultural objects and not as cultural subjects (Butler, 2013). While these critical viewpoints are justified and have their own merits, recent scholarship has also highlighted how Bourdieu's framework can serve as a theoretical basis for discussing the constraints that give rise to occasions for subversion and thus attempt to create a bridge between this reflexive thinking and feminist viewpoints (Herrera & Agoff, 2019). Further extensions that come from feminist and Bourdieu's perspectives, have also posited the importance of feminine attributes as a form of capital that increases the potential to perform certain types of roles (e.g., that of a caregiver) (Huppatz, 2009). These demonstrate the potential of using Bourdieu's framework as a basis for investigating the existing challenges embedded in social structures thereby warranting the need for subversion and reform (Chen, 2020). Another line of critical scholarship highlights the fact that Bourdieu's notion of gendered habitus is laid out as a static notion, the influences of race, culture, and other determinants which may shape the nature of the habitus is not fully explored, which may be also partly linked with another critique of his work, which is his attempt to make universal claims based on the exploration of Kabyle society (Fowler, 2003). Thus, this warrants a more

42

intersectional expansion of Bourdieu's conceptual toolbox. For example, some recent scholarship has highlighted how women in technical fields in the global south, have constantly struggled with doing and undoing gender in the everyday context in the workplace (Saifuddin et al., 2021). Such perspectives not only complement but also expand the notions of the gendered habitus, raising awareness about the importance of intersectional perspectives that constrain and enable the way the habitus is shaped within the field (Millar, 2016). In conclusion, the goal of this section is not to provide a synopsis of Bourdieu's conceptual framework, that is an exploration beyond the scope of the present narrative. But the focus of this section has been to provide a conceptual basis grounded in some of Bourdieu's key concepts, particularly the notion of the gendered habitus and the habitus in general, which provides grounding to motivate and connect different aspects of this exploration while also extending the constructivist framework of Anthony Giddens.

2.c. iii. Marginalization in the Technical Domain Through the Lens of Data Feminism - the Nexus Between Gendered Habitus and Systems of Exclusion.

While the previous section delves into Bourdieu's theoretical framework to situate at a broader level the symbolic structures that may limit one's ability to fully explore and express themselves, since the focus of this dissertation is particularly to look at technical fields and understand the organizational practices in virtual communities, concepts from the emerging body of work in the field of data feminism will be used to further motivate the issues and challenges that may arise as actors from historically underrepresented communities step into such virtual enclaves. Technical domains have historically been known to have been arenas where exclusionary practices have long existed (Ruel, 2018). Authors such as Meredith Broussard have termed these practices as Technochauvinism - a belief that technology is superior and cannot be challenged (Broussard, 2018). Yet, deeply entrenched in this ideology were social prejudices and beliefs of intellectual

inequality, wherein women were often assumed to perform inferior roles (Broussard, 2018). Likened with the ideology of the gendered habitus, technochauvinism is a viewpoint that depicts a form of symbolic violence that exists in the traditional practices of STEM disciplines that bears a certain masculine culture. For example, in the IT sector, such a hegemonic practice often results in a certain kind of value system and the creation of certain standards of expectations, failure to comply with such standards often results in rejection or termination from professional engagements (Peterson, 2007). Broussard uses the example of the Artificial Intelligence (AI) field to highlight such forms of hegemony that exist and persist in the culture of technical fields. The discussion on technochauvinism highlights how pioneers in the AI community often treated scientific musing as superior to practical considerations, which resulted in systems that were mathematically sophisticated but not sensitive to different social considerations and thus were limited in terms of use (Broussard, 2018). As the author highlights, technochauvinistic practice results from a long tradition of gendered practice, where women and other minoritized groups were treated as computers, employed to perform low-end tasks. This kind of culture can also be found in the gendered voices of smart assistants, which were given a feminine tone representing the fact that women historically were the ones performing functions of care (Obinali, 2019). Such practices depict a form of symbolic domination, encapsulating a hierarchy of knowledge (scientific tasks being superior to social functions such as care) and actors with socially marginalized identities being subjugated and denied equal respect and a fair chance to participate in mainstream activities (Raul, 2018). As a response to technochauvinistic perspectives and as a call to bring in more equitable voices and broaden the perspectives of technical fields, authors D'Ignazio and Klein lay out the foundations of data feminism, which is an endeavor to raise awareness of the need to reform and restructure the priorities and outlook of the technical fields (D'Ignazio & Klein, 2020). It

essentially is not just a critique of the output of technology using the use case of data-driven systems but is a call for a much-needed reprioritization and restructuring of the values, goals, and objectives of such domains. Rooted in feminist philosophy that advocates for justice and co-liberatory initiatives, its aims are also to broaden the scope and definition of data-centric knowledge and work, deepening ethical stances by contesting the existing hegemonic bounds that symbolically annihilate the voices and visions of the historically underrepresented (D'Ignazio & Klein, 2020). Thus, in many ways, one of its core objectives is also an attempt to address the gendered habitus that has long since remained unchallenged in the day-to-day practices of such technical domains (Hanappi-Egger, 2013).

Data feminism is a form of movement that is inspired by intersectional feminist thought. Given its roots in feminism, it is informed by direct experience and comes with a commitment to action (D'Ignazio & Klein, 2020). It is aimed at raising awareness about how sociocultural constructs are implicitly driving the way in which data-driven systems are designed, and questions who is the architect of these systems and for whom such systems are designed. Thus, in essence, it calls for increased consciousness of the way in which technical fields create a form of symbolic power that often favors certain social groups while undermining certain other groups. Given its close association with intersectionality, a brief overview of this notion is warranted. Coined by Kimberly Crenshaw, this concept highlights how experiences and identity are shaped by the overlaps of multiple socio-political constructs such as race and gender. It basically tries to drive that the layers of domination faced by women of color bear a distinct character due to intersectional attributes such as race, social class, gender, and economic status (Crenshaw, 1990). Intersectionality basically attempts to broaden the notion of experience beyond the traditional confines of feminist thought that was focused solely on that of white women through the dimensions of structural,

representational, and political intersectional frames. These frames appeal to the fact that women of color have to navigate oppression through social structure depending on the combined impact of race and gender on one's social position. These frames also allude to the struggles of representation in terms of how narratives about women of color are objectified and finally also highlight the limits of political discourses in terms of the fact that neither antiracist nor feminist ideologies fully encompass the overlapping nature of oppression induced through patriarchy and racism. Further, although intersectionality originated as a metaphor to give a voice to the experiences of women of color, it has since then added several dimensions of thought to feminist philosophy. Such a philosophical expansion is primarily driven by the fact that through this lens a multi-dimensional frame of reference can be used to simultaneously inspect and understand the impact of privilege and hierarchy through multiple categories of a social membership (such as race, class, gender) without any need for ontological separation or reduction to single monistic groups (Carastathis, 2014). Thus, it is a powerful theoretical and analytical frame of thought that helps to contextualize how oppression and lived experiences intertwine, paving the way to formulate an analytical structure to investigate struggles and prejudice that were previously invisible due to the intersectional nature of their origin (Crenshaw, 1990).

Through the application of intersectional feminism, data feminism outlines its motive and aims to create a dialogue to dislodge traditional structures of oppression that impede expression and threaten one's sense of belongingness in such communities. Driven by its vision of empowering experience, this book primarily comprises examples that help to unpack the key issues and challenges it aims to highlight. Its main goals are to interrogate power constituted through data-driven systems, to question the practices and assumptions that drive the data science community, and finally to unpack the importance of social forces and actors in shaping the way virtual

communities thrive, thereby decentering the focus and supremacy traditionally associated with scientific thought and practice. The entire conceptual assemblage is beyond the scope and focus of the research endeavor presented in this exploration and thus key concepts such as systems of exclusion, privilege hazard, and the importance of context are primarily discussed.

Systems of exclusion is a conceptual tool that basically questions the motive and impact of data-driven systems. It essentially questions the way in which power is construed wherein such systems are designed to profit from the privileged and surveil the marginalized (D'Ignazio & Klein, 2020). These systems, thus, become the very embodiment of social inequality and oppression, which this concept aims to critique. The notion of systems of exclusion can be envisioned to not only critique the impact of technical systems but can also be used to question the status quo of such technical communities. Several examples in the text highlight how women and other minoritized groups continue to be victimized due to the ways in which such systems are designed and the extent to which such systems enable visibility to all individuals. A powerful example as provided in the text includes the discussion of the representation of minoritized identities in an online forum. For example, when indicating one's gender on an online platform, binary modes of classification may exclude certain individuals who do not conform to existing binaries. This depicts how online forums may create systems of exclusion that limit the participation of historically marginalized groups. In a similar light, group norms in virtual channels may impair the participation of women, thereby exhibiting a transference of the symbolic violence that exists in the sociocultural context of the technical disciplines to the more sociotechnical arena of technical artifacts (May et al., 2019). Another concept stated in this assemblage is the notion of privilege hazard. This notion depicts a form of *empiricism of lived experience,* wherein those actors who have not experienced societal subjugation are not sufficiently equipped to capture the intricacies of the lived experiences

of those historically excluded. Privilege hazard may also be associated with the way in which social causes are advocated and redressed through online forums of connectivity. For example, studies have highlighted that a lack of peer parity can cause isolation and result in women feeling deterred from using online channels of connectivity (Brooke, 2001). This depicts the apathy and a lack of understanding of the trauma induced by symbolic violence that may exist in the collective practice of virtual channels as well, thereby creating additional forms of systems of exclusion. It essentially critiques the composition of the technical field which is dominated by actors who come from socially privileged groups and thus are not fully able to envision how exclusionary practices are implicitly embedded in the culture and practices of these communities across the sociocultural and sociotechnical contexts.

These systems of exclusion result in cloaking the experiences and voices of some, which the authors term an image of absence (D'Ignazio & Klein, 2020). A particularly pertinent example in this regard is how Amazon employees designed a system that automatically filtered applicants for a job in the organization. While this system was well constructed given the fact that the majority of Amazon employees were white men, the system excluded women applicants who might have been competent to pursue a role in that organization. Thus, this example highlights how systems of exclusion result in the silencing of the voices of those who may not come from the dominant demographic. Akin to this insight, algorithmic systems have also been critiqued by recent scholarship for perpetuating gender stereotypes and restricting entry into the Information Technology field for those who belong to minoritized groups (Yarger et al., 2019). The power of this notion thus is to basically critique the standards and assumptions that are set in these circles, which due to the nature of their origin are inherently masculine and thereby fail to address the criteria and experiences of those who fall beyond the standard practices resulting in a habitus of

dominance. It thus questions the value standards that drive the workings of virtual communities. For example, the book also highlights how technical organizations like Uber or GitHub fail to recognize the efforts of their female employees or have sufficient policies to protect their employees from abuse and harassment. This is akin to observations of studies that have highlighted how emergent practices in forums such as Wikipedia often marginalize women who participate in virtual enclaves, which leads to the formation of resistive tactics in order to subvert such forms of implicit expulsion (Corple, 2016).

Thus, in conclusion, systems of exclusions may be likened to Bourdieu's notion of symbolic dominance, which is primarily carried out through the gendered habitus. The examples and discussions in this section, thus, can be envisioned as an example case of how the notion of gendered habitus manifests in the technical domain. Further, intersectionality which is often considered a limiting case of Bourdieu's notion of the gendered habitus has been explored in this conceptual framework as a force to subvert the challenges posed by the gendered habitus formed in such communities. Thus, in some ways, the discussion here also expands on Bourdieu's framework. A key example in this regard is the discussion of NASA scientist Cristine Darden's experience working in a field with a traditional masculine orientation. Darden, operating in a Technochauvinistic context, was relegated to the peripheral role of a computer whereas male counterparts were given engineering positions, which were deemed superior in the organizational hierarchy. However, Darden found that many engineers had similar educational qualifications as the women operating in this domain. Thus, she challenged this status quo using empirical insights and observations from her working environment. This example highlights how experience can be used to resist and empower, thus breaking the systems of exclusion operating in a specific context. This narrative echoes similar objectives of initiatives that display resilience through resistance in

the context of Palestinian women resisting Israeli occupation (Ryan, 2015). Further insights about this concept of resilience through resistance will be discussed in chapter 5. Thus, subversion follows the recognition of systems of exclusion, and a key question raised is how and through what channels subversion can be enacted. That is one of the primary drivers of the research exploration articulated in this dissertation, for which this section in conjunction with Bourdieu's conceptual framework, provides a powerful background.

2.c.iii. Application and Conceptual Situatedness in Relation to this Research

Bourdieu's theoretical frame of gendered habitus grounds the premise of how social structures can curtail and restrict the degrees of freedom of certain individuals (women in this case) and thereby limit their access and ability to explore and expand their professional footprint. Such limitations may create implicit systems of exclusions which may also be likened to the notion of the gendered habitus as stated by Bourdieu. All these perspectives are trying to highlight how oppression, exclusion, and *othering* of certain perceived inferior groups are essentially different forms of social structures that then impact the agency and disposition of the actors involved. The supposedly superior group symbolically acquires greater control and agency over the inferior actors, creating an imbalance in power and expression. These imbalances result in different forms of stifling constraints and bounds, of which the context of my exploration is one. Such perspectives will primarily form the analytical basis that shall guide the investigations for many layers of investigations discussed in this document.

Drawing inspiration from the concept of the gendered habitus, a deeper and closer inspection of how such a habitus is formed and may impact the nature of organizational practice in online communities is warranted. Particularly, how a habitus manifests in the discourse of online channels

is the key aim of such an exploration. Essentially, online channels in this case become the tools of subversion, the conduit through which the habitus is consciously formulated, critiqued, and resisted. Although a central critique of Bourdieu's work is the fact that the habitus is not treated as a concept that manifests consciously, most studies that borrow Bourdieu's conceptual apparatus also highlight how a habitus of domination can be subverted (Herrera & Agoff, 2019). The concepts of data feminism further add nuance to these frames. Essentially, they help to provide motivation towards the way in which a gendered habitus or prejudices may result in exclusionary forces being shaped in technical fields (akin to the exploration conducted through this dissertation).

As elicited earlier, this constructivist treatment of gender also allows for situating gender as an emergent practice in the context of online communities. Further, through the comparative analysis, the goal will be to investigate how these forums create different types of habitus or practices around the notion of gender. Important in this regard shall also be concepts borrowed from data feminism. The goal of the comparative narrative will also be to explore how online communities may themselves depict a habitus of dominance and exhibit symbolic violence, some example cases of which have been discussed previously. The online arena might depict a form of collective practice that bears a likeness to the challenges induced by privilege hazard, silencing the voices of some, such tensions may result in the creation of an image of absence of some voices that have been historically underrepresented (Corple, 2016; May et al., 2019). This exploration thus highlights how the sociocultural and sociotechnical might blend in the online universe. Further, using the analysis of the psychosocial markers of conversational traces, the goal will also be to reinforce how affective dimensions are associated with the habitus and especially how these characterize the habitus of the online forums compared.

Yet, as also supported by the examples from data feminism, the power of experience (as in the case of Christine Darden) can help to bolster causes of emancipation. Thus, through the comparative viewpoint the goal shall also be to explore how possibly in the women-centric forum, the goal is to share and subvert many dimensions of ensuing tensions that originate in the professional context. For example, such inspections can help to justify how caregiving is in itself a form of a habitus associated with the gendered habitus. This also highlights how multiple forms of habitus may be related and linked together. As an example of the habitus of care, studies in the online context investigated how an online community may emerge as a shelter, where members assume the task of protecting its members when placed with identity threats in the occupation context (Vaast & Levina, 2015). The goal of my dissertation thus will be to further explicate how a habitus of care is established and how it may differ across the different forums. This investigation helps to provide a rigorous and novel theoretical application of the habitus framework in the context of online communities, which to my best knowledge has yet to have been thoroughly explored. In the next section, I discuss more regarding the context of care, the practice, the associated perspectives, and the infrastructure through which it is extended to others.

2.d. Subverting the gendered Habitus through an Informal Infrastructure of Care

2. d. i. Motivating the Premise of Care Practices to Restore One's Sense of Self:

Given the premise of the habitus of domination that may threaten one's sense of self as discussed in the previous section, this section emphasizes the need to find avenues that can help to bolster and amplify the agency of subjugated voices. In the discussion on structuration theory, I alluded to circumstances both in the sociopolitical and sociotechnical context that can threaten one's ontological security. This section, through a foundational narrative on care practices, attempts to

capture how ontological security can be restored. Critical in this regard is the fact that a habitus

may exist amidst instability and suffering caused by the pressure to perform to the demands of

those who fix the rules and bounds of the repressed, resulting in disparity and symbolic violence.

The challenge of such symbolic expressions of power and control is that the strains caused may

not be visible nor tangible, resulting in moral decay and inner conflict (Thapar-Björkert et al.,

2016). Such moral duress has been termed as moral injury, contextualized particularly in the

military context, resulting from the stress an individual experiences due to social conditions that

violate their value systems and perceptions of society (Shay, 2014). Akin, to the context of this

dissertation, in the context of occupational identity, moral injury may result from repeated

harassment, mistreatment, and lack of respect one may experience due to oppressive and

exploitative organizational contexts (Anderson & MFTC, 2021). Thus, creating turmoil that may

debilitate one's ability to perform on a day-to-day basis.

Having access to care and support is a need for anyone experiencing any form of struggle and

distress. The case of moral injury may thus also call for the need to find avenues of care, support,

and solidarity (Sengupta & Semaan, 2021). The practice of care and the acts of caring carried out

by providing support, empathy, and resilience-building tactics, depict the outcome of a certain

relational orientation between two groups (those in need and those who can provide) (Bowlby &

McKie, 2019). Such visions further postulate the practice of care, as a form of dynamic social

network, giving rise to an ecology of care also termed as *carescapes* (Bowlby & McKie, 2019).

The practice of care, in the form of providing support, involves a deep moral commitment and

orientation to serving the *other* and not the *self*, it, therefore, captures how individuals perceive

their commitment to the larger collective based on several different social roles, of which

occupational identity can be one. For example, nurses provide critical care and service to those in medical need, as a sense of duty and a commitment to societal welfare (Bassett, 2002). Thus, latent in the practice of care is an ethical stance and a moral schema of performance (Tatnell & Malpas, 2012).

Such morality surrounding care may thus create a habitus of service marked by sympathy and dignity even for those in a position of vulnerability (Bassett, 2002). The practice of care may thus be shaped by the various different institutional roles one experiences and thus, care may indicate different moral outlooks and objectives. Particularly relevant in this regard is that prior work has suggested that care can indicate different moral stands among men and women (Gilligan, 1993). Building on the underlying ethical viewpoints that drive the practice of care, this strand of scholarship suggests that the moral outlook of care for women is rooted in relational views, whereas for men it is construed on an individualistic view towards justice. This distinction further adds nuance to my exploration by theoretically supplanting a premise of possible differences in the nature of care and communal affinity exhibited by the forums inspected. The relational premise of care perspectives further highlights the power of caring as a community. Akin to the context of my exploration, a study on how bankers negotiate moral taint using online forums, depicts different coping strategies that groups develop to normalize the taint inflicted (Vaast & Levina, 2015). Through this study, we get a glimpse of how care is practiced and shaped by the nature of communal discourse.

The practice of care or the *carescapes* can be highly contextual (Bowlby & McKie, 2019). In the comparative analysis, I wish to conduct, the goal thus is to build on these prior narratives, to

situate how care practices may differ across forums, thereby indicating key differences in relational and moral perspectives such collectives define. Further, the goal of my investigation is also to assess the extent to which online forums may serve as channels through which individuals may seek refuge and attempt to repair the wounds inflicted by moral injury, akin to the study of the banking forum (Vaast & Levina, 2015). In essence, repair too thus forms a part of the healing and resilience-building process such forums possibly provide. In addition, as with any habitus, the goal will also be to characterize the psychosocial associated with the practice of care or the care habitus that emerges. Care is a laborious task and thus scholars have associated care work with emotional labor (Bassett, 2002). Thus, through the investigation of social roles, the goal of my dissertation work is also to provide insights into the labor associated with sustaining care through online forums.

In the following sections, the goal is to further explicate the connection between morality and care, and how it relates to the gender habitus, thereby answering *what* care can mean across contexts and social groups. In the final section, under this subheading of the literature review, my goal will be to situate the way in which sociotechnical resources or infrastructure shape the way in which care might be sought and provided, thus setting the stage for a discussion on online forums as care infrastructure.

2.d. ii. The Moral Underpinnings of Informal Avenues of Empowerment and Care – the Feminist Perspective

The goal of this section is to provide a deeper understanding of the moral foundations around the ethics of care and the two different planes of care perspectives it posits. This theoretical perspective was postulated by American social psychologist, Carol Gilligan, in her landmark

article titled *In a different voice* (1993). The core essence of this piece is situated in the fact that

moral outlooks differ based on gender – men and women have different orientations and that

affects the way in which they function in society, connect with others and perform care. The act

of care requires a certain sense of giving and thus can be impacted by the way in which the

individual construes their alignment with the larger collective, which is the central premise of

any moral discourse (Turiel, 2006). Morality is a topic of intense debate, and multiple

perspectives and the goal of this dissertation is not to delve into the issue of morality, but rather

situate how these arguments and scholarly investigations around the issue of moral development

served as a basis for the connection between care, moral perspectives, and associated relational

outcomes.

Particularly relevant in this context is Jean Piaget's relational treatment of morality. His

perspective towards morality was increasingly calling for a shift and need for situating morality

as embedded and arising out of social integration. In developmental terms, this can be

understood, as a gradual shift from the self to a more relational commitment to society and others

(Turiel, 2006). Critiquing and expanding traditional philosophical stances around morality was

psychologist Lawrence Kohlberg who wanted to situate the *layman's* perspective in the dialogue

on moral development. Thus, his core objective was to integrate a more empirical and contextual

understanding of moral development, so as to make it more relatable and applicable to everyday

circumstances. This seminal contribution provides a set of stages for moral development. The

main categories include – preconvential, conventional and postconvential. The preconvential

level was focused more on the self, the conventional depicted as adhering to social norms and

conforming to stereotypical obligations, the postconvential meant a deeper engagement or

detachment from the self and the other, wherein both perspectives were blended to create counterfactual arguments, and arrangements for dealing with conflict, respect, and internalized values associated with justice and rights (Kohlberg, 1986).

Without further wading into the contentious waters of moral philosophy, the reason I provide this background is also to highlight that care is a function of a moral habitus that may operate at the intersection of several other forms of habitus (Saatcioglu & Ozanne, 2013). Enmeshed in such a habitus may also exist assumptions and prejudices that create imbalances and exclusions. For example, as the previous sections have highlighted, the submissive disposition that women encounter as an outcome of the gendered habitus may induce a more subservient outlook and may create a naturalized orientation to care and pursuing collective goals, rather than furthering individual beliefs and values (Herrera & Agoff, 2019). This was the very premise of Gilligan's championing effort, to distinguish Kohlberg's ethics of justice from the ethics of care thereby creating a gendered psychosocial plane of morality. In Gilligan's narrative, using her case study of exploring women's perspectives on the issue of abortion, her insights helped to justify a different positionality. Her findings helped to create a departure from Kohlberg's moral ground rooted in an understanding of equity to a care-embodied ethos founded on sustaining relationality and responsibility (Woods et al., 1996).

Beyond the gender divisions, this theory proposes, the field within which the habitus of care is situated can also impact the associated ethical dimensions. For example, in an organizational context, organizational values surrounding effectiveness may come at a cost of disregarding the need to standby and support individual members, further such care allocation may be impacted

by individual needs and virtues that bound the members of the organizational community (Antoni et al., 2020). Such findings also justify the nature of the comparative analysis my dissertation provides. The goal is also to extend and examine if the ethics of care also manifest in the nature of collaborative practice established in the context of online enclaves. For example, community culture and the way in which the affordances of a channel are appropriated may impact the nature of issues, extent of discussion and disclosure that is practiced, thus the nature of reciprocity established may exhibit a more relational perspective with a greater outlook towards collective bonding, whereas some may create an informational outlook and focus only on the transactional perspectives (i.e. knowledge exchange) (Sengupta, 2021). These perspectives may also impact the way in which women are supported, and their causes are addressed, and thus may warrant communities that are designed for extending participation and inclusion of historically minoritized voices (Fiesler et al., 2016). The core reason for discussing this framework is to outline a moral outlook that may ground the way in which care is provided and thus impact the way in which online forums create a form of care infrastructure and the type of care practices nurtured. Building on these perspectives, in the next section I discuss how the concept of care infrastructure is motivated by drawing on prior studies on sociotechnical infrastructure studies and other related scholarship in this regard.

2.d.iii. Everyday Resilience Building and Online Forums as Care Infrastructure

Infrastructure is the very foundation of human society. Without infrastructure (such as roads, day-to-day household goods, and technical artifacts such as computers) our lives would be difficult and highly constrained. Yet, infrastructure is not just the artifact or the product – the people and the way in which use is conceptualized around such products define what infrastructure means. Thus, infrastructure (as the name suggests), involves a form of structure

and the associated use conditions or the emergent practice that defines the way in which the non-human artifacts involved in this infrastructure are used. The infrastructure of care involves and relies on reparative and restorative work carried out through dynamically interconnected ecologies of material and social practices (Alam & Houston, 2020). For example, hospitals as sites of care, have an infrastructure that involves not only the amenities such as labs, pharmacies, and wards, but also involves the human layer that provides support and establishes the norms associated with this infrastructure, thereby setting the nature and extent of care provided. The practice of care emerges at the intersection of these and is defined by the type of relationships that are established across all these separate components. While infrastructure studies involve a large avenue of scholarship that spans multiple domains, in this section, the discussion will focus on the sociotechnical conceptualizations of infrastructure that expanded the notion and context of infrastructure studies to account for the changes induced by the growing array of information ecologies (Bowker et al., 2009). In this conceptualization of infrastructure, a key concept is to focus on the more relational orientation characterized by a myriad of static and dynamic components. Thus, in this view infrastructure is treated from an ecological perspective – comprised of technical, social, and institutional factors. Infrastructure here is a dynamic construct that changes as the underlying organizational principles and policies evolve. The key emphasis however is to embed the analytical lens towards infrastructural relations and not to view the pieces of the puzzle as separate entities. Scholars who focus on the sociotechnical view of such infrastructure, call for a need to understand the more taken-for-granted granular inner workings of the human infrastructure upon which the other components merge, thrive, and accrue a potential for action (Star & Ruhleder, 1994).

In the context of care, CSCW scholarship has highlighted how ICTs (social media forums and other technical artifacts) can form part of the infrastructure that can help in resilience building in circumstances of crisis and disruption (Semaan, 2019). Thus, infrastructure leads to routinized patterns of daily interactions which in effect helps to establish a sense of ontological security. Breakdown of infrastructure leads to disruption and thus calls for a need to repair or augment the infrastructure that can help to restore one's sense of security, that is where such scholarship highlights the power of ICTs to lie, as facilitators that help to provide exposure to human relationships and can become critical to restore, expand and reaffirm disruptions during crisis (Semaan, 2019). This framework in the context of resilience building in times of distress attempts to broaden the scope of the term infrastructure, by highlighting how social and cultural practices intertwine with technical resources to create visible and invisible layers of support and collective care. For example, in this view, the term *home* as a sanctum of refuge refers not only to the structural aspects - such as the place, and type of residence but also to the relationships with those who inhabit the residence who collectively give such a *place* a unique appeal and sense of protection for the individual. Thus, these sociotechnical extensions aim to envision a form of infrastructure that acts as a surrogate to provide care, protection, and moral upliftment in times of distress and disruption (King et al., 2014). Such studies highlight how people seek and provide care using an assemblage of sociotechnical tools (such as online channels) to develop strategies for endurance and support (Ottinger, 2022). Further, expanding on this notion, studies have proposed the lens of infrastructural care (IC) to explore collaboration practices catalyzed by sociotechnical tools which help to cope with the breakdown of traditional infrastructure in crisis events (Dye, 2021).

In conjunction with the ethics of care framework as discussed before, the relational orientation of care can often nurture and intertwine with the ethics of justice (Williams, 2016). For example, in urban cooperatives (e.g., food collectives) the transformative and restorative work may happen in tandem creating a combined ecology of care and justice, acting together at the same time (Williams, 2016). Such viewpoints may also transcend into the online spaces explored in the context of this dissertation. Essentially the connective action scaffolded by using social media platforms can help to create an apparatus of care and support to negotiate and circumvent situations that give rise to uncertainty and struggle at the individual level. Further, studies have also highlighted how such forms of infrastructure can essentially act as vessels of empowerment and civic participation as indicated by Cazacu et al. (2020), bolster narrative agency as highlighted by Zhang et al. (2021), and aid in community building to embolden digital campaigns (Moitra et al., 2021).

Likened with constructivist theories unpacked before, various forms of infrastructure around care and support arise out of a need to establish ontological security and are defined through a form of the duality of structure (people exercising agency to create routines of support and care which result in practices or a structure around resilience building) (Cai et al., 2021). Thereby infrastructure crafted to nurture care routines depict a form of performative habitus, wherein individuals shape the collective practice and collaborative values. Trust, feelings of oneness, and cooperation established through the visible and invisible components of this kind of infrastructure are pivotal to maintaining and configuring the associated functions served.

In effect, hidden in the nature of the infrastructure established, is the way in which various forms of relational affiliation and attribution emerge among community participants (Shimohara, 2012). As an outcome of relational integration, as highlighted in prior feminist discourse, moral obligations and a sense of caring may become pivotal for any form of care-centric infrastructure to thrive (Gilligan, 1993). Thus, the way in which care-centric relations are modeled and embedded into the emergent habitus of these assemblages can be key for *infrasturucing* practices to be maintained. Infrastructuring refers to the way in which the relational fabric underlying infrastructure is created and maintained, providing a spatiotemporal continuity (Dantec & DiSalvo, 2013). For example, in an online health community, moral motives of care and giving may drive the way in which members provide guidance, support, and encouragement to those in need (Wang et al., 2017).

Given that care-oriented routines arise in practice, it is important to understand factors that define and render an identity to the conduits through which care is enacted. Thus, the subsequent section shall detail the way in which online forums cultivate and boost collective vision and purpose based on acts aimed at knowledge sharing, peer-led activism, and communal intervention (Sengupta & Tacheva, 2022). Thus, this framework of infrastructure can help to situate how online channels (in this case subreddits) can help to provide an avenue for care and create routines around caring for individuals as they attempt to carve their professional journeys. Further, through the comparative analysis, I aim to distinguish how each forum creates a different nature of *infrastructuring* for care. This again blends with the way in which each of these forums devises a moral habitus and the values established in these spaces (Weld et al., 2021). Through a comparative discussion, I also allude to how online communities create an

infrastructure of care and support. Further, through a discussion on role formation, the goal is to highlight how actors develop (human and non-human) routines that sustain and contextualize the infrastructure established. Prior studies have also alluded to how infrastructure (as the name suggests) often creates a layer of invisibility that hides the different forces of labor that shape the type of practices visible at the surface. Through the exploration of roles, the goal in this dissertation is also to make visible the labor and work that may help to sustain the practices of care, mentoring, and knowledge sharing that make such spaces functional.

2.e. Virtual Communities as Care Infrastructure: Cultivating and Sustaining Collective Agency and Empowerment through Virtual Channels

Online communities are in every sense the very embodiment of a form of infrastructure, a relational practice that natures many associated outcomes. The previous section has motivated the premise of online spaces as resources for care. This section delves deeper into the infrastructuring practices – that provide a deeper nuance of how such a relational ecology is established in the online universe. However, the infrastructuring practices in these spaces are shaped by the experiences of the people that create a ground for cohesive action and collaboration. Thus, experience, relationality, and affinity to one another are what make such collectives unique. When such affinity building happens people may bring their perspectives to the way in which they engage in such forums, which can have both positive and negative consequences. Care thus becomes a contextual outcome, which further warrants the comparative investigation. The nature of care provided depends on the voices of those who drive the collective practice of these domains. Thus, here I discuss further these nuances so as to motivate the human infrastructure and organization that is at play in shaping the collective practices that emerge and are maintained.

Coming to the context of occupational identity development of underrepresented groups, prior scholarship has treated the influence of online spaces in tackling institutionalized hegemony in many different ways. Some scholarship has highlighted how such channels enable disclosure and offer a mechanism to seek refuge in cases certain groups face institutionalized stigma or social exclusions (Lucero, 2017; Younas et al., 2020). However, parallel but pertinent scholarship has also explored how such channels may in fact become spaces that reinforce stereotypes and norms of exclusion that in effect cause additional feelings of harm and segregation (Vitak et al., 2017; Saha et al., 2019). This contrasting arena of exploration raises a critical question of defining how online communities are defined, the dynamics that make these spaces thrive, and the factors that shape the impact and outcomes supported by such digital enclaves. Thus, to unpack the angle of community dynamics and group formation in online channels, I pivot my investigations on scholarship from CMC and draw particularly on the concepts of community building, group attachment, and social capital formation as factors that affect modes of participation and engagement, especially in the context of support seeking (Siegel et al., 1986). Further, blending the above discussion, I also discuss pertinent literature to support how the practice of care is carried out through these channels and the form it takes. This section will first discuss the importance of online community and subsequently will discuss more focused scholarship in areas that serve the goal of motivating the empirical explorations pursued.

2. e. i A Brief Note on Online Communities: Formation, Collaboration, and Participation

The key essence of perceiving online forums as relational enterprises is rooted in framing these as communities. Thus, this section is dedicated to the discussion of what constitutes an online community. One of the key aspects that this research aims to tackle is the question of how online communities may emerge as spaces that offer potential ways for women working in technical

domains to seek informational, social, and motivational guidance. In order to understand the potential of online avenues as sites of care, it is essential to first address the question of how virtual communities form, evolve and sustain a shared sense of collective spirit and purpose. Community is a key concept for any group-driven activity. Akin to the nature of exploration this dissertation posits, communities can act as sites of collective care and depict a form of cohesive enterprise (De Choudhury & De, 2014). Communities have been integral to human society ever since the existence of mankind. Offline communities exist based on geographical location, similar interests (i.e., political affiliation, religion), and similar professional goals (workgroups, learning groups). Communities also emerge as collectives of justice with an outlook toward serving and caring for societal welfare and equity (Manggat et al., 2018). The growth of the internet has led to the creation of a multitude of online communities. The central questions that arise in this context are: *What is an online community? What factors shape and define an online community?*

Offline communities exist based on geographical location, similar interests (i.e., political affiliation, religion), and similar professional goals (workgroups, learning groups). Thus, what is essential in this context is the metric of 'similarity'. Communities are thus a collection or group of people who are connected together based on some criteria of similarity in terms of thought or ideology. This shared orientation leads to the development of interpersonal bonds and a collective identity that affects the nature of collaboration and discourse in these spaces (Baym, 1995; Haythornthwaite, 2007). In the online space, this measure of similarity is expressed through a shared interest of some kind that connects people together. Communities thus are connected by a common frame of thinking, understanding, and reasoning. Essentially, the most important distinguishing factor between offline and online communities has been the notion of *place*. That is, an online community's place is replaced by an *imagined space* wherein people have a certain

model that they adhere to when they decide what to discuss in a community, thus they establish imagined social bonds and, in this process, create the essence of a virtual community (Gruzd et al., 2011). The way virtual communities work is in some sense created or designed by the establishment of social bonds which represent a kind of cooperative, collective thinking that leads to a consensus of thoughts and ideas (Licklider, 1968). Thus, connecting this back to structuration theory, online communities the emergence of a form of virtual structure, crafting a mutual understanding which can help establish modes of belongingness or a sense of ontological security in such spaces (Rosenbaum & Shachaf, 2010).

Norms, akin to the structures of domination, legitimization, and signification, play a key role in driving the way such communities operate. Norms are a vital part of any collaborative endeavor. Norms are defined as "*unwritten, implied, create a frame of understanding within a group that identifies appropriate/inappropriate behavior*" (Martey & Stromer-Galley, 2007). Norms are conveyed through social interactions - through language, verbal, and even non-verbal cues (e.g., gestures). Even though online forums may not enforce normative structures similar to those found in offline contexts, over time, community members may bring in some of the norms and structures into these communities, which may mutate giving rise to new normative patterns in online contexts (Ivaturi & Chua, 2019). For example, the norms and conventions of online communities may affect the nature of self-disclosure in online chats (Dietz-Uhler, 2005). Norms may play a pivotal role in setting the nature of collaboration, especially in terms of the roles that people configure for themselves in these spaces (Müller-Birn, 2015). For example, Jackson et al. (2020) analyzed how normative patterns of word usage are demarcated based on emergent roles. Yet, conversational norms may also create a habitus of domination and exhibit symbolic violence on historically minoritized groups (Corple, 2016). For example, network studies of

Stack Overflow have alluded to how gender may impact reputation, validation, and interaction, thereby implicitly exuding an aura of toxic masculine superiority (Brooke, 2021). While prior research has tried to investigate and propose typologies of normative patterns of engagement, these customs are not written or explicitly mentioned in any manifesto, but evolve and emerge over time through repeated engagement (Bruns, 2007).

Normative conventions may result in the formation of specific forms of engagement. For example, prior work highlights a distinction between *listening* and *speaking* behaviors. These forms of engagement essentially highlight how norms may constrain and enable certain orientations or the way in which people develop affinities within online communities, pointing to the fact that individual factors may affect the nature of relationships that community members develop within these spaces (Wise et al., 2014). *Listening* is shaped through the extent, depth, and attentivity to contributions whereas *speaking* refers to patterns of contribution (nature of the contribution, reciprocity, and responsiveness). Further, sociocultural biases may further push historically underrepresented groups to peripheral and subjugated positions in such forums (Brooke, 2021). This kind of categorization of knowledge production behavior is important in the context of peer production communities, as the multiple dimensions of contributions help expand and sustain the community. These insights can also aid the discussion of the design and structuration of online communities by highlighting the importance of understanding factors driven by technical features (affordances of the platform) and community norms that may impair or inhibit participation, giving rise to *listening* or *lurking* behaviors (Crawford, 2009; Sun et al., 2014). Such lurking may be exhibited not only in terms of participation but also in forms of engagement, for example, due to existing gender stereotypes, women may participate and

engage in the way the larger masculine culture of the community operates, thereby silencing their perspectives and topics of importance (May et al., 2019). Thus, while some of their needs may be served through such forums, a need to connect may drive women to seek forums that nurture peer parity, equivocality, and open expression (Fiesler, 2016). Thus, the emergent community culture dictates the nature of the conversation and the extent of engagement (Seraj, 2012).

Community culture drives the nature of *voice* that is cultivated in virtual collectives (Fiesler, 2016). The notion of voice connects with the line of inquiry presented above on how sociotechnical systems can act as channels for subverting social stigma and forms of exclusion that historically minoritized groups may face in technical domains (Brooke, 2021). It is also important to note in this regard, that such collectives may also have latent and implicit restrictions which may inhibit underrepresented groups from successfully and freely participating (Brooke, 2021). The norms of participation that impact the nature of collective voice virtual enclaves exhibit depend on the nature of values that develop in practice. For example, in a case study of how Wikipedia policies are carried out and enforced by editors, authors established that certain values receive precedence over others, which shapes the way certain articles are presented (Morgan et al., 2011). Values play a crucial role in the extent to which one way expresses or seeks support or whether the community provides support. From the constructivist viewpoint, the notion of values may induce a collective notion, in terms of the community dynamics, yet it may also be captured as the individual's perception and alignment with the community's values (Oliveira et al., 2018). In cases of misalignment, participation and engagement may be affected. Values can play a key role in shaping the nature of support,

openness, and comfort that people feel in disclosing sensitive issues and thereby affect the moral habitus crafted in such spaces (Benefield, 2018). In this section, the goal has been to discuss how values emerge in the context of group dynamics which may affect the way in which a community forms, collaborates, and sustains its collective vision. The next section provides further details about key concepts that further drive the way in which online communities function.

2.e. ii. A Brief Note on Social Capital and Attachment in Online Communities

The previous section highlights how online communities are essentially structures that are developed through cohesive forces shaped by emergent norms, values, and shared linguistic practices. Communities essentially portray how social integration is shaped and performed. As a result of such integration, these communities develop various types of relations which may help community members achieve different types of outcomes. Prior scholarship and theoretical foundations have highlighted how such relations can help in developing social capital (Spottswood & Wohn, 2020). Social capital can be conceptualized as resources embedded within a network that manifest both in terms of the structure constituted by the relations and the content that is shared through such relations (Adler & Kwon, 2002). Essential in this regard is the notion of strong and weak ties, which are some foundational concepts in social network research (Granovetter, 1973). In social capital research, weak ties have been highlighted as relations that support external forms of exchange that are particularly helpful in information and knowledge exchange, for example, securing a job through connections or procuring specific domain-related knowledge in specialized learning contexts (Sengupta, 2021). This form of capital has been termed bridging capital as it helps to grow and tap into resources beyond one's immediate or close network. In contrast, the notion of bonding capital refers to resources within

a certain collective that nurture and sustain the community. These relational outcomes thrive on norms and networks of trust and reciprocity (Putnam, 2000). Bonding capital thus refers to strong ties or those relations that share a certain degree of mutual closeness and thus can be considered more endogenous in origin (Adler & Kwon, 2002). Such kind of ties has been shown to be very helpful in providing emotional support and care. Thus, social capital is not only a property of the level of embeddedness in a collective, but it also has a functional aspect, for example, certain relations facilitate the procurement of certain kinds of assets (Coleman, 1988).

While the above classification of social capital has been the more structural approach, parallel themes have also investigated a more nuanced view of not only focusing on social capital as a potential within a network for generating an outcome but also combining the two to define it as '*social capital can be defined as resources embedded in a social structure which are accessed and/or mobilized in purposive actions*' (Lin, 2017). By this definition, the notion of social capital has three elements – (1) The question of opportunity and access via the network structure (this bears similarity with the structural dimensions mentioned above) and (2) the intent or motive that drives the way social capital is sought and performed by individual actors, termed as relational capital. This captures the relations, feelings of togetherness, and mutual respect that develop between actors beyond the structural dimension (3) The ability of actors or the collective to perform a specific task through a shared language or domain-specific knowledge, termed cognitive capital (Nahapiet & Ghoshal, 1998). This line of scholarship is also aimed at providing a middle ground to the debate as to whether social capital is to be viewed as an individual notion or as more of a collective notion. Essentially, this line of scholarship posits social capital as operating at the interplay of the two, akin to the interplay of structure and agency that structuration theory or the larger frame of constructivism states. Particularly of interest are the dimensions of relational and

cognitive capital as these embed the elements of community culture and values as discussed in the above section. Relational capital may be understood as a way in which perceptions of individual actors that manifest in the form of trust, moral obligations to the community, and feelings of reciprocity may impact the way in which community members are motivated to perform a specific or pursue a specific objective (Ha & Nguyen, 2020). Finally, cognitive capital captures the way in which an individual's ability affects the extent to which they can perform an action for the community. For example, in the forums of my interest, expertise in technical fields such as Computer science may be essential to be able to provide specific solutions to particular problems one may face. For example, novice programmers may need support and mentoring in terms of encouragement to continue learning while also receiving actual guidance in terms of content to learn (Sengupta, 2021). This also demonstrates how cognitive and relational capital may mutually be intertwined and affect one another, which has also been studied and supported in prior scholarship (Li et al., 2014). Thus, these dimensions of social capital also capture how structure and agency shape the way the collective defines social capital and how individual actors or community members perform or enhance the way social capital is sustained in these spaces.

Given the power and nature of this concept, it has seen application across a wide spectrum of disciplines, which include organizational studies, sociology, and public health among many others (Israel & Beaulieu, 2001; Inkpen & Tsang, 2005; Poortinga, 2012; Ehsan et al., 2019). Given the widespread use and adoption of ICTs, studies on social capital in the context of online communities have seen steady growth (Spottswood & Wohn, 2020). While such scholarship started with the comparison of online vs offline social capital, there has been considerable exploration of contextual variables and how these shape the formation and maintenance of social capital. Studies have highlighted how the technical affordances of online channels may help to expand one's

networks to activate *latent* connections and thus increase one's sense of belongingness to such communities (Resnick, 2001; Pénard & Poussing, 2010). For example, bonding capital has been associated with expressions of trust and disclosure associated with discussing political affiliation, to prevent discord among close relationships (Ferrucci et al., 2020). Further, bridging capital may enhance the ability to socialize and invest in areas of mutual interest, e.g., online games and fandom groups (Zhong, 2011; Recuero et al., 2012). Expanding on the outcomes associated with social capital, in the more organizational setting it has been found to affect motivations for knowledge sharing and improving organizational performance (Zhang et al., 2017; Kamboj et al., 2017). In the context of care, social capital has been pivotal for providing avenues for community resilience in disaster management, to help restore critical infrastructure (Aldrich & Meyer, 2015). A significant portion of such scholarship has drawn Putnam's categorization of social capital through bridging and bonding capital and earlier work in this regard investigated the impact of social capital on social network usage among college students for expanding their network (through bridging capital) or through bonding capital establish strong friendships that act as proxies of emotional and moral support (Steinfield et al., 2013). The power of this approach is that it provides a more communal level measure of social capital beyond the individual.

While social capital with its roots in sociological thought and overlap with econometrics has been found to be a widely studied concept in the context of information and knowledge sharing in the context of online communities Zhang (2017), a growing branch of scholarship has also explored how social capital essentially is linked with psychological wellbeing and thus offers channels for people to seek social support in times of need and distress (Huang et al., 2019; Spottswood & Wohn, 2020). Care manifesting as support is one of the key outcomes that has been associated with network structure as previously discussed. For example, prior work has established how the

type of support especially in terms of disclosure related to one's health is different based on the nature of association, weaker ties support information exchange whereas stronger ties can facilitate more prolonged and extended conversations (Antoci et al., 2012). Even in the context of social justice campaigns, social capital has been shown to be key to bolstering narrative agency which can be pivotal to raising awareness and supporting cooperative outcomes (Tacheva et al., 2021). Further, in healthcare communities, various dimensions of social capital have been found to be especially powerful as determinants of emotional support and a form of virtual companionship (Huang et al., 2019). As explored, bonding capital in this regard can help to increase opportunities or access to emotional support, and bridging capital can help expand the pool of expertise or provide role models for the distressed (Taylor & Lobel, 1989).

While social capital influences the potential for seeking support within a community or can help to shape the collective identity of a community as a channel of refuge, through repeated interactions, community members may develop a certain form of attachment with one another and with the community. Such attachment(s) may drive the way in which they participate, and engage and thus may affect the extent to which support is sought and provided for within the community (Lee & Park, 2019). Attachment can manifest in many different ways, but key ways that it can be conceptualized are (1) Normative: a sense of belonging within the community which is shaped by the perceptions of norms of commitment and reciprocity (2) Affective: a feeling of kinship or an affective orientation to the community (Blanchard & Markus, 2004). The second entails an expression of endearment or fondness for community members, typically expressed through notes of gratitude and salutations (Makri & Turner, 2020). Attachment is key as it mainly drives a sense of belonging and has been found to be a key driver in the extent of participation and mediates the creation of values and thus significantly impacts the culture of the community (Liu et al., 2020).

Studies have also highlighted how such attachment or the lack thereof may also bear a negative impact on certain users resulting in non-participatory behaviors or community members leaving the community altogether (Sun et al., 2014). Further, conceptualizations of attachment based on social psychological theories have also highlighted how attachment can create a sense of collective identity (similar to the normative sense) and can also be captured through a more bond-driven perspective (with some similarities to the affective sense, in terms of the affect developed towards individual members), which in turn can impact intentions of participation and knowledge sharing (Ren et al., 2010). This scholarship also highlights how attachment like social capital can be perceived at the collective and individual levels. Attachment both affective and normative may affect participation trends at both levels. For example, in online forums, one may feel drawn to respond to a particular post, driven by normative or affective attachment to the community, while at the same time one may respond based on an affective attachment to the kind of experience conveyed through the content. In the context of disclosure about sensitive topics, affective attachment can play a vital role in the nature of the response and so the type of support that is provided (de Choudhury & de, 2014). In the context of my exploration, affective attachment can be likened to the context of the relational outlook that impacts the ethics of care and thus may impact the way in which women support and care for one another, as opposed to a general forum which does not have a similar type of peer parity. Such investigations motivate how attachment and social capital formation intertwine. For example, relational social capital as captured through a sense of familiarity with community norms can foster normative attachment to the community (Zhao et al., 2012).

Social capital and attachment development play a pivotal role in the way in which online communities may provide opportunities for advocacy and empowerment, while also impacting the

way in which care is performed and construed. Through this discussion on social capital formation and the styles of attachment that emerge, the goal has been to further motivate the comparative analysis to discuss the forms of collective orientations that manifest in such spaces.

2.e. iii. 1 Infrastructure Maintenance: Sustaining Online Communities

As discussed earlier, social media channels may certainly through several relational outcomes boost the nature of care and cooperative endeavors supported and nurtured. Yet, a challenge of virtual forums still remains embedded in the fact that the production, consumption, and maintenance of knowledge are highly dependent on those who use these channels (Bruns, 2007). Thus, trends in participation and engagement may dictate the vagaries of information production and exchange. Thus, it is important to also understand those who craft the community (i.e., the micro-level view). While the previous sections delve into the macro view of infrastructure and detail the processes through which infrastructuring for care occurs in the context of digital wilderness, this section shall discuss the various considerations that are essential for sustaining online communities. In the discussion of infrastructure from an STS context, labor perspectives become essential, since it is after all the underlying human conduits that allow for such an infrastructure to acquire a certain form of societal significance and function (Bowker, 1998). Even in the context of care infrastructure, the practice of care through medical institutions in the offline world has been shown to induce emotional and affective labor (Bassett, 2002). Thus, it is worthwhile to investigate how in the case of online communities that nurture collective empowerment, labor practices may transcend and acquire similar or distinctive connotations. Even in the online domain, emerging discourses have highlighted how labor perspectives are becoming vital, to ensure those who do the critical work of keeping virtual channels active are given their due credit and validation (Li et al., 2022). These studies highlight the importance of bringing to

the surface both visible and invisible labor practices that shape the day-to-day functioning of social computing systems (Geiger & Halfaker, 2013).

2.c.ii.1. Labor Perspectives and Online Communities

Maintaining online communities is a laborious task. It is in a sense managing a virtual organization, where there aren't any fixed managerial roles or a fixed rhythm of information exchange. At the same time, online space is a relational collective that thrives on the commitment, and attachment of those involved in these spaces. Thus, the participation and engagement of each and every member in some way or the way contribute to ensuring the survival of these collectives. For example, moderators of these platforms have the task of maintaining the norms and etiquette of the forums and ensuring that the policies of the sites are enforced appropriately (Habib et al., 2019). Beyond moderators, other community members also have tasks to maintain the flow of conversation, innovate and ideate on topics that can help the community thrive and enrich the pool of expertise curated (Siegel, 1986). Thus, imbibing, and conforming to the performative habitus of the virtual space can in itself be a laborious endeavor. Thus, it becomes important in this discussion to understand forces that ensure that the habitus established survives and thrives.

In this regard, an important conceptual framework revolves around the way in which relational labor is performed and defined through social media channels (Baym, 2015). Relational labor lays out the labor embedded in establishing and maintaining 'connect'. Drawing on the work of musicians to connect with their fans through social media forums, this article highlights the labor of performing, hosting, and understanding the needs of the audience. In a sense, this form of labor may yield monetary income (i.e., for articles it may result in subscriptions) but the key here is a form of attachment that is established and the skills needed to retain and bolster that attachment. Relational labor thus requires skills, practice, and the vision to adapt to relate to the needs of the

audience. The key outcomes of relational labor lie in successful social integration. One can envision such forms of labor also manifest in the exploration of online communities. For example, in the context of the forums, I explore, supporting individuals as they navigate their professional footprints may entail the need to understand ways to connect with the needs of their soul (a relationally oriented care perspective) while also balancing the needs of the community within which the conversations happen. Thus, in a sense, it resonates with this framework of having to connect and host the audience. The audience in this case is members of the community. Thus, expertise and an understanding of community values may impact the way and extent of connection (Oliveira et al., 2018). Further, as this study highlights, the 'connect' may be different across channels, for example in the general forum (r/csc) the connect may be pivoted on the identity of somebody entering or working in technical communities, yet in the women-centric forums the connect may mean affective synergy and expressions of mutual support and respect (Sengupta, 2021).

In addition to the task of establishing and maintaining connection, the nature of the content (sensitive disclosures, expressions of grief, and turmoil) can also weigh in emotionally on those who help sustain these spaces (Wohn, 2019). Emotional expression in affinity-building activities may also have gendered connotations. Akin to the relational conceptualization of the ethics of care framework, women may be prone to deeply connect and perform emotionally driven activities via online forums (Sakariassen, 2021). Such feelings and expressions of affect may in turn be connected with the psychosocial – the performative habitus may induce a form of emotion work that has to be done in order to sustain these collectives. Thus, an inspection of the psychosocial may help to posit a typology of motives that drive the nature of participation and emergent roles

in such spaces, as conducted in my dissertation work through the examination of roles based on the psychosocial context.

Akin to the above context of emotional expression, studies in the realm of online forums have focused on the emotional labor that moderators in online spaces have to undertake (Dosono & Semaan, 2019). Emotional labor is undertaken to balance the expectations of community members, manage hierarchical structures and maintain moderation practices. Literature in this context has focused on moderators and the several dimensions of visible and invisible work they have to perform to maintain the sanctity of virtual spaces (Li et al., 2022). While moderators have an ascribed role in online forums, virtual channels are kept active and alive by members who may not have a specific role as in the case of moderators, but still bring several dimensions of expertise to nurture the nature of care and support provided (Bruns & Schmidt, 2011). In a sense, their tasks and roles are emergent and tacit. Hence, a psychosocial investigation to find tacit roles assumed is further helpful to shed light on the work that community members do on a voluntary basis.

The distinction between moderators and other members of the community becomes further pronounced to distinguish the difference between the emotional toll these two groups have to endure. From the moderator's point of view, the emotional endeavor is akin to the context of emotional labor. This indicates the regulation and management of emotional dynamics when placed in a specific managerial role (Hochschild, 2015). However, in the case of the larger community, it relates to the definition of emotion work that is done in the everyday context through different forms of relationships established and nurtured (Hochschild, 2015). In this regard as well, the notion of emotional work can be linked with the nature of relational orientations of community members. For example, in an information-centric community, the goal of community members

might be to provide information and maintain a more transactional exchange with the community. However, in other spaces, community members may also relationally orient themselves with the community and thereby provide various dimensions of care and support for others, depicting a sense of fellow feeling and a deeper sense of commitment to serving others in the community (Sengupta, 2021). Thus, this further motivates the case of the comparative investigation between the spaces, while also finding ways to undercover the emergent roles that community members undertake to keep the performative habitus in these spaces active and thriving.

2.e. iii. 2. Role Formation and Contribution to Online Communities

Role formation is central to maintaining any form of collective practice. Roles are critical for infrastructure to be functional. Roles can be envisioned as classifications that help to standardize the routines associated with infrastructure (Bowker & Star, 1998). For example, in the infrastructure of healthcare, roles such as doctors, nurses, etc., describe groups of people, clustered together based on a form of functional expertise and domain knowledge (Pirnejad et al., 2008). It is through such roles that patterns of interaction and exchange are configured and sustained. Thus, roles help demarcate the boundaries of social, political, and cultural activities (Masolo et al., 2004).

Drawing back on the constructivist tenets of this dissertation, roles can be seen to be a direct consequence of the duality of structure. That is, in the online context, community members express their agency through the way in which they configure the emergent conversational palette. Yet, through the repeated performance of conversational habits, they may in turn create a certain specific function for themselves, which again could depict the way in which they orient and align themselves with the larger collective. Akin to the context of the previous discussion on labor and the type of work that is undertaken to sustain virtual collectives, it becomes important

to understand what roles emerge (Golder & Donath, 2004). Essentially roles, depict the type of positions that community members take on in the context of the larger collective, and thereby each such position creates a specific kind of disposition that manifests through the conversations observed at the more macro level. Prior studies in this regard, have highlighted how roles embody certain *speech competencies,* which means the way in which these communities function requires the need to develop a certain skill set towards participation and engagement (Golder & Donath, 2004). These speech competencies entail a deep understanding of the performative habitus that emerges in online channels that may in turn cognitively impact the way in which community members function and align themselves with the goals of such spaces. Eliciting the markers of such speech competencies is the key goal and challenge of role delineation emergent in virtual channels.

Aligned with the rationale of speech competencies, roles thus can be understood as the manifestation of how community members establish ontological security when participating in online forums. In a sense, it can be seen as the way in which members of online communities perform according to the norms of the habitus of practice that emerges in online venues of communication. Yet, given that conversation and community in online forums are highly dynamic, demarcating roles can be challenging. There are several possible avenues for defining roles, depending on the kind of metric selected. Investigating role formation has received considerable attention from the academic community in the context of online forums. However, there have been two primary lines of inquiry in this regard – (1) configuring roles based on function and (2) configuring roles based on structure.

For those that define roles functionally, analysis of content has been primarily used to demarcate roles (Kou et al., 2018). This study is also in the context of my exploration, as it attempts to

understand the different forms of roles that emerge in this context through the perception of levels of expertise. For example, the five categories of users this study posits include those who are learners, experts, and brokers who occupy different positions in the community by fulfilling the function of being domain experts, novices (those who initiate conversation), and brokers (those who bridge different communication activities). Similarly in the context of Wikipedia, a similar exploration is associated with the roles of domain experts, editors, vandal fighters, and social networkers (Welser et al., 2011). These provide a more macro-level understanding of the way in which roles create a structure of information-sharing practice that sustains these communities at the macro level.

On a parallel structural front, studies have also used network metrics to understand how network parameters, as markers of engagement, may help to provide more granular insights into the task of role formation (Liang & Introne, 2019). These insights help to configure roles by looking at behavioral markers from a more social network perspective. Key behavioral classifications include roles such as question-askers, answer persons, and discussants (Welser et al., 2007). Certain studies from the care perspective have also investigated role formation by using equivalence properties of nodes in such emergent networks of online forums, to devise key ways in which online support groups can provide instrumental guidance and emotional attachment (Pfeil et al., 2011). Most studies in this realm of investigation combine content and network features to gain an understanding of content and network attributes that help to distill ways in which people participate and communicate with one another.

While content and network can be useful metrics, they are limited in that they yield insights into the performative habitus, yet do not signal any association with the psychosocial which is linked with the habitus. As motivated in prior sections, a habitus can only be sustained by assimilation,

adherence, and inclination to perform the habitus (Reay, 2015). Thus, in conjunction with content and network perspectives, capturing the latent motivational markers and clustering them can provide a deeper nuance into the motives that are key for participation and engagement, expanding prior synergistic classifications (Crowston & Fagnot, 2008). This is the approach I wish to take for the micro-level inspection, as will be elucidated in section 3. Linking emotion work and associated motives that ensure participation with the understanding of roles using such psychosocial signatures is a novel dimension of exploration and contribution to this existing body of scholarship my dissertation aims to make.

Labor and the onus of maintaining virtual forums, where organization is fluid and constructed in practice, requires motivation and a thrust to participate and volunteer (Crowston & Fagnot, 2008). Beyond the specific tangible markers, motives driven by psychosocial attributes can help to explicate essential perspectives that help online forums to survive. Along these lines and aligned with the social justice aimed motives of pursuing this dissertation, studies of participation have also alluded to the importance of psychosocial correlates that ensure engagement in digital initiatives (Klandermans, 2004). This further establishes the importance of investigating role formation from a psychosocial standpoint as I undertake and aim to contribute to this avenue of scholarship.

Based on the above discussion of roles and the labor performed by members of online communities, I conclude the literature review section. Essential concepts that guide and drive my research questions and analytical lens have been presented, discussed, and comprehensively summarized. Next, I shall move on to providing details about the methods and analysis sections that lay out the experimentation setup of my dissertation.

3. Methods

3. a. Section Motivation – Bridging Theory and Practice

The goal of this section is to provide a transition between the theoretical precursors and bind them to the methodological approaches used for conducting the empirical aspects of this dissertation. Towards that end, I start with a brief motivational statement about how the theoretical stage aids and guides the nature of empirical investigations pursued. Next, I provide information about the nature of the data collected and the motives for selecting the forums which guide the investigations undertaken. After that, the methodological toolkits used are outlined. Finally, this section concludes with a discussion of how the methods align with the nature of investigations followed for each of the studies undertaken. The research plan is presented at the end of this section so that I can build on the methodological details provided as well as draw on the insights from the data description and theoretical foundations presented in section 2.

The key essence of the theoretical overview provided is rooted in the concept of relationality. All the research outlined in the previous section details the way in which relationality manifests and affects the way in which people participate, interact and render their voices to the collective unit created in the online universe. Drawing on structuration theory, the goal here is to see the collective practice – the structure that is crafted and that is evident through the various markers of analysis, as explored. In addition, through such forms of repeated engagement, a habitus that creates a form of the performative schema (or disposition) is crafted. In essence, thus through various dimensions of methodological insight, the goal here is to provide a deeper understanding of the human infrastructure crafted in such spaces and the type of relational outcomes supported. Further, drawing on the framework of *ethics of care,* the goal here is also to explore how

relationality and the orientation to care may differ across forums. All of these motives will be explored primarily through a comparative investigation of three Reddit forums. Further, these motives shall be outlined in relation to the data and specific study details as narrated and scoped below.

To understand the performative habitus and infrastructuring practices that emerge in these virtual spaces, I conducted a multi-method, multi-level investigation, triangulating inferences based on three methodological approaches - content analysis, social network analysis (SNA), and analysis of psychosocial attributes using linguistic markers (Kou et al., 2018). This methodological framework 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).

Text-driven interaction is the foundation of community in such contexts. Connecting back to Structuration theory, Giddens highlights how language is one of the key forms of structure that can act as a way for understanding contextually situated socio-cultural practice. In narrating the ways in which structure and agency interact, Giddens, mentions how norms and conventions such as turn-taking, conversation ordering, and seriality are forms of structure, mediated by contextual factors such as culture, that shape the way in which agents communicate. In turn, the agent possesses the ability to mutate certain structural elements, for example, order and presentation of content that can affect the structural continuance of linguistic practice (Giddens, 1984). These conceptual frames are applicable to the way in which online communities develop a shared understanding and practices around conversations (Rosenbaum & Shachaf, 2010). The collective agency may drive the way in which offline motives and rationales seep into the

organizational habits nurtured in such virtual spaces. For example, exploration of the

conversations on the women-centric forums (such as r/ggw & r/cw), may help to distill how

concepts such as the gendered habitus and systems of exclusions may impact the nature of

participation and engagement in such spaces. Further, the ethics of care, may also manifest and

may accrue a distinctive meaning across forums. All these are avenues of discussion and

exploration as detailed below.

The textual conversation regime motivates the need to conduct content analysis, which forms the

heart of my dissertation. Content analysis is conducted at the conversational level to understand

the patterns of communal discourse that keep these communities active and thriving (Dosono &

Semaan, 2019). Additional psycholinguistic inferences at the content level are drawn to better

situate how the content creation habits depict the overall impetus and affective orientation of the

communities (Iosub et al., 2014). Further, I analyze the social network structure to better

understand the way in which the collective practice is created and maintained by the

conversational initiatives and connections between the actors or the community members (Pete et

al., 2020). This helps to provide deeper nuance into the organizational features of the

community, thereby further situating the human infrastructure that develops. The network

metrics I detail and discuss help to shed light on the different normative conventions that give

rise to the underlying exchange mechanisms that help to sustain the nature of conversational

practice observed. In a sense, thus, the network analysis helps to uncover the way in which

relationality manifests through the cohesive practice established in such spaces. Network

investigations can also shed light on the type of positions held by different actors (and especially

key actors who serve integral roles in managing the conversational traffic), which can further

help to expand the way in which the habitus is framed and performed in such online channels of

discourse. Finally, aggregating psycholinguistic inferences at the actor level I situate the way in which participation motives develop and complement the network insights, indirectly indicating roles that individual members define in order to sustain such communities (Xu & Li, 2015). The following part of this section details the data collection and analysis procedures followed as part of the methodological framework.

While the details of the study plan (as empirically situated based on the theoretical and methodological precursors) shall be outlined in the end, I shall briefly touch upon the objectives and research pipeline, so as to provide an insight into the nature of the investigation that is to follow. This dissertation is conducted as a two-part framework, drawing inspiration from the structure-agency dialectic of Structuration theory. Thus, the first investigative pipeline shall focus on looking at the macro scale (the structural perspective). Complementing the macro layer, the 2nd shall look more deeply into the micro or the agentic layer to understand the actors and how the actions they perform through the roles they take on the shape the macro-level observations. A combined methodological framework comprising content, network, and psycholinguistic inspection shall be used in both these two layers of analysis, albeit through different data silos. The 1st layer of investigation shall focus on the content level aggregation, while the 2nd shall be conducted on the actor level of aggregation. The particulars of the data aggregation processes shall be discussed associated with each methodological investigation, as appropriate. The three-way mixed methods approach allows us to develop a more granular understanding of the typology and habitus of gendered practices among members of the virtual communities (Bourdieu, 2001) that can help unpack the interactions between different social positions (captured through social network analysis or SNA), as well as the dispositions exhibited by community members (captured through content and psycholinguistic analysis) (Kou

et al., 2018). Given the differences in the total number of conversational traces and the total number of users across the three forums, results were normalized (wherever applicable) and then validated for comparison. Further, conducting investigations at the content and actor level blended with network inferences allows for a deeper understanding of how the emergent social roles that individual agents in these spaces craft and adopt give rise to the observed content patterns (Pete et al., 2020). This interplay helps to elucidate the way in which the community functions as a whole and also the way in which individual agents participate in such channels, creating an essence of ontological security and alignment with the community practice (Rosenbaum & Shachaf, 2010). Further details are narrated in the subsequent sub-sections.

3. b. Research Site

3. b. i. Brief Description of Reddit and Associated Scholarship

Reddit in the present day and age has emerged as a forum for considerable discussion and deliberation on a wide assortment of topics, such that it has been often heralded as the *front page of the internet* (Anderson, 2015). Reddit is divided into several topical groups called subreddits, through which the conversation and community of this channel are maintained. Reddit supports a wide spectrum of subreddits, ranging from discussions on fan fiction, history, and art to science and technology. Given such a diverse topical variety, Reddit over the years has also received widespread attention from the academic community to study the nature of the conversation, and the underlying dynamics and also to ideate on considerations to further shape the community in the future (Chandrasekharan et al., 2019).

One championing effort of Reddit has been in the arena of support and creating a platform for openness, advocacy, and transparency on stigmatized issues (such as Mental health) (De

Choudhury & De, 2014). Akin to the model of produsage, where content producers are also content consumers, discussions on Reddit also are crafted and provided directly by those who engage and participate in these spaces. In this regard, studies have pointed to how features such as pseudo-anonymity and other affordances of Reddit, yield an atmosphere for openness and equivocality, ending regimes of institutional silencing on such stigmatized topics (Shelton & Nardi, 2015). Yet, studies have also cautioned and raised alarms about the way in which Reddit discussions can perpetuate social stereotypes, and encourage hate, flaming and uncivil behavior, as a negative consequence of providing an open ground for discussion (To et al., 2020). This dual view on Reddit, further calls for a comparative analysis to understand forces that nurture and help grow the community, such that the efficacy of such channels can be further enhanced.

In a sense thus, online enclaves have emerged as not only channels of connectivity and information exchange, but in many cases, have become conduits geared towards collective empowerment and resilience building for those experiencing crisis (O'Neill et al., 2018). Studies have highlighted the power of these venues in relation to issues such as identity development, and disclosure management and have surmised their effectiveness as collectives that support, nurture and help to provide shelter to those shunned, excluded, and harmed (Saha et al., 2019). Beyond the dimension of group processes and associated outcomes, governance issues have also emerged as one of the pivotal avenues of scholarship with regard to Reddit (Jhaver et al., 2019). In this regard, moderation and associated practices, and automated expansions of these governance capabilities, have emerged as a thriving direction of continued exploration (Jhaver et al., 2019).

Akin to the context of exploration as pursued in my dissertation, Reddit has been explored as a collective for narrative agency development of marginalized groups, as a stage for reclaiming

their collective identity and footprints, thus serving as a vehicle for empowerment and advocacy (Dosono, 2018). Women-centric voices on Reddit have been explored from a feminist perspective, to understand how the infusion of a feminist perspective in the ever-expanding zeitgeist surrounding digital culture, impacts the participation of women and the issues these collectives aim to serve (Mowle, 2021). This study is essential as it taps into the essential motives that align with my work around participation, the creation of a voice, and using online forums (especially Reddit) as a channel for emancipation and liberation. Close to my exploration, it situates and explores the construction of a *networked feminist community* and the associated benefits and challenges (Mowle, 2021). Such scholarship further highlights the need for the nature of exploration I conduct through my dissertation. I add to these explorations by further exploring the intersection of work, career formation, and gender and also through a comparative investigation further add to the visions of such studies surrounding the issues of gender participation in the digital context (with a focus on Reddit).

Beyond the phenomenological appeal of using Reddit as the microcosm, I explore, practical considerations such as its format of exchange as a question, answering site, and the ease of data collection further add to the rationale of selecting Reddit. To briefly highlight the mechanics of Reddit, I shall discuss the essential features associated with a Reddit conversation. As indicated earlier, Reddit functions as a collection of subreddits. Each subreddit is organized by a set of threads. Each thread starts with a question and then can have a multitude of comments. Each question as well as the comments can be upvoted or downvoted by Reddit users who thus help to situate the value of a conversation. Moderators as well as the person who makes the original post (or triggers) the thread with a question, can delete or close the conversation on a thread. Users accrue *Karma* by virtue of their contribution to the community dynamic. A subreddit thrives

based on the number of subscribers. A community or a subreddit can also have a set of rules or guidelines that set the norms of participation. Having discussed the essentials that provide further insight into how Reddit operates, I shall now move to detail the specific selection criteria of the forums inspected and the data collection and sampling strategies used.

3.b. ii. The Rationale for the Selection of Subreddits and a Brief Overview:

The key concepts around which this dissertation revolves include: work, gender (with a focus on women), and the use of online communities. Marrying these perspectives, the goal of my work was to explore forums that support discussion on careers in the technical context, women, and struggles they face in crafting a professional footprint, and finally a combination of all the above – a nexus indicated by the intertwining effect of technical workforce and identity (manifesting in the form of women). Linked with the notion of the habitus, the goal here is thus to explore how the habitus of the technical field, occupational habitus, and the gendered habitus intersect and manifest in the online universe.

A comparative analysis allows for a deeper understanding of not only the way in which specific groups function, but also allows for an engagement with the way in which different groups develop their own goals and nurture different dimensions of conversations albeit on similarly contextualized narrative frames (Sun et al., 2018). Even in the context of Reddit, a synergistic comparative analysis in the context of teaching has been conducted to gain deeper insight into the effectiveness of the different forums in relation to pedagogical initiatives (Staudt Willet & Carpenter, 2020). Inspired by such narratives, my goal was to explore through the avenue of Reddit, the ways in which the different forms of habitus as motivated earlier manifest. In doing so, I not only aim to contribute to this growing scholarly direction of comparative analysis but

also wish to address the need for more exploration in the context of career research using online forums, as well as the use of online forums for career and professional development, as advocated by prior scholarship (Dillahunt et al., 2014; Tomprou et al., 2019).

Thus, my goal was to find three forums that best capture the phenomenon of interest, with the aim to accomplish the following comparison, akin to (Sun et al., 2018):

1) A forum for women in tech vs a forum for women seeking guidance for professional careers.

2) A forum for women in tech vs a general forum related to tech and careers.

3) A forum for women seeking guidance for professional careers vs a general forum related to tech and careers.

For shortlisting the forums, I conducted a thorough search from Reddit, the final forums shortlisted were based on the following criteria: (1) topical match with the phenomenon of interest (2) activity, and popularity level captured in terms of the number of subscribers and the total number of conversations. This set of filtering conditions was adopted from similarly motivated studies that explored identity formation among marginalized groups in the context of Reddit (Dosono, 2019). In some cases, condition 2 did not apply since there was just one forum aligned with the topic of interest. This was applicable in the case of the forum for women seeking guidance in relation to professional careers. Thus, I selected r/careerwomen (r/cw) as the forum I wanted to investigate in this regard. When selecting the forum for women in tech, there were other forums that had partial alignment with the topic of interest (but were broader – delving into engineering topics or science) which did not fit with the scope of my work. Further, in terms of activity, these other forums did not have comparable activity traces (in terms of the number of subscribers) and thus were not considered. The forum I finally selected was r/girlsgonewired (r/gw). Similar observations and careful considerations were also made for the

forum of choice for the general forum related to technical careers and the workforce. The final

forum selected in this case was r/cscareerquestions (r/csc). Table 1 details more specific

information related to these subreddits.

Table 1: Information about forums shortlisted

Subreddit Name	Creation Date	# of subscribers	Community aim
Girlsgonewired (ggw)	10/5/2012	24400	*"Where girls get their geek on."*
CareerWomen (cw)	5/17/2013	4600	*"This is a subreddit for career women to discuss challenges and triumphs in their career, give and seek advice, share articles about successful women or career tips, and the ever-present work/life balance issue."*
CSCareerquestions (csc)	3/19/2011	930000	"*A subreddit for those with questions about working in the tech industry or in a computer-science-related job."*

3.b. iii. Details on Data Collection and Key Statistics

The dataset was compiled using a mixture of existing databases of Reddit data (PSAW)[1] and

Python API wrappers (PRAW)[2], for each of the three subreddits inspected. Data was collected

for the period between January 2018 to June 2022. The extent of data collected depends on the

---

[1] https://psaw.readthedocs.io/en/latest/

[2] https://praw.readthedocs.io/en/stable/index.html

data present in the repositories and also on restrictions imposed by these servers. Due to API

rate limits which restrict the extent of historical information that can be collected from PRAW

[restricting the maximum of threads that can be collected from a given subreddit], I collected the

initial information about the threads using PSAW (Sengupta & Semaan, 2021). The information

collected from this data repository includes (1) Author name (2) URL of the thread (3) ID (a

unique record locator) (4) Timestamp of creation (5) Title of the thread (6) The text (called the

selftext of the thread) (7) Score (total upvotes minus downvotes) (8) Total number of comments.

Using the thread URLs, I then used PRAW to collect the information for each associated

comment in a thread. Most data descriptors collected from this source were similar to the one

collected from PSAW, but additionally also had three additional pieces of information (to

uniquely identify a comment): (1) Unique ID for the comment (2) The ID for the associated

thread of which the comment is a part of (3) Parent ID – referring to the parent (or the preceding

conversation to which the comment in question was sent as a reply). Parent ID for top-level

comments (those that are sent as responses to the opening question of the thread) start with t1

and those which are sent as responses to other comments start with t3.

Given that the forums have different churn rates (in terms of the total number of threads and the

total number of responses associated with each thread), the total number of threads collected

from these forums in this time frame greatly differs. This has also been observed by other studies

that have conducted comparative analyses across Reddit forums (Staudt Willet & Carpenter,

2020). Thus, for r/csc, which is a general career-centric IT/CS forum, and has a high turnover

rate, collecting all threads for the aforementioned time frame was beyond the scope of the

present investigation and approximately half of the total conversational threads were compiled,

and analyzed. API rate limits further restricted the extent of data collection in this regard.

Following best practices in the study of Reddit, conversational threads that were removed, deleted, or did not have author attributes, were excluded from the analysis (Chandrasekharan et al., 2018; Staudt Willet & Carpenter, 2020). This was also done to ensure that those conversations that best captured the values and goals of the collectives were retained for further inspection (Dosono, 2018). Further details about the data collected are summarized in table 2.

Table 2: Descriptive statistics for dataset

Metric used	ggw	cw	csc
Number of threads	959	348	33011
Number of unique users	2259	433	59428
Total number of conversations	7076	906	392285
Average score	5.03	1.93	5.84
Average number of contributions per thread	7.37	2.6	11.88

Cumulatively, across all the three forums, there were 400,267 conversational units (top-level posts and comments combined), with a mean score value of 6.21 and 61,746 unique users across all the forums. To conduct the multi-level analysis, data was aggregated both at the content and actor levels. For the actor-level part of the investigation, all the contributions for each actor were

aggregated together into a single concatenated string, creating a unique contribution vector for each actor. Next, I move on to the methods used for the analysis.

3. c. Methods Used:

3. c. i. Content Analysis: Motives and Process for Developing the Codebook

Since textual conversation is the primary mode of collaboration and knowledge construction in these online discussion channels, the content analysis serves as a chief mechanism of inferring community norms and conversational habits created, maintained, and habituated over time (Cherny, 1999). Content analysis has been widely explored and employed for the use of understanding traces of digital behavior in the online context (Lai & To, 2015). Content analysis has been used for various different purposes across different contexts (Downe-Wamboldt, 2015). While there are several different approaches to content analysis, given the constructivist motivation of my work, I situate my study using grounded theory as the analytical approach to conducting content analysis.

The motive for applying grounded theory to perform content analysis also stems from the fact that grounded theory in essence also aligns well with the motive of structuration theory for providing a dialogue between positivist and interpretivist ideologies. It is a paradigm that is methodologically dynamic and is aimed at understanding stories about humans in contextually situated practices (Ralph et al., 2015). Further, the founding tenets of grounded theory are aimed to provide a bridge between a practice of developing symbols in the form of codes that provide meaning to the phenomenon of interest, while also developing a form of systematic, rigorous methodological tradition (Downe-Wamboldt, 2015). While several different epistemic themes drive the application and use of grounded theory, I primarily situate my investigations in the

constructivist approach postulated by Katherine Charmaz (Charmaz, 2014). The main additional aspect in this frame is that the researcher is considered a part of the analytical procedure. Further, this perspective allows for a dualistic connection between inductive and deductive positions previously held in relation to grounded theory. It allows for induction to give rise to deductive conclusions, thereby allowing for multiple and diverse theories and structures to co-exist and manifest in the narrative the data presents. The three main methodological components of this method include - (1) coding (2) Memo writing (3) Integrating and writing up theories. In the first phase, line-by-line inspection is performed to find the patterns and themes that manifest in the data. Such analysis may also be influenced by sensitizing concepts, which provide motives behind the way themes are analyzed. Sensitizing concepts help to direct the way experience is studied (Charmaz, 2014). They do not define the end but provide a basis for reaching the goal, an objective, and a direction. In my investigations, several such sensitizing concepts are at play. For example, the concepts from data feminism such as systems of exclusion and gendered habitus from Pierre Bourdieu provide an initial motive that directs the nature of the investigation I undertake. Further, the coding schema, which highlights various coping mechanisms that are at play in the use of online channels for dealing with moral taint, also acts as a sensitizing scheme (Vaast & Levina, 2015). The first phase of coding is often termed open coding. Subsequent stages involve axial coding (to further prune the content categories and find associations between the codes generated) and selective coding (the final process of sampling a set of data to verify the coding process). Theoretical sampling is an important consideration in this regard, this process entails verification of the content categories derived to ensure saturation is achieved.

While the coding process is the primary core of content analysis using grounded theory, memo writing is essential as it entails descriptions of content categories and thus embeds the

perspectives of the researchers as they engage in the process of content analysis. In a way, this process works in tandem with the coding process and helps in constant comparison (a key theme in grounded theory) which may occur at each stage of the coding process: between data, between categories, and between data and categories. Using these techniques, the goal will be to derive the final content schema that best captures the type of community norms and support provisions that manifest in the discourse of such spaces.

With this premise, I now detail the way in which I applied this approach for my analysis. First, in the open coding phase, I randomly sampled a set of 100 conversations from r/ggw. This forum was used as the initial basis for developing a coding schema, as in essence, it has characteristics that overlap with both the other forum and in a way serves as a middle ground between the two. As a technically focused forum, it retains in many ways the ethos of the other career-centric technical forum, while at the same time being a women-centric forum, it also captures elements akin to the nature of discourse and community goals of that forum. Based on this sample, an initial code book of 10 themes emerged. These themes involved several tactics inspired by the schema derived in the study on online banking communities and the way in which the narratives that emerge here help to deal with moral taint (Vaast & Levina, 2015).

The larger goal was to capture the extent of relationality that develops, that is to see if the community is focused on the self or focuses on collective outcomes. This is also inspired by prior scholarship, which highlights such relational separation at play in shaping the nature of community outlook that emerges across online groups (Sengupta, 2021). Next, I conducted axial and selective coding across this initial set, carefully merging and regrouping themes. The goal here was to capture any potential thematic overlaps between the 10 themes. Finally, after two rounds of iterative coding and schema adjustments, I arrived at a final set of 6 categories. To

give an example of a potential regrouping: an initial category of "expressions of disgust and provocative attacks" was grouped with the category of "Navigating toxicity", essentially conversations in this regard, aligned with the larger conceptual focus of handling blames, attacks, and other forms of harm that may threaten one's sense of self and thus conceptually aligned together in a single cluster. Once the final schema was derived, two coders, independently, coded the same sample, using the derived schema. Pairwise Cohen's Kappa was used as the measure of intercoder reliability (McHugh, 2012). The score obtained was 0.82, expressing a high level of mutual agreement. To expand the content schema derived to the other forums, a multi-step process was followed. First, I coded a random sample of 100 conversations from r/csc and r/cw and expanded or realigned the themes of the schema developed. Next, two independent coders validated the schema on the sample, achieving an intercoder reliability score of 0.76 (the average pairwise value). Further, discussions were conducted to collectively assess meanings, coding approaches, and keywords associated with each content category. Another short sample of 50 conversations was finally coded, yielding a kappa score of 0.86 (aggregated across the three coders) – which signaled a high level of agreement, thereby finalizing the code book derived. Next, a separate random sample of 1062 (ggw), 906 (cw), and 945 (csc) conversations were classified. Each forum was classified separately by an independent coder. The sample was derived such that the total number of digital traces coded were comparable and also each thread of conversation captured in the sample was fully represented (that is no conversation in any one particular thread was omitted for the shortlisted sample). The final results and description of the content schema will be provided in section 4.a.

3.c. ii. Social Network Analysis

Content analysis helps capture community members' dispositions, based on insights drawn from conversational traces. In essence, it displays the emergent practice that manifests in the form of discourse. It thus captures the different ways in which the structures of legitimization, domination, and signification are at play in shaping the nature of the practice that is maintained in the community. Yet, as structuration theory posits, structure and agency intertwine, thus the structure we observe through the conversational traces is the product of the exchange mechanisms and interaction patterns that community members engage in (Seraj, 2012). Complementing these inferences and distilling further insights into the way in which the actions of the community members drive the community dynamics, social network analysis allows us to 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. This approach has been shown in the literature on online communities to be an effective way of understanding the positionality actors acquire within their communities which in turn impacts the nature of their participation or the disposition they exhibit when engaging in these conversational spaces (captured through the content and linguistic markers) (Staudt Willet & Carpenter, 2020). Essentially from the constructivist point of view, this form of analysis helps to shed light on the way in which micro-level transactions arise resulting in social integration and relationship formation in online collectives (Groenewegen, & Moser, 2014).

Understanding interactions in the virtual sphere is key to unpacking the underlying forces that sustain the way in which each of these venues develops its own practice of infrastructuring. This type of analysis can be key to providing a way in which the relational aspects of the emergent

infrastructure can be made visible (Lee et al., 2006). It thus exemplifies the 'inversion' process that Bowker et al. (2009) suggested. Infrastructuring practices in the digital world are primarily situated and sustained by collaboration (Wellman, 1996). These studies lay out an initial roadmap for how social network analysis can help to discern the way in which online networks are establishing community, the features, and properties that characterize the nature of relationships that develop, and the outcomes associated with that (Elder et al., 2007). For example, studies in this regard have captured how different structural properties associated with social networks (such as social capital) may serve as proxies for the way in which leadership develops in these open online spaces (Faraj et al., 2015). Inspired by these prior studies, the goal in this segment is to use various social network features and metrics (as discussed below) to highlight several structural properties and associated outcomes that help to further provide insight into the way in which online communities operate and nurture different forms of knowledge sharing and care related practices (Andalibi et al., 2018).

The network was constructed using the process outlined by Staudt Willet & Carpenter (2020). The goal was to capture the reply network that emerges in each of the subreddits from which data was collected. Each node represented an actor in the dataset. A link or edge between two such nodes was characterized by conversation exchanges (comments). For example, an edge between nodes A and B indicates that node B has commented on A's post (which could be a question or comment). The communication network generated thus was a directed network to distinguish possible differences between reciprocity and the nature of interactions between actors (Pete et al., 2020). Using the above example, if B comments on A's post (a question or a previous comment), then, B would be the one originating the conversation, thus the source and A would be the recipient of the conversation and thus the target, in the directed network. A

directed network also provides nuance into the way network measures are captured and the inferences that can be drawn from them. Additional pruning steps as outlined by Staudt Willet and Carpenter (2020), such as removing isolates (representing actors whose posts were not commented on) were also conducted.

While social network analysis can be performed at varying scales, for this study, akin to other exploratory studies that have used social network analysis in the context of online forums such as the one by Priadana and Tahalea (2021), I focus primarily on network and actor level measures to gain insights into the overall community infrastructure on the one hand, as well as into the emergent dyadic associations established and maintained by actors, on the other. The most fundamental statistic associated with networks is the number of nodes and edges. In this regard, prior studies have investigated the degree distribution of the nodes of the network. This distribution represents the propensity of connection for each node (Muchnik et al., 2013). Akin to the notion of the Pareto outcome, which states that 80% of outcomes are driven by 20% of cases, social network scholars have highlighted that the degree distributions in the context of online forums (such as Wikipedia) also follow a power law (with many contributions coming from a select few heavily engaged actors) (Muchnik et al., 2013). Thus, for each of the three networks, I shall plot the degree distribution to test if the power law is applicable in this case. These will be further highlighted in section 4. Studies have highlighted that a power law distribution can be indicative of several properties of networks that impact information flow and transfer and thereby may impact the structure of the community formed (Pete et al., 2020).

Specifically, to capture the overall network structure of each subreddit community, I use the metrics of density, centralization, diameter, number of connected components, transitivity, assortativity, and reciprocity. Further, to illuminate dyadic and individual-level network

properties, particularly to understand influential members who drive the dynamics of these communities I examine a variety of node-level attributes, particularly the centrality measures of betweenness, closeness, and eigenvector centrality (using the PageRank algorithm) (Rabbany et al., 2014). These metrics are selected based on a similar analysis done to evaluate the structure of dark web forums (Pete et al., 2020). Below, I detail each of these metrics and justify their use in my investigations. Gephi[3] and the igraph package in R[4] were used for computing each of these metrics.

Network (Macro) level collective measures:

The metrics outlined below highlight the key collective level measures that offer insights into the way in which group-level practices operate and help to provide structural insights into the level of cohesion and collective bonding in these virtual spaces (Pete et al., 2020).

1. **Density**: It describes the proportion of potential connections, that are actual connections. A potential connection refers to a possible connection that could exist between two nodes (Pete et al., 2020). An actual connection is the one that is actually there. It essentially captures the extent to which nodes in a network are connected to one another by direct relations. A highly dense network can exert greater control over the opinions and nature of action of community members (Janky & Takács, 2002). Thus, a highly dense network can depict a highly cohesive network that

---

[3] https://gephi.org/
[4] https://igraph.org/s

is closely bound and thus can be very effective in providing support and information exchange (Wellman, 1996). Thus, in a way, it captures a greater sense of bonding and affinity among group members and can be seen as an indicator of bonding social capital (Borgatti et al., 1998).

2. **Centralization:** Centralization is another metric often used to test for network cohesion (Burt, 2017). Centralization is computed as the network-level aggregation of the individual node-level centrality scores. It is taken as the cumulative sum of the difference between the theoretical network with the highest possible centralization score and the network in question, aggregated at the nodal level (Borgatti, 2005). Centralization is a key concept that has found widespread application. In the political context, it can be seen as a measure of power and authority (Nouh & Nurse, 2015). Thus, a highly centralized network can indicate a more strongly connected core and a higher degree of relational integration, whereas the opposite can indicate a network that is siloed and weakly tied together (Borgatti et al., 1998). As explored in the context of prior studies, I use the degree metric for calculating the centralization of the networks constructed in my analysis (Pete et al., 2020).

Diameter: The diameter is the longest of all the shortest paths between the nodes in a network (Marin & Wellman, 2011). It can be seen as the shortest path between two of the most distant nodes of the network. Thus, first, all the shortest paths between the nodes of the network are calculated and then the largest of these values is taken as the diameter. It thus in a way linearizes the network. A smaller diameter can indicate a faster flow of information through the network (Pete et al., 2020). A smaller diameter can thus indicate a more tightly woven network and a faster spread of information (Marin & Wellman, 2011). A network with a larger diameter may indicate a more fragmented community (Borgatti et al., 1998).

3. **Number of connected components**: The number of connected components serves as another measure of social cohesion. A component represents a subset of nodes in which any single node α can reach any other node β in the subset (Marvin & Wellman, 2011). Thus, a greater number of connected components signifies a lack of affinity and a weakly bound network (Wellman, 1996).

4. **Transitivity**: Transitivity is measured as the probability of adjacent nodes of a network connecting together (Marvin & Wellman, 2011). It thus is a measure of how clustered the network is, which signals a greater degree of association between the nodes in the network (Kadushin, 2012). Mathematically, it resembles the global clustering coefficient, which is measured as the number of actual triangles, divided by the total number of possible triangles. A triangle is a triage of nodes in which each shares an edge with the other, forming a closed loop. Transitivity thus captures the amount of redundancy in the connections established in the network (Yip et al., 2012). Such a network can signify a highly cohesive and tightly woven group and thus serve as a measure of bonding social capital (Borgatti et al., 1998).

5. **Assortativity**: This is a measure of homophily. It is the idea that similar nodes connect with one another. Akin to Pete et al. (2020), I too use the degree variant to capture assortativity. In this case, it signifies that high-degree nodes connect with one another and vice versa. It is often treated as a measure of robustness since if one of the high-degree nodes is removed, there is sufficient redundancy to carry forward the exchange mechanisms established by the other nodes of a similar degree (Noldus & Van Mieghem, 2015). A disassortative network can thus signify connections between nodes with dissimilar degrees and depict those nodes which have a higher degree may engage on different subjects and topics which may differ from other high-degree nodes (Pete et al., 2020). In the context of online forums, a disassortative network may offer opportunities for newcomers (those who may not have high-degree associations yet) to mingle

and learn from more experienced peers, not only in terms of subject matter but also in terms of adjusting and learning the norms of the community (Johri & Yang, 2017). Thus, it may offer insights and exposure to novel information and offer varied relational enrichment, thereby acting as a proxy for estimating bridging capital (Borgatti et al., 1998).

6. **Reciprocity**: This metric measures the likelihood of mutual connection, i.e., it is most applicable in a directed network, where the goal is to calculate the probability of the opposite counterpart of a directed edge also being included in a network (Hogan, 2016). It is a key metric for capturing the extent to which mutual exchange is nurtured in the network. High reciprocity can signal higher bonding capital (Borgatti et al., 1998). Reciprocity can be seen as an expression of the way in which online community members acclimatize to the structures of legitimization, domination, and signification and align themselves with the habitus of the online forum (Seraj, 2012). For example, expression of gratitude and validation can be seen as a marker of reciprocity in these online spaces that help to create a sense of camaraderie and facilitate collective bonding and the development of attachment in these forums (Liu et al., 2017).

Micro level (individual) measures:

Node level measures can help to distill insights into key players who drive the mechanics of the communities. These actors hold power, influence, and popularity and control the flow of information across the networks they are part of in many different ways (Borgatti et al., 1998). In many ways, these actors are crucial to establishing the schema on which the nature of practice in these online spaces depends. To measure such node-level characteristics from the structural perspective, centrality measures are used (Rabbany et al., 2014). The central measures I report in this dissertation include (1) Betweenness centrality (2) Closeness centrality (3) Eigenvector centrality (using the PageRank variant). While other measures such as degree centrality are also

widely used and adopted, prior studies have advocated for the use of Eigenvector centrality as a measure of nodal popularity, as it not only captures the immediate connections of a node but also takes into account the importance of the neighbors a node is connected with (Priadana & Tahalea, 2021; Yan & Ding, 2009). Inspired by Pete (2020), I present a discussion on these measures in section 4 (Results section) in two ways: (1) Firstly I present a plot comparing the centrality distributions for the top 100 nodes in each network (2) I present a qualitative discussion using the activity traces of the top nodes to highlight key characteristics and functions these nodes serve in the community. This discussion will commence in section 4. Below I outline each of these measures and the way in which these were adopted for this study.

1) **Betweenness centrality**: Betweenness centrality is a measure of the bridging effect of each node, which indicates the extent to which it connects different groups in a network. Betweenness centrality is measured as the number of shortest paths that pass through a specific node in a network, thereby depicting its role in acting as a broker or a facilitator for connectivity (Freeman, 1979). Betweenness centrality has seen widespread interpretative application (Yan & Ding, 2009).   It is typically associated with providing diversity and enriching information and resource sharing in a network by drawing connections between different segregated parts (Burt, 2018). For example, in the context of scientific collaboration, it can be envisioned to signal actors that share interests with various disciplines and thus indicate interdisciplinary (Yan & Ding, 2009). Further, betweenness centrality can indicate bridging capital, for example in a college network, bridges can help to provide information and resources needed for knowledge growth; can also help to expand interpersonal connections (for example connecting family and close friends) (Pan et al., 2017; Stolz & Schlereth, 2021). In a context akin to my exploration, betweenness

centrality can indicate expertise and specialization across multiple topics and thus can denote key actors that help to enrich and connect different topical dimensions (Pete et al., 2020).

2) **Closeness centrality**: It is the measure of how *close* a node is to all other nodes in a network (Bavelas, 1950). It is thus computed as the inverse of farness aggregated over all nodes, where farness for each node is measured as the geodesic distance (usually shortest path) between two nodes. A particularly important variant is the harmonic closeness centrality measure that extends the concept to disconnected networks (Marchiori & Latora, 2000). In this variant, two key ideas are introduced. Firstly, the distance between two non-connected nodes is treated as 0, and instead of taking the arithmetic mean the harmonic mean is taken to aggregate over all nodes. Closeness centrality can thus be seen as depicting the role of the broadcaster, highlighting that information can flow from a node with high closeness centrality to all other nodes in the network very quickly (Newman, 2018). Such nodes can indicate collegiality and an association with many others within a network. For example, in citation networks, high closeness centrality can indicate a higher extent of collaboration with many others in the field (Yan & Ding, 2009). In an online forum, closeness centrality can indicate members who participate in discussions of interest to all and thus may possess multiple different topical interests and expertise (Pete et al., 2020). In the context of my analysis, I use harmonic closeness centrality since there is more than one connected component. Further, there are several clusters of closeness centrality scores that appear. This could be due to the way in which the network is constructed and also due to the latent properties of the networks as has also been observed in similar studies (Pete et al., 2020). Thus, I used the process as detailed below: I first selected the top n centrality score clusters (n can vary). Each of these clusters is next sorted based on degree. Then the node with the highest degree is selected from each of these n clusters, giving rise to the final set of n nodes I present

and qualitatively analyze. This method is motivated by prior studies that have observed strong correlations between degree and closeness (Zhang & Luo, 2017). Further, by selecting the node with the highest degree we also take into account the activeness of the node, in addition to its ability to add to the efficiency of the network (Freeman, 1978).

3) **Eigenvector centrality**: The last metric I present is a measure of a node's prestige in a network (Zaki et al., 2014). This score essentially computes the extent to which a node is connected to other powerful nodes in its network (Yan & Ding, 2009). Mathematically, it is calculated using by using the eigenvectors of the adjacency matrix of a network. I further use the PageRank algorithm to calculate this metric, as Yan and Ding (2009) and other prior studies have suggested the use of this algorithm given its applicability to the context of directed networks (Heidemann et al., 2010). The directedness is essential as it helps not only capture if a node associates with other influential nodes (outdegree), but also captures if influential nodes are associated with a node (indegree) (Heidemann et al., 2010). For example, in the case of the networks I investigate, the in-degree can be crucial as it can help to unpack how more experienced members interact, express support, and help newcomers acclimatize to the community (especially in the case of the women-centric forums) (Fiesler et al., 2016). Eigenvector centrality can have several different applications. For example, studies have indicated that political families have high eigenvector centrality due to their proximity to political leaders (Cruz et al., 2017). Further, in citation analysis, this metric has been shown to be linked with the impact of collaboration (Yan & Ding, 2009). In online forums, this measure can give an understanding of the activity of those who are popular and active and how well they connect with others who also have high communication activity (Nouh & Nurse, 2015). It can give a measure of the network importance of actors (Pete et al., 2020). Thus, the activity traces

associated with these actors can be indicative of the nature of narrative action that is nurtured and cultivated by those who are highly influential in these networks (Priadana & Tahalea, 2021).

3.c. iii. Psycholinguistic Markers of Communication

An understanding of content and underlying network mechanisms can provide insight into the actions and practices that help to sustain infrastructure. Yet, these insights do not provide an understanding of the deeper motives, outlooks, and perspectives that drive the way in which people act and behave. Thus, in this final layer of investigation, the goal is to uncover and find glimpses of how the psychosocial attributes (cognitive, social, and behavioral characteristics) intertwine with the way in which people express and perform in an online community (Rodgers & Chen, 2020). The term psycholinguistics thus refers to the way in which these psychosocial attributes can be discerned and quantitatively analyzed using linguistic markers traced from the data collected and inspected (Rodgers & Chen, 2020). Drawing on the theoretical motives that ground this dissertation, a habitus is a form of structural schema that is implicitly etched into one's demeanor and behavioral contour, thus prior scholarship has highlighted that emotions and other psychosocial attributes are essential correlates that can help to define and characterize the habitus within which one operates (Reay, 2015). These psychosocial markers can further help to unpack how people orient themselves with the relational fabric of a community (Rodgers & Chen, 2020).

In line with these theoretical precursors, linguistic analysis helps distill meaning from large quantities of unstructured text by identifying patterns of frequently used linguistic expressions in a quantitative manner (Varis & Hou, 2019). These investigations have been in line with the longstanding goals and visions of psychometric research (Graybeal et al., 2002). This kind of research is critical to uncover the way in which an individual perceives and absorbs the habitus

in order to sustain their day-to-day footprint (Beaudreau et al., 2005). Akin to the context of my exploration, psycholinguistic considerations have been shown to be critical in the contexts of care, support, disclosure, and workplace productivity (Rogers et al., 2007; Vedhara, 2007; Maqsoom et al., 2020). Further, gender and linguistic expression have also shared a close psychometric association (Larsen & Seidman, 1986). Finally, even in the context of successful group collaboration and integration in the online context, psycholinguistic research has been essential to understanding practices that sustain such collectives (Arguello et al., 2006). Thus, given all these guiding investigations, conducting an empirically driven analysis of conversations manifesting in the spaces I explore, can help to yield further insights into the way in which virtual channels operate and help to nurture collective action and vision. Next, I detail the tool and the analytical approach followed for this part of the investigation.

One of the most widely used tools for conducting linguistic analysis on large digital text corpora is the Linguistic Inquiry and Word Count tool, commonly known as LIWC, which detects 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 (Tausczik & Pennebaker, 2010). Since its inception, LIWC has undergone several key updates seeking to refine and extend its dictionary-based linguistic categories (Boyd et al., 2022), the newest version of which was unveiled in 2022 and contains more than 120 psychosocial linguistic dimensions. These comprise two key types of words – style words (or function words) and content words. Style words are essentially a representation of how people commonly reflect their social and psychological worlds, whereas content words represent the actual meanings. Style words can be pronouns, prepositions, articles, conjunctions and auxiliary verbs. LIWC reads a given text and compares each word in the text to the list of dictionary words and

calculates the percentage of total words in the text that match each of the dictionary categories. For example, if LIWC analyzed a single speech containing 1,000 words using the built-in LIWC-22 dictionary, it might find that 60 of those words are related to positive emotions and 20 words are related to friends. LIWC would convert these numbers to percentages: 6.0% positive emotion and 2.0% friends. Describing all the categories is beyond the scope of this discussion. But it is important to note that there exists a hierarchical structure between the different categories. For example, anger words may fall under negative emotions, which falls under the larger theme of emotions.

In LIWC-22 there are four top-level LIWC categories that combine multiple sub-dimensions - "Analytic," "Clout," "Authentic," and "Tone" language. Analytic has been associated with formal and logical thinking, associated with markers of professional success (Pennebaker et al., 2014). Clout is a marker of social status, confidence, and leadership (Fox & Royne Stafford, 2021). Authentic captures an honest and open style of conversation, where there is less self-regulation and speech filtering (Newman et al., 2003). Tone is an aggregate measure of both positive and negative emotions (also categories of the LIWC dictionary), where a higher number signifies a more positive tone and vice versa. This tool is inspired and built to capture several facets of human life, ranging from social status, hierarchy, relationships, group processes, and individual differences (Tausczik & Pennebaker, 2010).

In the category of individual differences, a salient line of investigation also applicable to my exploration has been the use of LIWC to capture gendered patterns of conversation (Schwartz et al., 2013). Such gender differences capture the relational essence of emotional expression and care that women express, especially during times of crisis, which has also been explored through the use of LIWC (Vegt & Kleinberg, 2020). Another line of inquiry associated with LIWC and

also linked with my explorations has been related to capturing care, affect, and disclosure patterns evident in online collaboration (Iosub et al., 2014). LIWC has also been applied to capture cognitive processes and emotions associated with coping mechanisms across varied contexts (Robbins et al., 2019). Thus, the application of LIWC has been immensely explored across varied sociocultural arenas.

Further, another line of scholarship associated with capturing individual differences, as proposed by Decter-Frain and Frimer (2016), has explored how markers of communal or agentic disposition can be demarcated through linguistic investigation. Further, such relational separation can also be associated with gender. For example, in line with the notion of *ethics of care,* prior studies using LIWC have highlighted how in political conversations, women tend to depict greater group awareness and cohesion, as compared to men, indicating that women tend to assume more communal dispositions (Hu & Kearney, 2021). Specifically, this operationalization of communal and agentic linguistic separation relies on selecting the LIWC word categories most strongly associated with these two constructs based on their underlying dictionaries. Building on this approach, I selected from the list of word categories identified by Decter-Frain and Frimer (2016) by shortlisting only those strongly correlated by communal and agentic language (r >= .8). This list comprises 22 LIWC categories - 9 measuring agentic language (including words associated with achievement, motion, certitude, first-person singular pronouns, and work), 12 capturing communal language (e.g., words about family, home, friends, and other social references), and one shared between both - the category of perception (Decter-Frain & Frimer, 2016). This separation applied at the psychosocial level further amplifies the aim of this investigation to capture the nuances that delineate the nature of relational identity that is at play in each of the communities I explore. I particularly employ this analytical approach for the

micro-level analysis I conduct – to guide the way in which relational separation manifests and segregates the orientations of the agents. In the next section, I further detail the way in which LIWC is used and applied for the two different dimensions of research I pursue, while also further elaborating on the theoretical motivations that guide the nature of the application pursued.

3. d. Research Plan:

Having detailed the scope of data and analysis procedures that apply to the context of my exploration, the goal of this final piece in this section is to provide a narrative of how the different methods blend and provide a basis for the research objectives I follow. Particularly, I detail two streams of inquiry. Both these are rooted in the fundamental tenet of structuration theory that outlines the interplay of structure and agency. At the structural level, the goal is to capture the overarching practice that emerges and shapes the collective persona of these communities. In the 2nd line of investigation, I unpack the agentic layer, that is to detail the way in which individual agents shape the practice or the structural dimension captured. Both these are aimed at comparing the dynamics of the three communities I explore at various levels.

The comparative analysis draws inspiration theoretically from investigations that have highlighted how each community can create its own unique persona, some creating a more communal outlook depicting fellow feeling, shared understanding, and camaraderie, whereas some can portray a more informational outlook wherein knowledge exchange is the chief modality of association (Sengupta, 2021). These studies also help to outline how through such a comparative vision, different collective outcomes such groups nurture are also captured. For example, community-oriented groups can be perceived as depicting a stronger degree of bonding capital, whereas those that primarily act as knowledge hubs can be considered to have a greater degree of bridging capital (Sengupta, 2021). Akin to this exploration, is also the gendered nature

of relational exchange that underlines the moral outlook towards care and caring practices (Gilligan, 1993). Finally, augmented with these insights is also the exploration of how agentic vs communal dimensions of relationality are captured through discourse (Decter-Frain & Frimer, 2016). Since textual conversations are the primary nature of exchange in the forums I survey, such psycholinguistic motives greatly boost the nature of the investigation I pursue and the comparative stance I wish to explicate. Next, for each of these segments, I provide a narrative of the theoretical motives and nature of the empirical investigation pursued.

3. d. i. Study 1: A Comparative View of Collective Practice Across the Three Forums

The goal of this layer of the investigation will be to explore the collective identity that is established and nurtured in these online spaces I compare. The motive here is to explore how the gendered habitus intersects with other forms of organizational habitus and in effect, a new form of habitus emerges that defines the nature of practice and norms that operate. Here, the unit of analysis is conversation. That is through various facets of conversational dynamics, my goal will be to provide a deep understanding of how a collective practice is crafted and the points of distinction that render a unique collective image to these. The goal thus is to define how the practice of care shapes the attributes of infrastructure that emerge in each of these collectives. I shall use content, network, and psycholinguistic markers to further distill meaning to such a practice that is crafted. Below I outline the questions that drive my investigations and the goals of these.

1) What content themes emerge and how do these define the habitus that emerges in each of these forums?

For this question, I shall discuss the different content themes that emerge (using the methodological arc of content analysis). The goal will also be to associate them with the different themes of care in the form of providing support, and resilience that is evident. These themes shall help to unpack the outcomes associated with the infrastructure that is established. Such an investigation will provide a foundational basis for separating the nature of the practice that emerges, as conversational practice is the chief marker of communal identity in these forums (Sengupta, 2021).

2) Using macro-level collective measures, what forms of group identity and characteristics are discerned? How do these compare across the forums?

In this segment of the investigation, the goal will be to pivot on the macro-level collective measures (from social network analysis) of the three social networks constructed to get an understanding of the extent of cohesion and group dynamics that operate in these spaces. Such an understanding can provide a deeper sense of the way in which the human infrastructure operates at a collective level and a comparison can help to provide an understanding of how such an infrastructure may differ across contexts (Bowker & Star, 1998). Further, the goal here will be to also understand the collective outcomes of these spaces that drive the conversational exchange explored through the content analysis. The overall aim is to get an understanding of the nature of group-level practices that emerge and how these characterize the networks that emerge in each of these spaces.

3) Using psychometric tools of analyzing conversation, what psychological attributes characterize these forums and further help to distill the distinction between these?

In the final layer of investigation in this context, the goal will be to use the psychosocial cues as discerned from the LIWC analysis to understand the way in which the psychosocial associated with each of these spaces is characterized. Using the theoretical guide of the ethics of care framework by Gilligan (1993) and the additional empirical distinction between the agentic vs communal linguistic markers as proposed by Decter-Frain and Frimer, (2016), the goal will be to investigate the relational orientation cultivated in each of these spaces to further unpack the nature of habitus and shared repertoire nurtured.

3. d. ii. Study 2: Agentic Intervention: Understanding Emergent Roles and Psychosocial Portraits of Engagement

As structuration theory postulates, agency and structure bear a reciprocal relationship. Thus, in the previous study, I detailed the way in which structure is established, in this layer of the investigation, my goal is to highlight the way in which individuals play a role in the nature of collective purpose and practice. As discussed earlier, the nature of community crafted and the type of support, care, and moral outlook nurtured in such spaces depends on the way in which functional roles are crafted and sustained through the emergent associative actions of community members. Thus, social roles capture the essence of relationship building and varied levels of affinity building among community members. In this part, I thus use the individual level of social network analysis conducted using centrality measures and psychosocial portraits to explicate the way in which participation and engagement of key members are pivotal for sustaining the community. This part helps to shed light on the micro-level forces that sustain the infrastructure and help to provide an understanding of the infrastructuring practices that nurture

the collective action of these spaces (King et al., 2014). The two key questions I seek to address

for this part include:

1) Using the various centrality measures drawn from social network analysis, what kind of

activity traces do the key members engage in? How do their actions differ across the two

forums?

The centrality measures of betweenness, closeness, and PageRank (a form of eigenvector

centrality), shall be used to find the top 100 actors for each forum. Next, their activity in terms of

the type of content they engage with shall be mapped along the way in which they engage and

network with one another. The goal here is to understand how content propagates, the nature of

interactions that scaffold and infuse different dimensions of conversation, and the actions that

help to bind the community together. Yet, possible differences in their actions can not only help

to set aside different actors within a community but can also help to distinguish different

communities and their characteristics. Thus, in doing so I will offer a richer account of the

underlying mechanisms that offer the assortment of content themes observed in the macro-level

study. In this part, I thus detail through the combined mapping of content and network

investigations, the type of functions the central members serve. This investigation is inspired by

studies by Pete et al. (2020) and the work by Nouh and Nurse (2015) that highlight how

individual actors play a role in acting as facilitators, and conversation experts and thus not only

diversify content but also help to delineate the essence of community.

2) What groups of psychosocial attributes define the varied motives that drive contribution in

these spaces? How do these motives span across the different forums?

This final investigation helps to provide another level of nuance to the understanding of

individual contribution, by grouping the different psychosocial motives that may impact the

117

nature of participation in these communities. In the micro-level context, using the agentic vs communal distinction proposed by Decter-Frain and Frimer (2016), my goal is to apply this to the individual level, to capture the different categories of actors through psychosocial portraits of participation. As highlighted earlier guided by this study, a subset of variables was used to capture this distinction (such that these bear a strong correlation with either agentic or communal dispositions).   The psychosocial aspects provide a novel dimension to understand the way in which community members align themselves with the goals of the community and how the group dynamics impact their association with the group (Vogel & Pechmann, 2021). The goal here is to understand the cognitive associates of action, thus providing empirical verification of the psychosocial layer that emerges in association with the habitus (Reay, 2015). To conduct this investigation, a process akin to that of Kou et al. (2018) was followed. First, for each community, the actors in the top quartile were shortlisted and grouped together. This process yielded a set of 14687 actors. Next, using the LIWC outputs associated with the conversational vectors for each of these actors, k-means clustering using the elbow method for determining the optimal number of clusters was used (Davidson et al., 2019). The k-means clustering approach was conducted using the best practices and recommended parameter selection, and preprocessing steps specified in extant literature (Wu et al., 2009). The metric used for evaluating the effectiveness of the clustering approach was inertia – which calculates the sum of the squared distance between each point and the closest cluster centroid (Wu et al., 2009). Lower inertia thus indicates a better model. Based on the different values of k, the model with k=4 was selected for further investigation. The k-means clustering was conducted using the scikit-learn package in python[5].

---

[5] https://scikit-learn.org/stable/modules/generated/sklearn.cluster.KMeans.html
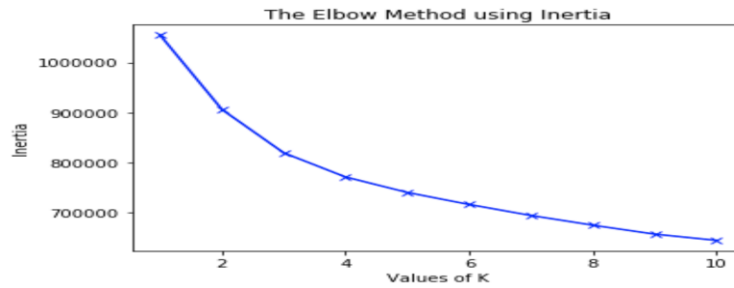
Figure 1: Kmeans result by varying the number of clusters

I shall discuss the results and insights from this research plan in the next section.

4. Results

4.a. Section Objectives

The goal of this section is to provide a detailed account of the results and insights compiled from the varied dimensions of analysis carried out as part of this dissertation project. The section is organized by the two research goals outlined in section 3. In the first segment, I provide the results for the macro-level investigations that help to unpack the collective practice and organization of the three communities investigated. In the second segment, I provide the inferences associated with the investigations for the individual or micro-level analysis. The motive is to provide insights that can further help to provide glimpses into the way in which the communities share similarities and the points of distinction that appear and set these communities apart.

4.b. Results Associated with the Collective Organization and Practice of the Three Forums

In this section, I provide the results for content analysis, social network analysis, and the psychosocial markers associated with the conversations from each of these spaces. These inferences are aimed to shed light on the way in which each of these groups operates at the

119

collective level. The aim is to use the various modes of inquiry to unpack the different dimensions of collective practice that are emergent in each of these spaces.

4. b. i Final Content Schema Derived

First, I outline the six content themes that emerge. Table 3, further elaborates on how the different content themes are spread across the three different forums.

1. **Resource development**: These posts provided instrumental and practical guidance towards materials and resources one can use to grow their career, 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 professional expertise online channels may offer. In essence, this category helped to capture more of an informational outlook, with some communal perspectives as well, aimed at enriching the knowledge capital of these spaces (Hall & Graham, 2004). In essence, this content category, captures a weaker form of association, depicting a weaker communal orientation, aimed at only serving as a site of information exchange and thereby aiding the growth of bridging capital in these collectives (Reus et al., 2022). An example conversation thread from r/ggw inquiring about remote training resources to sharpen one's technical ability detailed: *I'm searching bootcamps and if anyone can share their experience of one that is online*? A core theme in r/csc, many conversations involve sharing resources around informal learning channels (such as online courses, and bootcamps) and other avenues of scholarly expansion that can help with professional enrichment.

2. **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, typical discussions detailed issues surrounding recognition of labor in the technical workplace, whereas in r/ggw this theme aimed to capture the struggles that underrepresented groups may face in tackling the demands of the technical workforce, which often places such voices at the periphery (D'Ignazio & Klein, 2020). Casting a similar but broader light, conversations in r/cw under this theme discussed issues such as wage disparity, workplace 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"*, in a discussion regarding the expectations and necessary skill sets needed by 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*." Further, posts from r/ggw attempted to shed light on the latent gender disparities and the symbolic subjugation that women have to navigate in the technical workplace. For example, an example post in this regard stated, "*Nothing is equal, often us women have to struggle much harder to get our ideas appreciated and get treated at par with our male colleagues."* Such discussions show that this theme also lays the ground for a provocative arena of speculation around how diversity should be embraced, performed, and balanced in the workplace (especially in the technical domain). 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. Drawing on

the infrastructure framework, this theme exemplifies how virtual forums may act as conduits of advocacy and expanded civic participation (Tacheva et al., 2021).

3**. Survival & Empowerment:** The central aim of this category was to share tacit skills and tactics to better acclimatize to the implicit organizational expectations such as prescriptions of demeanor and conduct, aimed at facilitating greater social integration with others in the workplace. This theme thus helps to exemplify the cognitive capital curated in such channels, wherein more experienced community members share their wisdom and experience with others, thereby providing informal mentoring and guidance (Jin et al., 2015). This theme thus provides a way for one to seek advice to repair and reclaim their sense of ontological security, in the process of defining their professional identities (Mantere & Whittington, 2021). 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; whereas 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 is important to you, then you should find out if that's possible now.*" Further, even in situations, wherein community members sought support for dealing with the struggles and pressures of the technical domain (especially for newcomers), the nature of guidance depicted a form of detached, isolated style of support, that is often found in more masculine approaches to mentoring (McKeen & Bujaki, 2007). For example, when a community member posted on r/csc, indicating that they were struggling in their internship, they were not performing well and were feeling helpless, comments from other community members, entailed suggestions on seeking self-care resources, or suggested instrumental guidance (for example, discussing with

mentors, forming peer groups). Yet, missing in these conversations was an establishment of association, affinity, parity, or other forms of expressions of collective empathy (Batson et al., 1995).

In contrast, a conversation under this category in r/cw and r/ggw 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 careerwomen, 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*. Further, in many circumstances, community members wanted to empower others through expressions of solidarity. In an example conversation from r/ggw, a community member stated, *"I can relate to your experience so much. You will get through this."*. While r/cw \& r/ggw, exhibit similarities in the way in which this thematic category is used and conversationally situated, a subtle distinction arises in the conversational traces of r/cw, wherein community members discuss struggles and issues around work-life balance and negotiating multiple aspects of their emergent persona as a career woman. For example, a conversation on r/cw in this regard stated, "*I would defiantly advise for some personal time at work just to address your own needs if you happen to feel overwhelmed.*" On a related note, imbued in such conversations were elements of spiritual wisdom and guidance aimed at empowering one's sense of self (Damianakis et al., 2018). This theme captures how the spirit of community differs among the three forums. From the lens of infrastructural care, this theme depicts an act of caring and guarding enacted through sharing of experiential wisdom.

4. **Community preservation**: These posts were aimed at invoking, maintaining, and upholding community values and beliefs. Beyond 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, sustenance, and maintenance. Thus, such forms of exchange also highlight a stronger sense of trust and belongingness to the community which manifests through expressions of solidarity and empowerment (Stewart & Schultze, 2019). An example from r/cw stated: "*Thanks*, *I admire the work you are doing, congrats"*, appreciating the way a community member contributes to the collective vision and inspires others. In essence, this theme highlights strategies that community members employ towards relationship maintenance through expressions of affect, peer parity, instilling a sense of kinship, all of which help to boost the bonding capital of such spaces (Ellison et al., 2014). Beyond the reaffirming posts of validation and acknowledgment that help a community to bond, replete in these conversations were also actions of maintaining community, especially by moderators. Interestingly, in these conversations, it is worthwhile to note how a strong essence of community identity is enforced. For example, a moderator in r/ggw, stated, "*Thank you for your post, while it is valuable, but please understand that this forum is exclusively for women and non-binary folks, who do not have many other channels out there to connect. So, I regret I will have to remove your post"*. This comment was made as a response to a question asking about male perspectives, in a women-centric forum. Such acts also portray how moderators play an essential role in maintaining virtual spaces and ensuring that the posts adhere to the goals and norms of the space and align with those for whom the spaces are crafted, especially underrepresented voices (as in this case) (Barakat & Redmiles, 2022).

5. **Navigating toxicity**: These include disclosures around travails and obstacles faced in adverse workplace regimes and culture (an example of a habitus of domination). Thus, 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). Thus, this theme

highlights how such collectives provide care in terms of helping to heal and repair moral and psychological scars (De & De, 2014). 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 woman, I want to power through and fight the system, but I don't know if I want to put myself through that*". Such a post indicated the strain and trauma induced due to symbolic forms of oppression and forces of exclusion that operate in workplaces. Similar calls for retribution were evident in the conversation traces of r/ggw, as a community member stated, "*Whenever I explain an idea, it is never good enough. I feel very frustrated when that is explained back to me as if he thought of it'*. In a sense, there is a strong underlying pattern of disclosure that is associated with this category (Andalibi et al., 2018). This theme highlights a stronger communal orientation, imbued with a sense of trust and belief in the community as a safe space (Lucero, 2017).

6. **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). This theme, therefore, captures how submissive dispositions manifest in the organizational routines, which may inflict moral harm upon underrepresented voices. 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 again captures a deep sense of trust and fellow feeling with others in the community. Interestingly, a key distinction in the nature of the conversation between r/ggw and r/cw in relation to this theme emerges through conversations

around professional attire and expectations of self-representation - which further highlights differing norms of identity between a career woman in a generic sense and a career woman in the technical workplace (Ruel, 2018). For example, in an example conversation from r/cw, an actor stated, "*So, I just got my first job, looking at this link to decide, any thoughts about clothes?*". Yet, such conversations did not commence on r/ggw, where this theme was more centered on negotiating the latent masculinity of the technical workplace, balancing relationships, and fear of identity-based exclusion (Peterson, 2007). For example, a conversation associated with this stated, "*My fear is that I am not getting interview calls and how I might manage them, could it be affected by the fact that I am a woman*"? Such differences in thematic representation further allude to the fact each community develops a unique sense of collective identity and group affinity (Ren et al., 2012).

These themes capture various nuances of relational integration that characterize the contour of collective performance in each of these forums. As the discussion highlighted, while synergies exist, each content category assumes a unique meaning depending on the persona of the forum wherein it takes place. The results are compiled in table 3, following the procedure outlined in section 3.b.i.

Table 3: Results from content analysis

Content categories	ggw (%)	cw (%)	csc (%)
Survival & Empowerment	31	33	22
Resource development	14	16	40
Community preservation	25	27	15
Navigating toxicity	8	9	8
Reflections on ethics	15	8	10
Impression management	7	7	5

4. b. ii Network Analysis at the Group Level

In this section, I present the insights drawn from the network investigations conducted at the group level. These give us an understanding of the way in which structure and practice are crafted at the collective level and help to distill further nuance into the way in which the conversational dynamics operate. Subsequent discussions aim to unfold the latent group dynamics that characterize the practice of these communities.
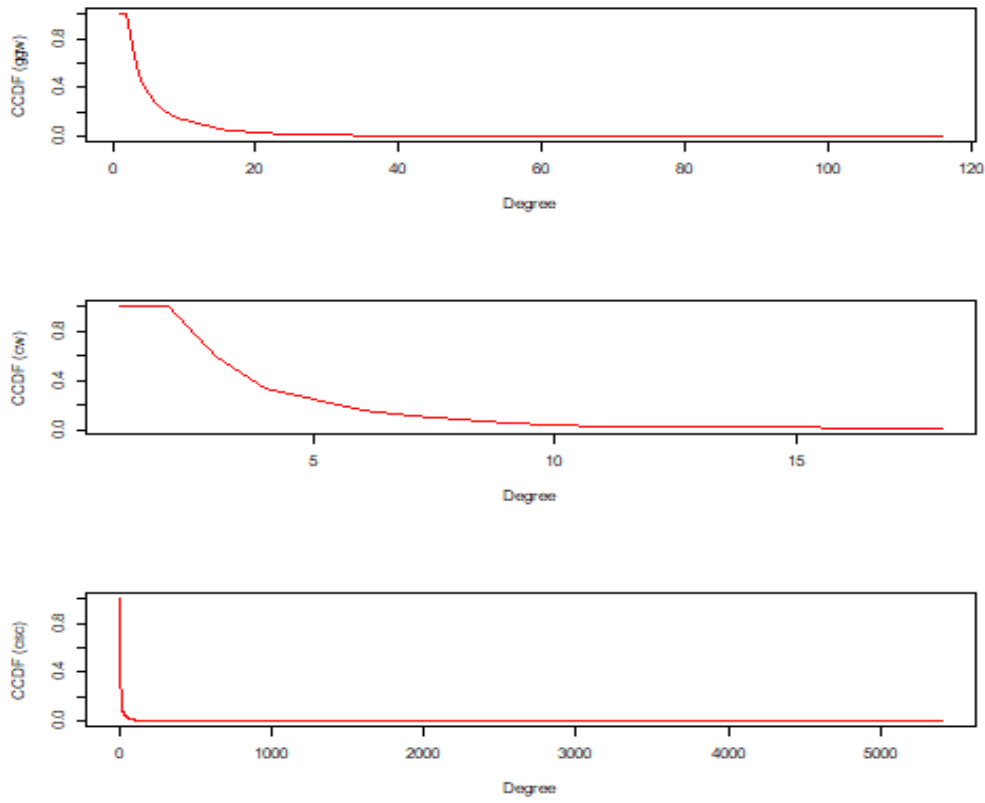
__Figure 2: CCDF showing Degree Distributions on each subreddit__

Based on the above plots we can conclude that the power law manifests in each of the virtual

spaces I have explored. This indicates that much of the action and activity on these forums are

driven by a select core of actors at the top of the degree distribution. This further warrants an

agentic dimension of investigation (which I explore qualitatively) to understand the type of

actions that create the template of practice nurtured and sustained in these spaces. Next, I provide

table 4, with the key metrics as detailed in section 3, to summarize key observations.

Table 4:Network measures across the three subreddits

Metric used	ggw	cw	csc
Number of nodes	2071	332	57406
Number of edges	4711	454	262726
Density	0.001	0.004	0.00007
Centralization	0.03	0.02	0.05
Diameter	16	16	16
Number of connected components	24	27	288
Transitivity	0.04	0.01	0.008
Assortativity	-0.11	-0.05	-0.07
Reciprocity	0.46	0.41	0.36

Based on these insights, it is evident that size of the network mediates the way in which the network is formulated and the characteristics it depicts. As the density of a network is greatly dependent on size, a larger network is likely to be less dense (as we observe with r/csc) (Staudt Willet & Carpenter, 2020). But still put in aggregate with the degree distribution plots and other

metrics, we can get a general sense of the network attributes. Particularly salient in this regard are the measures of transitivity and reciprocity. As described in section 3, these two metrics can be used as indicators of mutual exchange and thus can be associated with group cohesiveness and bonding capacity (Borgatti et al., 1998). From the above scores, we can estimate that r/ggw, has greater cohesion and degree of association and affinity (bonding capital) than the two other forums (r/cw & r/csc). Between, r/cw & r/csc, r/cw ranks higher across both these metrics. These could indicate that the women-centric communities have a greater sense of collective identity which manifests as a commitment to mutual exchange and developing a unified collaborative stance (as indicated by transitivity and reciprocity scores) (Ren et al., 2012; Faraj et al., 2015; Staudt Willet & Carpenter, 2020).

Looking at the number of connected components, we can infer that r/csc is a lot more dispersed as compared to the other two forums. However, again size could factor into this, larger networks may have a greater number of information hubs (Pete et al., 2020). However, we see that r/ggw, in this regard, seems to have nearly the same number of connected components as that of r/cw, this could indicate further that r/ggw values group identification and nurtures the cohesiveness among community members. It is interesting to note that the diameter is the same across all the forums, such observations might be the result of how the network is constructed, as has also been observed by other similar studies by Pete et al., (2020).

The larger centralization value of r/csc poses an interesting dilemma. One might argue that r/ggw and r/cw which are apparently more cohesive (as indicated by the transitivity and reciprocity scores), would have higher centralization values as well. However, given the definition of centralization, this high value could be indicative of a (or a set of) highly prolific actors who play the role of gatekeepers and control the nature and extent of traffic that flows through this channel

130

(Nouh & Nurse, 2015). It thus could be seen as an expression of power, authority, and autonomy (exerting, imposing, and exhibiting control over the actions of other members) (Nouh & Nurse, 2015).

Finally, coming to the assortativity metric, it is to be noted that this is calculated based on degree in this case, as mentioned in section 3. While the negative score is indicative of disassortative networks, the scores are relatively close to zero, akin to observations by Pete et al. (2020). These networks thus can provide exchange between individuals of unequal standing, which in this case manifests as high-degree nodes, interacting with nodes with lower degree. Such exchanges can help to foster connectivity and may help those who are new to the community or are struggling to associate with others in the community (probable reasons for the disassortative tendencies). Such associations help to find a way to connect with more experienced individuals who can mentor and guide them not only to feel included in the community but also to gain topical expertise (Tomprou et al., 2019). In this regard, thus, the highly disassortative score of r/ggw might be an indicator of relevant mentoring exchanges.

Based on all these insights, the network-level measures are helpful guides toward potential markers of community action and cohesion. Yet, these serve only as glimpses, by inspecting the nature of action at the micro level, through key actors, using the centrality metrics (as shall be discussed in section 4.c.i) can help to further elucidate and provide deeper insight into the actual exchange mechanisms and the way in which these topical communities create a shared repertoire of practice (Jackson et al., 2020). Linking back to the facets of structuration, this macro-level analysis yields essential insights into the larger practice or the routines of the community. Yet, such an exploration is never complete without investigating the agentic dimension or the micro-level view, the results of which shall be discussed in section 4.c.

4. b. iii. Psycholinguistic Inferences

In this portion of this narrative, I present and discuss observations gleaned from the psychosocial investigations conducted using LIWC. First, I use the four summative variables from LIWC-22 to discuss the key traits that help to understand the deeper psychosocial motives associated with the conversations from these forums. Statistical tests are used to understand the way in which these manifest and help to characterize the nature of orientation and perspectives of the community values. Regression analysis shall be used to further discuss potential attributes that help to compare and distinguish the type of community or collective practice nurtured on these platforms.
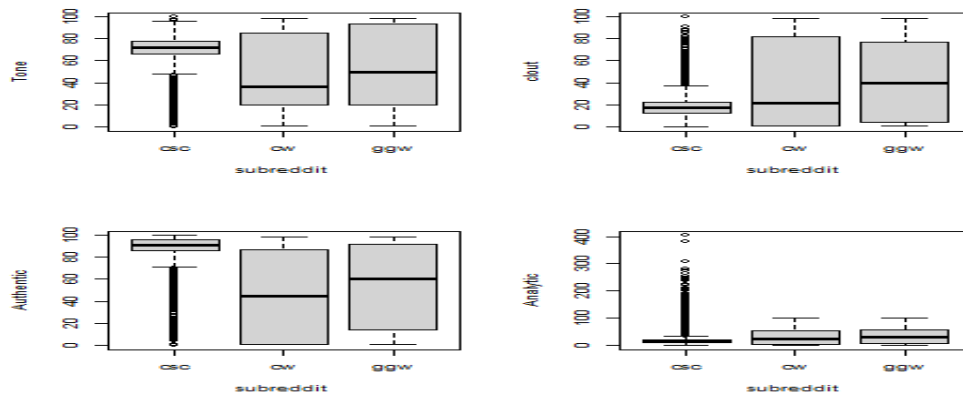
Figure 3: Box plots for key summary metrics for LIWC

From the above box plots we infer that there are variations in the emergent collective practice across the forums. Thus, I conducted pairwise t-tests, to check the variation in the means of the two groups. Based on these markers the observations gleaned are as follows. Further, the descriptions that follow shall be guided by the definitions provided in section 3.b. iv. Between r/ggw & r/csc, I find that r/ggw has overall higher Clout ($t = 52.8$, $p < 0.001$), Analytic focus ($t = 58.3$, $p < 0.001$), but scores lower in terms of the measures of Authentic ($t = -79.1$, $p < 0.001$) and

Tone (t= -41.6, p < 0.001). Since Clout is a measure of status and hierarchy, the higher values for

r/ggw could be due to gendered expression manifesting and reinforcing the importance of

identity as I have highlighted in the content analysis. The greater analytical focus could be driven

by the need for deeper reflection on situations, challenges, and struggles that set the contour of

contribution in r/ggw (evident in the categories of navigating toxicity, survival & empowerment,

reflection on ethics, impression management) (Sencerz, 1980). Further, this dimension could also

be more pronounced in this context (r/ggw), since often questioning the status quo can call for

deeper insight, wisdom, and experience, which further amplifies the analytical dimension

(Sencerz, 1980). The lower values for authentic conversations (which indicate restraint and self-

monitoring) and a less positive tone, could also indicate initiatives for questioning and contesting

the existing status quo of the technical habitus, as has been observed by prior studies that have

investigated the association between gender and toxicity of content (Nurik, 2019). Further,

drawing on prior studies, such linguistic markers as gleaned are also akin to the way in which

women express themselves in group contexts (Tausczik & Pennebaker, 2010). Interestingly, a

very same pattern of differences was observed between r/cw & r/csc. This further justifies the

observation that the gendered dimension of social position and identity manifests in r/cw &

r/ggw. Empirically, I find that between r/cw & r/csc, r/cw has overall higher Clout (t = 15.8, p <

0.001), Analytic focus (t= 17.3, p<0.001), but scores lower in terms of the measures of Authentic

(t= -33.03, p<0.001) and Tone (t= -19.5, p < 0.001). These observations indicate that in many

ways the tendencies of r/cw & r/ggw are similar, given the gendered focus and position, yet are

different from the overall nature of conversation and collective identity that is harbored in r/csc.

An interesting question that arises thus, is if there are differences between r/cw & r/ggw. It is

interesting to note that r/ggw displays higher Clout (t=2.05, p = 0.046), Analytical focus (t=3.92,

p < 0.001), Authentic conversational style (t= 5.26, p < 0.001), and Tone (t = 3.6, p < 0.001) as compared to r/cw. This could potentially indicate a stronger form of commitment, cohesive group identity, and collective enterprise that emerges in r/ggw, which could potentially be linked with an emergent discursive initiative towards empowerment and advocacy aimed at dismantling the symbolic violence induced by the habitus of domination associated with the technical workplace. It is interesting to note that the more authentic style of conversation is similar to that found in r/csc. This could potentially be driven by the synergies with the underlying culture of the technical workplace, or could also be indicative of the open conversational style nurtured in the forum to address and redress issues of systemic oppression and symbolic violence. The positive tone, could in fact be indicative of a potential orientation towards empowerment and mentoring, which also supplants the observations associated with the nature of disassortative networks that arise in the context of this forum (r/ggw) – which as discussed before could indicate mentoring exchanges.

To further add to these visions, regression analysis was conducted to gain deeper nuance into the psycholinguistic factors that shape the nature of conversation in these forums (Kou et al., 2018). With regard to the regression analysis, two dimensions of analysis were conducted. The first was a multinomial regression model to understand the differences between r/csc and the women-centric forums (both r/ggw & r/cw). Another dimension was a logistic regression to understand the differences between the two women-centric forums. The inferences of the first analysis guided me to conduct the 2nd stage of exploring the potential nuances associated with differentiating the two women-centric forums. Next, I highlight key takeaways associated with both these sets of analyses.

For the multinomial regression analysis, following best practices, several different model combinations were tried (Osborne, 2016). Here the dependent variable represents three possible cases ("ggw, "csc", "cw"). The independent variables represent vectors associated with the LIWC dimensions. The goal here was to find the best-performing model, as per standard approaches and metrics of evaluation (Osborne, 2016). After trying a total set of 51 different models with various parameter permutations and combinations, sampling approaches, and other techniques, the model discussed below, depicts the observations from the best-performing model. r/csc was treated as the baseline or the reference level in these models. These models were implemented using the mlogit[6] and caret[7] packages in R. Following were the key observations.

In comparison with r/csc, I find that for both the women-centric forums (r/ggw & r/cw), several salient markers emerge. This discussion revolves around those variables that emerge as significant in the final model[8]. In this description, I focus on associating meaning with the empirical insights, guided by the significant features, since the goal of the regression is not to gain empirical nuances but to use the empirical insights as pivots for understanding the conversational culture that emerges in these virtual spaces. First, several cognitive markers are indicated. The results indicate, that the women-centric forums have a higher manifestation of cognitive processes such as discrepancy (signaled by words like "should", and "would"), and a lower manifestation of factors such as tentativeness (signaled by words like "if", "but any") and certitude (affirmations such as "really", "of course", "actually"). The higher discrepancy could follow from themes such as *Reflection on ethics* that raise questions and challenge existing structures, the lower values could be linked with categories such as *resource sharing* since many

---

[6] https://cran.r-project.org/web/packages/mlogit/index.html
[7] https://www.rdocumentation.org/packages/caret/versions/6.0-93
[8] The numerical results are presented in the appendix

of these posts in seeking help often preface these questions, with words akin to the category of tentativeness. Further, the lower assertiveness coming from the certitude category could indicate a stronger masculine orientation manifesting in r/csc, which further posits a difference between the gendered orientation of the virtual forums (Iosub et al., 2014).

In the emotions category, I find that the women-centric forums depict less anxiety and anger, but depict greater sadness and the use of swear words (in that of r/ggw). Again, the markers of anxiety and anger could be linked with the fact that r/csc is a forum associated with professional growth, discussions related to career struggles could induce anxiety and anger. Further, studies have also highlighted that agentic and potentially masculine group norms could result in extended expressions of anger and anxiety (Iosub et al., 2014; Decter-Frain & Frimer, 2016). Complementing this observation, the conversational marker of netspeak (which measures the use of informal language such as 'haha', 'lol', and ':)' was also evident in the conversational traces of r/csc (Boyd et al., 2022). Such themes might align with the previous observation that r/csc depicts a more authentic conversational style as described, further, these markers could also be indicative of a more open and free manner of expression, again capturing the more agentic disposition of r/csc (Kimbrough et al., 2013). Sadness and use of swear words as evident in the women-centric forums could be linked with the extended discussions on topics such as *navigating toxicity*, *survival & empowerment.* Sadness could be driven by sharing struggles and traumatic experiences associated with exclusion and systemic violence (Zhang et al., 2021). The same logic can be applied to the use of swear words which is a distinguishing factor for r/ggw (Iosub et al., 2014). These could be indicative of the wave of advocacy and calls for inclusion and extended expression. Further, studies have also indicated such markers to be common indicators of gendered patterns of conversation (Tausczik & Pennebaker, 2010).

136

Again, as captured in studies of group processes and gendered expression, the women-centric

forums capture a deeper social orientation. From the insights of the analysis I have conducted,

both r/ggw & r/cw have a higher tendency of using prosocial (caring for others) and moral

markers of communication. These could again be driven by the categories of *survival &*

empowerment and *community preservation*. These markers could be indicative of a stronger

attachment to the community, collective intimacy, and a feeling of shared understanding and

commitment to nurturing others in this space (Chen, 2013). Further, the women-centric groups

depict a lesser presence of markers of masculinity (indicated through the category male) and

technical references but have a greater presence of markers for work, which follows from the

description of the groups and their collective purpose. The women-centric forums have higher

indicators of risk and curiosity, which again could be linked with discussions on topics such as

reflection on ethics, survival & empowerment, and community preservation. This insight may

follow from the fact that posts in these categories may incur risk in terms of raising questions

beyond the established practice in the organizational structure, eagerness for change, and

validating actions of others which may incur risks by again supporting subversion (Ruel, 2018).

Among other markers, r/csc depicts a stronger focus on reward and linguistic correlates of

fatigue, which could be linked with a stronger orientation towards the technical workplace,

which has depicted to harbor a stronger focus on self-advancement (as captured through reward)

and also higher cognitive strains due to the demanding nature of workplace regimes (Peterson,

2007). Other key observations indicate that, that women-centric forums are more present focused

whereas r/csc appears to be more past focused. This could be indicative of the fact that the

women-centric collectives' bond over the resolve for change, are associated with the calls for

building community, increasing collective footprint, and participation of women, especially in

the technical workplace context. This observation again reinforces the stronger sense of community that emerges in the women-centric forums. Yet, the general forum, due to the extended discussion of resources, often which entails conversations about how people have navigated technical tools and professional development in the past, could be the reason for the focus on the past. In a sense, such musings could indicate a more agentic disposition, as the focus is on the experiences of the individual and do not cater to the needs of the community or collective future goals (Kimbrough et al., 2013).

While the multinomial regression helps to capture differences between the general forum and the women-centric forums, it is interesting to note that we don't particularly see any major points of distinction between the two women centric groups. This is also in many ways similar to the insights from content analysis, there are a lot of similarities between those two groups, yet subtle distinctions do exist. To check if these distinctions can be made evident using the psycholinguistic markers, I used a logistic regression test (with a similar setup as that of the case of the multinomial one, just with the difference being that here the outcome variable only has two categories) between the two women-centric forums. Again, after conducting several tests of validity to test the overall model performance as indicated by Osborne (2016), I subsequently report insights from the best-performing model. This discussion shall also follow a similar structure as that of the one associated with multinomial logistic regression.

The logistic regression in a way attested to the fact that there are not that many significant differences between the two women forums. Yet, subtle but key distinctions do arise. Essential factors in this regard include the following. Based on the results, it appears that r/ggw has a greater moral orientation – this could be driven by the impetus for conversation on topics such as *reflection on ethics* and also indicates the group's collective focus on empowerment and

advocacy as observed through other linguistic markers and content categories. This is further

validated by the more pronounced presence of markers associated with measures of risk. The risk

factor could be induced by the propensity of provocative discussions aimed at disrupting the

existing hegemonic modes of operation in the technical context. Further, I also find less

discussion of categories such as money, work, and home (categories that fall under the theme of

leisure. Such an observation holds with the fact that conversations on r/cw often entail

discussions on self-presentation (e.g., mannerisms, workplace attires) and work-life balance –

aspects of life beyond the organizational setup, which may impact a woman's ability to fully

explore and develop their professional footprints. The absence of this angle of conversation from

r/ggw further highlights a distinction in the nature of conversational practice and overall

orientation between the two women-centric groups. Further significant in this regard, is the fact

that r/ggw holds a greater focus on the past as compared to r/cw, this could be driven by the fact

that in r/ggw many conversations center on issues of oppression and sharing of experiential

wisdom, which is driven by prior experiences of community members. Greater presence of

cognitive dimensions associated with r/ggw, also hold with the need for deliberation and

discussion on a wide variety of challenges and struggles that women may have to endure in the

context of the technical workplace. Overall, these insights highlight a difference in collective

purpose and the way in which the two communities envision the cause of empowering women

within the organizational context.

4. c. Results for Agentic Intervention

The collective dimension explored in section 4. b revealed the way in which collective practice is

established and maintained. We gain key insights into the group cohesiveness, and attributes of

psychosocial elements that characterize the linguistic practice further bolsters our understanding

of the nature of practice and communal identity nurtured in these spaces. Based on these insights we see a clear demarcation unfolding, the women-centric spaces have a greater collective and collaborative outlook than the general forum (Hu & Kearney, 2021). Further, in r/ggw, we see the prevalence of a thrust toward advocacy and empowerment especially captured through the content dimensions of reflection on ethics and the psychosocial marker of morality (as discussed earlier). While these insights are powerful, this narrative is incomplete without investigating the way in which the actors (who make up the micro level) play a pivotal role in shaping the action and direction of a communal enterprise in these virtual spaces. The goal of this part of the narrative is to address through qualitative and quantitative insights from social network analysis and psycholinguistic analysis, the nature of roles and functions that are pivotal for such spaces to sustain and thrive. First, I use the metrics from social network analysis as detailed in section 3, to highlight how key actors drive the performative habitus and norms that emerge. Augmented with content markers, such a description not only highlights the actions but also maps action with the function, providing markers of the type of roles that agents configure for themselves (Kou et al., 2018). Next, using psychosocial markers, I further postulate how the relational fabric gets embossed in the perspectives of the community members, expressed through the content themes, which further helps to situate the roles and functions that are nurtured in these collectives.

4. c. i Exploring Insights from Centrality Measures
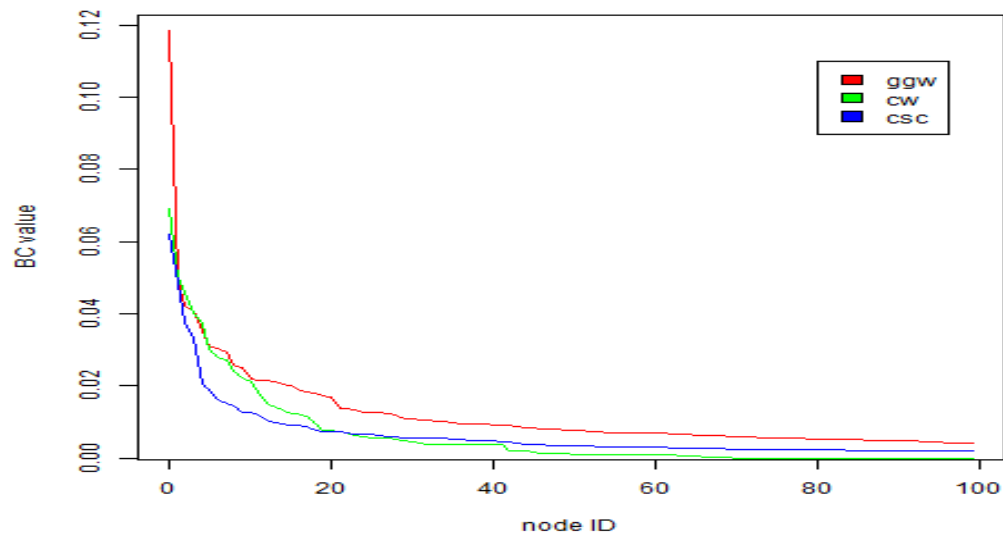
Figure 4: Plot of Betweenness centrality for top 100 actors
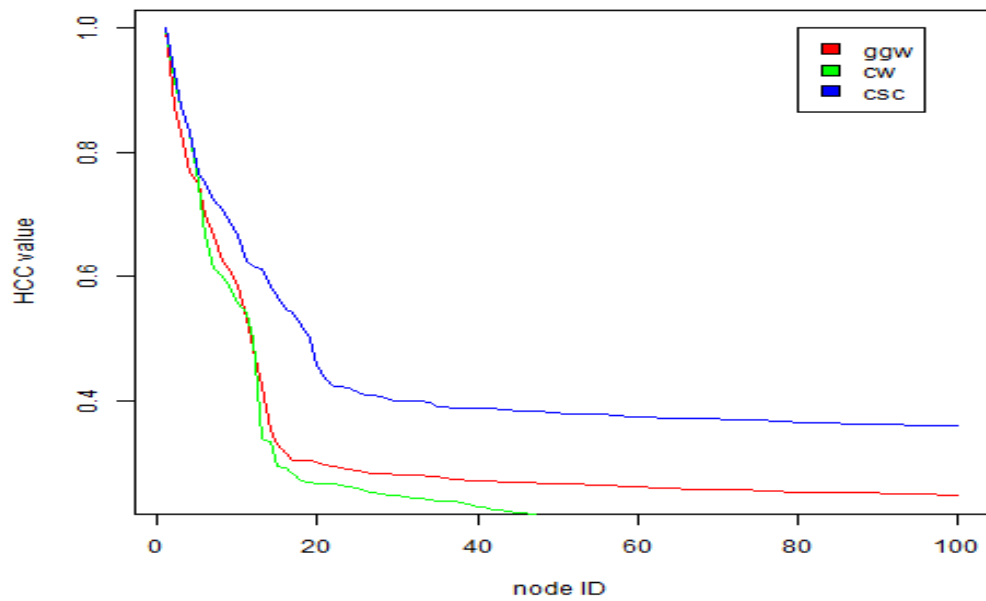
Figure 5: Plot of Harmonic closeness centrality for top 100 actors
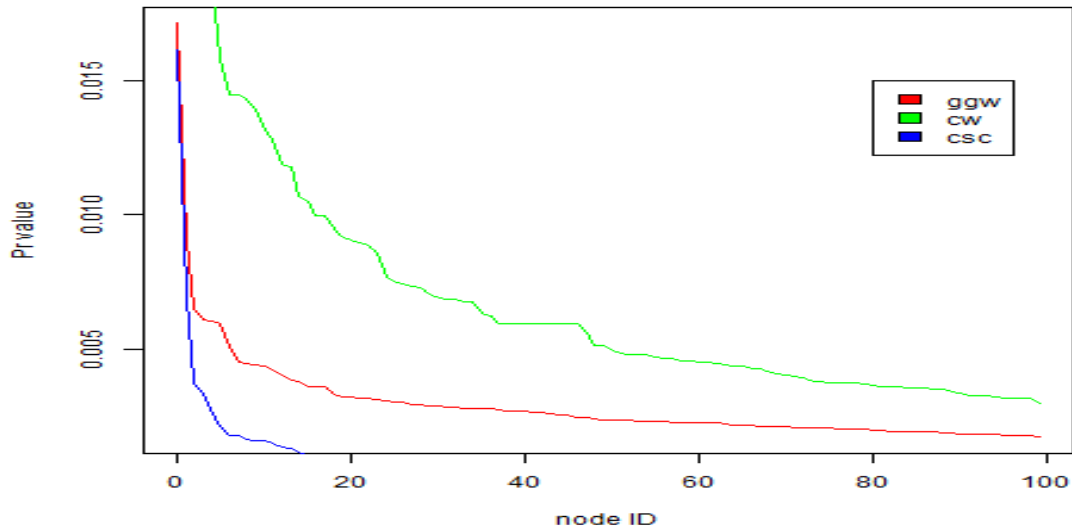
Figure 6: Plot of PageRank scores for top 100 actors

Qualitative insights

The above plots capture a quantitative perspective for the ways in which centrality scores are distributed across the three forums compared. In this subsection, the goal is to present qualitative insights deduced by inspection of the top 100 nodes (based on centrality metrics) akin to the approach followed by Pete et al. (2020). The goal of this discussion is to understand how the key actors act as community custodians and in many ways control how content is produced, consumed, and curated (Bruns, 2007). The goal here is to discuss the top themes that characterize these actors and the way in which their actions establish unique functions they perform to nurture emergent community actions. Hence, the aim is to map the way in which the collective practice is shaped by the individual actors and vice versa.

Insights from r/ggw

First, looking at betweenness centrality, I see that the top three themes that emerge revolve around the issues of *Reflection on ethics*, *survival tactics, and community preservation*. Actors engage in conversations aimed at providing encouragement, solidarity, and deep reflections on the nature of practice of the technical community. A large number of conversations under this theme capture visions akin to the theme of *resilience through resistance*. For example, a top actor in this category mentioned – "*Have you ever written about your struggle and what you have learned over the years? You're absolutely not obligated to, but if you wouldn't mind doing so, I can say I'd personally be encouraged to hear from other women who went through some tough times while working in tech and got through them successfully*". This shows a collective stance and aim to connect with others through experiential sharing and healing (Ryan, 2015; Vaast & Levina, 2015). Further, in this regard, another top actor quoted "*Her experience felt so very familiar to me*". Such expressions depict a deep relational outlook and an effort to connect with others in the forum by expressing a sense of peer parity and experiential synergy (May et al., 2019; Sengupta, 2021).

In other topical themes, conversations related to strategies to deal with toxic workplace regimes and acts of undermining chiefly characterized the way in which the theme of survival tactics manifested. In a parallel light, several conversations revolved around hiring practices and ethics, the way women are perceived and sometimes denied an equal standing in the technical workplace, akin to the concept of *systems of exclusions* as D'Ignazio and Klein (2020). In an attempt to build community, actors also empowered and encouraged others by sharing their experiences and by narrating their struggles as an effort to empower others in the community.

For example, an actor quoted – "*You are awesome. Thanks for offering to mentor others. Women like you who have been in this business for a while now that help us newbies feel more comfortable and allow us to grow as a community*".

Thus, the actors who rank high in the betweenness centrality metric, are in a sense boundary spanners who act as bridges by spanning multiple topical clusters. The majority of the themes they engage with show that these actors serve as community advocates in several different ways. Their topical expertise and community wisdom help them to repair and infuse new dimensions of thought into the topics discussed. Thus, they are not only experts but also serve as guides and those who hold the community together in many ways (Vydiswaran et al., 2019). Repair strategies aim to help provide clarity and information, sharing knowledge and wisdom in the form of links, providing clarifications, and depicting the way in which these members take on the crucial function of helping those who are struggling (especially new members or those who are new in the technical field) and may not belong to the dominant group may not feel welcome and require help to acclimatize to these occupational spaces (Sharif, & Magrill, 2015). This form of relational outlook aimed at providing care, especially to those who may be new entrants and struggling to cope with the habitus of domination, could also be a potential cause for the lower assortativity score observed at the macro level. Essentially, it captures how high-degree nodes (these community advocates) aim to connect and shield those who are new, thereby creating a connection between actors of unequal degrees. Such exchanges can be pivotal for peer-driven learning and mentoring activities catalyzed through these online venues (Johri & Yang, 2017). In this regard, it is interesting to note that among the top actors are also moderators of the community (especially for r/ggw). These actors seem to contribute to two main themes – *Community preservation* & *Survival and Empowerment.* This shows how moderators serve dual

roles. They not only cater to the role of maintaining the community by enforcing norms and guiding the way in which people participate but also serve as bridges portraying a keen sense of commitment and communal empathy aimed at enriching, nurturing, and serving different topical visions and engagement in these online spaces.

Using the scores of harmonic closeness centrality, the analysis revealed that the top actor as per this metric engages in unifying and attempts to nurture a deeper sense of communal affinity among community members. These posts aim to create a collective stance among the community to act as a single cohesive unit (Waltonen-Moore et al., 2006). For example, the top actor according to this metric, engaged in conversations on creating additional connective spaces for group members to bond and deepen the overall sense of community among participants. These conversations were further expanded by others also ranking high in terms of closeness centrality, to strengthen the call to unify and nurture the development of fellow feeling among community members.

 Beyond such calls for community strengthening, other actors who score highly as per this metric, engaged in issues associated with exclusion and ethical viewpoints around inclusivity and equivocality in the technical workplace. These discussions helped to distill how latent deterrents may cause harm and disparity in access and recognition in these contexts. The higher closeness score associated with these authors, thus indicates that such calls for collective action help to embolden the collaborative spirit and boost justice-centric perspectives. It is interesting to note that those nodes who are active, popular, and score high in terms of betweenness and PageRank, do not capture the top position in terms of closeness centrality. While such limitations can be influenced by the way the network is formulated as suggested by Pete et al. (2020), however, it could also indicate how community members bound the scope and nature of engagement. For

145

example, in conversations around informal meetups and expanding channels of association, these actors who act as community advocates as discussed in the context of betweenness centrality are not present. This further indicates topical specialization and potentially how community experts focus on mentoring, empowering, and advocating as the key functions of these engagements. Thereby, while they are bridging some key topical clusters, they are far apart from other popular topical clusters which impact their closeness score. Such insights reveal not only different roles but also indicate an implicit hierarchy wherein the more experienced members refrain from certain actions and scope the nature of association they cultivate with the community as a whole and with other members of the community (Thom-Santelli et al., 2010).

Finally, by inspecting those who score highly in terms of the PageRank metric, I do not find any novel dimension of topical engagement. However, akin to the definition of PageRank, the way in which actors are ranked as per this metric, highlights the way in which they influence and align themselves in relation to others in the community. It is not surprising to find a close match between those with high degrees to also have higher PageRank scores, as studies in this regard indicate a direct correlation (Yan & Ding, 2009). Thus, the top of the heap is captured by moderators. However, it is interesting to find a few actors at the top of this stack who do not possess a high degree. On further inspection, I find that these actors engage with other actors who have the following characteristics – (1) Are highly prolific and experienced members (2) Others who are potentially equal in terms of authority and power within the community (possess a similar degree and betweenness score), however, engage in discussions that aim to create rapport among other community members, thereby attracting many other highly prolific members. Such an ordering not only helps to understand more intricate patterns of engagement but also helps to understand how strategic positioning and engagement may impact one's

influence and role in a community (Rehm et al., 2016). The more expert echelon of the community in their effort to mentor and nurture, lose out to these strategic positioners as per the PageRank metric, since they (the experts) associate with a wide assortment of members, many of whom have no influence and are newcomers. This observation also helps to unpack the way in which the relational perspective aimed at nurturing and growth that the more experienced members chiefly serve, can actually dampen their power and influence in the community due to the lack of reciprocal exchange with other members who occupy similar positions in the community (Hardy & Van Vugt, 2006). Overall, some pivotal themes emerge as part of this exploration, as subsequently discussed. In r/ggw, we see the emergence of caregivers and community experts, who wish to engage and encourage participation, discussion, and collective empowerment and nurture support-seeking behaviors. We also see an emergent arc of purpose which revolves around collective action, advocacy, and a call for co-liberation that is bolstered by key actors in the community. Thus, there is strong evidence of care practices and an underlying urge of establishing a strong spirit of relational orientation in this virtual arena.

Insights from r/csc

Akin to the method followed for inspecting r/ggw, in this case, I report key observations from r/csc. First, on investigating the key actors by betweenness centrality, it is interesting to note that the top position is held by the automoderator. This can be attributed to the fact that this automated agent acts as a knowledge curator in some ways, by periodically enforcing norms of participation and acceptable contributions. The reason why it has high betweenness is due to the fact that in several posts, the automoderator acting as the gatekeeper helps to remove, delete and control the flow and traffic surrounding several threads. This depicts a form of control that automated agents execute in the way in which they embed themselves within a community

147

(Jhaver et al., 2019). Other actors who rank highly as per this metric, engage in conversations around survival strategies providing practical guidance and information that can help enhance job satisfaction and performance. The nature of advice, however, depicts a more objectified stance and focuses more on the individual rather than the way in which the individual is embedded within the collective (in this the technical workplace). For example, a post stated: "*1. Unlikely. There is no official definition of 'intern'. 2. I'm not sure why you can't do both positions that you find aligned with your goals. Apply for jobs while you're in school. Take one if offered, otherwise, finish your education.* ". As this post attempts to convey, the goal here is to help those who are facing struggles of acclimatizing to the technical workplace to develop resilience and find practical solutions for managing their careers. Often, these contributors also provided clarifications about policies in the technical workplace (especially those related to ethics and hiring practices in relation to diversity). Thus, portraying their deep embeddedness and tacit insight into the way in which the social fabric of the technical workplace functions. Such insights provided vital insights into the more implicit norms of such a workplace, further highlighting the use of such channels.

Adding to these objectives, these members also establish their authority when conversing with others and often attempt to control the way in which others communicate on the platform (Reyes & Bonnin, 2017). For example, in response to a forum member who expressed concern over receiving downvotes, an actor who ranked high as per the betweenness centrality metric, chided them by saying – "*I downvoted since you complained about it*". In a sense, it also captures how these key actors, who come to these forums with experience and wisdom, can often perceive themselves as those who structure and enforce the norms of the collective (Reyes & Bonnin, 2017). In this case, that manifests in the way in which one can contest voting rationales. It also

captures how a form of toxic masculinity manifests in these forums and is exhibited by key actors, wherein any discussion beyond the standard knowledge-centric focus is usually discouraged (Parent et al., 2019). Such actions can also have a negative impact on the way in which people participate and engage in these forums and could possibly be one of the reasons the reciprocity and transitivity scores are lower since members may not feel a deep connection and attachment with others in this space or may feel unwelcome (May et al., 2019).

Inspecting the top actors with respect to closeness centrality reveals that the actors who rank high as per this metric usually post in relation to topics associated with *s*truggles of *impression management*. Such posts usually get a lot of attention from community members, as it is well documented that the expectations of the technical workforce can often seem daunting and dampen the self-belief of new entrants to this field (Begel & Simon, 2008). For example, the top actor in this category, posted only a few times, but all their posts had mentions of struggles and challenges and received widespread attention from the community, which also explains the high closeness centrality score. An example post stated: "*I have been working endlessly on this task but nothing is helping me. Further, the person who was assigned to help me is very judgmental, he raises his voice a lot and makes me insecure. He said to others that he thinks that I am incompetent so I wanted to prove him wrong. But maybe he was right.*" Community members came together and offered strategies aimed at self-care, options for alternate career pathways, and opportunities for self-development. The high closeness value indicates that community members feel a call to support those experiencing such struggles and want to provide objective guidance that the individual can undertake (Johri & Yang, 2017).

In terms of the observations obtained from the PageRank metric, topically no new trend of engagement was observed. Interestingly, nearly all top 20 actors as per this metric also align with

the top 20 actors as per the betweenness centrality metric. This shows a possible close

association between the two metrics as other similar investigations have also proposed (Yan &

Ding, 2009). The only striking difference in this context was the involvement of another

automated agent employed. This is because this agent only generates threads for specific topics

and encourages participation in those threads. Thus, when other influential actors participate in

these discussions, they also share their influence with this agent. Unlike automoderator, it does

not engage with other members in any way. Its only functional task is to create separate topical

threads related to a diverse spectrum of topics (such as ranting, venting, interview preparation,

and so forth). In doing so, it attempts to create a separation across different topics. One may

ponder why this agent does not appear in the ranked list as per the other metrics, but that is due

to the lack of outbound edges that can help it to bridge with others. In graph-theoretical terms,

this node can be seen as a sink and thus will not contribute to the flow of information across it.

This activity trace helps to not only provide an example how why PageRank is an effective tool

for inferring insights associated with participation, especially capturing edge directionality, but

also helps to provide an understanding of the type of organization and knowledge management

that is happening in these spaces and the role of automated agents in this regard (Pääkkönen et

al., 2020).

It is interesting to observe, that those who rank highly as per the betweenness and PageRank do

not capture similar positionality with respect to the closeness measure. In fact, only a handful of

these actors appear in the top 20 as per the closeness list. This again could be likened to the

development of topical expertise and a set rhythm of participation, which helps these actors to

accrue authority, control, and influence (as indicated by PageRank and betweenness) but renders

them a bit far from others in the network. These actors (those who capture the top spots as per

betweenness and PageRank) thus assume power and influence and center the nature of knowledge production and consumption in these collectives. Further, the existence of automated agents that wield influence over who, what, and how participation happens, could also potentially be the reason for the higher centralization score at the macro level. Additionally, as explained during narrating the observations associated with betweenness centrality, there are a few actors who exert control over the actions of others and attempt to direct the type and nature of conversation, these actors too could potentially add to making the network more centralized and focused around them. Thus, we see a potential mixed influence on centralization by both human and non-human actors, which can have important insights into the way in which such actors drive the emergent group dynamics (Pääkkönen et al., 2020).

Insights from r/cw

Interestingly, the group culture that is captured through the activity traces from r/cw, bears a close resemblance with the insights gleaned for r/ggw, yet there are subtle differences. Using the metric of betweenness centrality, I find that the top actors participate in conversations that revolve around the themes of *survival & empowerment,* and *community preservation.* These actors act as bridges by spanning key themes that are closely linked with developing a stronger sense of collective purpose and aim to usher in a communal perspective. Several of these posts encourage other women participants to contribute and also validate them for holding their ground and expressing their struggles in an attempt to embolden and empower others in the forum. Such posts also offer valuable strategies for handling relational tensions and friction that may arise, all of which can fall under the category of *Survival tactics.* Some of these posts also express solidarity with others in the way one learns to deal with toxic workplace regimes, resilience strategies, and how one learns to strengthen oneself (Gilligan, 2014). Many of these posts depict

characteristics akin to the concept of resilience through resistance (Ryan, 2015). For example, one post stated – "*Yes often, my ideas get repeated back to me by a man, I have learned to ignore and smile'.* Such discussions depict a sense of resolution and drive, even in the face of adversity that may dampen their sense of self or make them feel undervalued in the everyday context (Ryan, 2015). These posts not only offer solidarity but also help to provide strategies on how to protect one's self-esteem in order to counter the dampening effect of such exclusionary practices that one may have to encounter in the workplace (Shay, 2014).

In terms of closeness centrality, many of these posts revolved around strategies and tips to understand the norms and expectations of the workplace. The top themes were centered on struggles with *impression management*, *resource sharing,* and *reflection on ethics.* These issues as discussed by actors who score high on the closeness centrality metric depict a keen interest in discussing, deliberating, and sometimes contesting the norms of presentation, perception, and conduct that women have to follow and endure in order to survive the habitus of domination that manifests in the workplace (Kronsell, 2005). These posts depict the struggles, frustrations, and collective condemnation of the behavioral aspects associated with the gendered habitus (for example, women being expected to be docile, polite, and obliging) (Miller, 2016). An example post in this regard stated – "*The challenge is that a woman's aggression is viewed differently than that of a man. Men can express themselves how they like, but if women engage in such behavior, it is considered emotional and un-equipped. To deal with such circumstances, you can politely criticize, but try not to complain.*" Thus, in a way, these posts capture how in this community closeness is expressed in situations that entail discussion, deliberation and involve learning the art of surviving and subverting the gendered habitus (Fiesler et al., 2016).

Finally, in terms of the PageRank metric, the ranking order bears a close connection with the one captured through the closeness metric. Those who rank in the top 15 as per this metric, participate in discussions that attempt to validate and encourage others to share successes, and achievements and motivate the community. Thus, these posts capture how women desire and often act as pivots and guiding figures for others to strive and persevere through the structural limitations that may impair their extent and ability for professional enrichment (Ibarra & Petriglieri, 2010). Further, other actors depict a strong communal orientation and a desire for nurturing interpersonal rapport, as one post stated – "*Happy to talk about anything, DM me*". These themes capture how influence is developed and cultivated in this forum. Influence captures the essence of creating parity and cohesion among group members, expressions of solidarity, validation, and moral support (Andalibi et al., 2018). Akin to this, it is also interesting to observe that some of the top actors (especially those who rank high as per the betweenness centrality) tend to interact on similar posts and often respond to each other's contributions. This could also potentially indicate the reason for the higher assortativity values for this channel.

In a sense, actors in this space not only capture a topical dimension situated on collective empowerment but also associate with others in these topical clusters, depicting a collective stance towards topical specialization and further indicate a strong sense of affinity and parity. Overall, we see that there are some core objectives of the key actors that help to set the tonality of contribution in this space. These actions center on strategies for self-preservation (including maintaining one's image and persona in the professional context), resource sharing for career enhancement, and finally a keen sense of togetherness is expressed and exchanged through the encouragement of disclosure, validation, and solidarity.

4. c. ii Psychosocial Portraits Across the Three Forums

The insights derived from the network analysis can be helpful to gain insights into the actions that help to set the ground for the way in which practice is crafted and maintained. By marrying macro-level insights with deeper qualitative network investigations, I have thus far provided an account of functions that emerge and thrive in these virtual outlets. However, as motivated earlier, understanding the more latent and deeper psychosocial motives can provide a more insightful account regarding how members of these spaces carve out the way in which the habitus operates and construe their positions along it. Thus, the goal of this section is to borrow the psycholinguistic analytical lens captured from the LIWC attributes and involves understanding how the relational fabric of this community is captured in the way in which the community members participate and contribute. Inspired by prior scholarship by Decter-Frain & Frimer (2016) and Sengupta (2021), that highlights an emergent separation in the nature of relational integration and outlook, the goal here is to capture the extent to which such relational separation can be used to further explore the way in which the different communities operate. The use of this framework is further justified by the fact that all the prior macro-level investigations as well as the insights from the network centrality measures indicate such a relational separation existing and emerging as the key distinguishing factor across the forums. Thus, using this framework is helpful to scope my work theoretically and empirically.
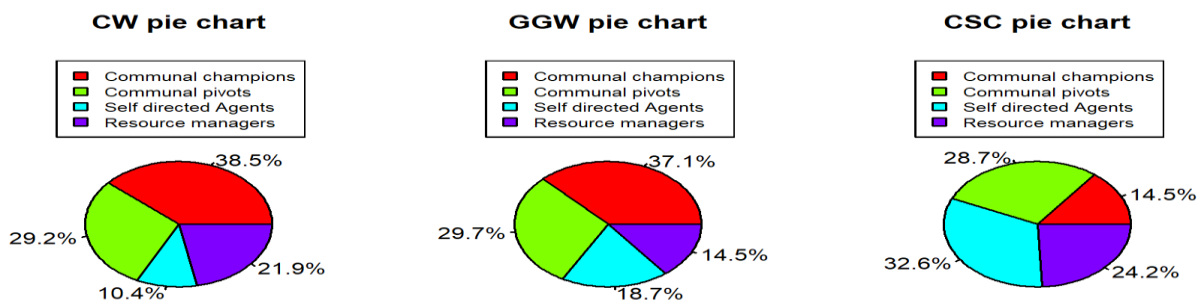
Figure 7: Distribution of psychosocial portraits across the three forums

154

As explained earlier, to investigate this aspect of the exploration a clustering approach was used on a subset of themes drawn from the set of categories highlighted by Decter-Frain and Frimer (2016) to capture the essence of agentic vs communal action in these communities. The results from that clustering approach yielded 4 distinct psychosocial portraits that further delineate the nature of roles that emerge in these spaces. These include (1) Communal champions (2) Communal pivots (3) Self-directed agents (4) Resource managers. Investigation of these four psychosocial profiles reveals a spectrum of communal vs agentic attributes, with champions ranking the highest in communal linguistic markers, followed by pivots. The two categories of self-directed agents and resource managers rank higher on the agentic spectrum. This observation extends the binary segregation of the relational perspectives postulated by Decter-Frain & Frimer (2016) to a more continual spectrum. Such insights are akin to observations made by Sengupta (2021), highlighting how three models of engagement emerge, while one category captures a more communal essence and the other more agentic, a middle category emerges that blends the two perspectives, capturing expertise in both community and domain-specific knowledge. Further discussions and descriptions of these profiles are as explained below:

1) **Communal champions:** As the name of this category suggests these actors really drive the cause for collective affinity development in the forums. In terms of the linguistic markers (using the centroid scores for each of the underlying LIWC attributes), I find that this category is characterized by a greater sense of function words (such as we, assent, pronouns, and affiliation) that are indicative of strong group bonding and cohesion (Tausczik, Y. R., & Pennebaker, 2010). Further, it is also characterized by a greater social outlook, with a very strong indication of prosocial behavior. According to Boyd et al. (2022), the category of prosocial captures the essence of helping and nurturing others. Akin to this observation and as observed at the macro

155

level and supported by prior work from Iosub et al. (2014), this category is also associated with affect, positive emotion, and markers of social processes. All these indicate that this category of actors depicts a strong affiliation with the collective (captured through the strong presence of the affiliation construct), is highly embedded, and fosters a sense of collective collegiality with others in the group, which has also been posited as describing features for actions of women in collaborative endeavors (Hu & Kearney, 2021). Building on the LIWC insights, I further explored the conversation traces of actors who belong to this group and to understand how this category spans across the forums.

Based on my investigations, across all three forums, the actors who belong to this category capture deep wisdom about the nature of community, and the type of knowledge produced and curated, and strive to enhance the development of a collective spirit. Based on figure 3, there is a high prevalence of this category in the women-centric forums, so on investigating further, it is evident that those in these spaces (especially in r/ggw) are focused on championing the goals of inclusivity and collective upliftment by empowering, advocating and calling for collective action. For example, an actor belonging to this category stated – "*I am going to participate in a meetup for women and non-binary folks in computing soon, I would encourage others to consider participating as well*". Further, in this regard, depicting a drive to preserve community, actors who fall in this category, also help to nurture discussions on the issues of ethics and inclusivity in the technical workplace, while also ensuring that the conversations adhere to the norms of the community and encourage multiple standpoints and opinions (Preece, & Maloney-Krichmar, 2003). In doing so, these actors further portray their commitment to the community and maintaining community values of transparency and equivocality (Weld et al., 2021). For example, in a conversation on diversity practices and hiring in the technical field, one

156

actor belonging to this category stated, "*I completely agree with all views here, but the goal of this thread is to think about whether men and women should be required to have the qualification level for a job in the technical workforce?"*. This post urges the importance of thinking about the position of women and the requirements that women are subjected to that might create barriers to entry, at the same time clarifying the objective of the question so that the responses can focus on the central agenda. This shows that in addition to acting as advocates, actors who fall under this category also act as negotiators and mediators, which further amplifies the point about their embeddedness and possession of tacit wisdom about how the community functions.

In many ways, these actors aim to instill confidence in those who may feel weighed down by the habitus of domination that manifests as discriminatory practices that one may encounter in their professional pursuits (especially in the technical workplace). For example, in a thread wherein a community member of r/ggw shared and vented their struggles about finding a voice and the challenges they have faced in career advancement and finally achieving their goal, an actor in this category encouragingly responded by saying, "*CONGRATS on your promotion! So happy to see you shine! Seems like you are totally killing it!*". Statements of validation and encouragement were common across (both r/ggw and r/cw). For example, an actor in r/cw, stated, "*Good for you! I appreciate how thoughtful you were about this job move and it's a great learning experience for the future. I'm excited about your next gig, all the best to you"*. Those who fell under this category in r/cw, akin to the ethos of the community, engaged in conversations aimed at providing strategies and tips for navigating the organizational habitus, thereby imparting their experiential wisdom and in a way attempted to engage in acts of tutelage and nurturing (Dillard, 2016). For example, in a post, addressing concerns about reacting to criticism, an actor stated, "*I*

would suggest thanking him for this feedback and also saying that you are happy to discuss through the feedback. It shows that you have an open-door policy and are open to conversation".

All these activities indicate that those in this category, use their wisdom and commitment to the community as a way to mentor others. Such mentoring actions are further substantiated by actions that attempt to connect users to each other. For example, an actor in this category mentioned, - "*I am not so good at this topic, but I know another who is, I will connect you with them".* The extended nurturing was also evident in conversations such as – "*You should definitely participate in this event, they are a great bunch, nothing to be afraid of".* Such conversations aimed to encourage community members to actively seek and connect with one another, the bridging actions further amplify the attachment that these actors have with the community and the way in which they manage the knowledge capital curated in these spaces (Hall & Graham, 2004). Also, in checking how many actors in this category overlap with the top 100 actors for each of the centrality measures, I find that the percentage of overlap is highest across the centrality measures of betweenness and PageRank, for r/ggw and r/cw. This indicates that this category of actors plays a central contributing role in the way in which these communities' function and are key to sustaining the template of practice followed. In terms of r/csc, while this category does not have a great overlap with the sets of actors across the three centrality measures, I find that several key actors (for example Automoderator) fall into this category. The lack of potential match could be indicated by the greater agentic orientation of r/csc as indicated in Figure 3. However, the fact that key actors especially automated agents score highly as per the betweenness and PageRank metric fall into this category, also indicates how automated agents play a critical role in absorbing communal wisdom and get embedded

within the community. Their role in controlling traffic could be likened to a deeper sense of the norms of the community and thus through such actions, they also emerge as highly communal entities.   In a sense thus these actors can be perceived as leaders who play a key role in propounding key topics and play a fundamental role in crafting the action space of these communities (Faraj et al., 2015).

2) Communal pivots: These actors in the linguistic frontier share quite a few aligning attributes with the category of communal champions. Second to champions, in terms of LIWC attributes, this category of actors is also characterized by a set of markers associated with group, community, and gendered expressions as indicated by Iosub et al. (2014). However, the most pronounced and distinguishing for this group are cognitive processes that capture a keen sense of thinking, especially through the category of insight. Such a category depicts deeper intuition, wisdom, and understanding (Boyd et al., 2022). Also, second to the category of self-directed agents (which shall be described next) linguistic markers such as the use of pronouns such as 'I', and expressions of achievement also characterize these contributions, to a large extent. Thus, in the communal-agentic spectrum, these actors are further along towards the agentic end as compared to champions, but less than the other two categories (self-directed agents and resource managers) and capture a middle ground of psychosocial motives that manifest in these spaces. These actors thus play a strong role in balancing the communal and agentic aspects that set the pattern of contributions associated with these spaces and thus are termed as pivots. The strong cognitive dimension could indicate acts that require more cognitive effort, such as thinking and knowledge sharing in a group, akin to a collaborative learning setting, as has been observed in prior investigations by Geng et al. (2020). A key conversational analysis is presented to further elaborate on these observations.

Akin to the idea of collaborative learning, these actors participate in collective sharing and engage in collective efforts to enrich and empower one another, by boosting professional development outcomes for those engaged in these spaces. While a large percentage of actors from r/ggw & r/cw fall under this category, one can also observe a strong presence of this category in r/csc. Looking at activity traces first from r/ggw & r/cw, I find that the actors in this category, aim to foster communal affinity by proactively encouraging engagement and collaborative endeavors towards knowledge-centered empowerment and participation in events. For example, an actor in this category posted – "*I am studying algorithms and it is a topic I feel many might be presently studying, struggling with. It would be great to have someone to study this with. Although not sure how much I can contribute! If anyone wants to join, my DMs are open.*" This conversation captures how these actors attempt to create opportunities for collective learning and engagement. Collaborative learning can also involve acts of encouraging and validating each other, to express a form of togetherness and value contributions from different team members (Sun et al., 2008). Such forms of encouragement were also evident in conversations associated with actors in this category, who stated – "*I completely missed that aspect of the exercise, you are so correct about this clarification, I wish you luck and hope we can both get our results soon*". Such posts also depict how actors in this category, create a sense of parity and synergy and attempt to encourage, reinforce and motivate each other, capturing how cognitive acts and care together create the contour of learning practices crafted in these channels (Sun et al., 2008).

Knowledge-seeking was also a central theme in this context. For example, a post in r/cw, seeking advice about navigating the professional context stated – "*I am a bit anxious about my new job. I am concerned if I will be able to complete all the work that I am allocated and/or any challenges*

I may face. Any advice and suggestions as I transition into my career would be greatly appreciated". Another such example, as captured from a post from r/cw, expressed frustration over not being able to acquire a job and urged others for support and advice, this post stated, "*Hi all, I prepare extensively, I try but best, but am not landing any offers. I feel rather flawed and am losing hope. Why are these companies denying me, where am I going wrong?*" Such posts, not only capture an intent of connecting and information seeking but also show how many of those who are associated with this category, essentially are facing concerns with impression management and aim to use the resources curated in this community as guidance (Chikersal et al., 2017). Essentially, such conversations aim to tap into the social capital of these spaces, in doing so they show an understanding of the community, a belief in the community as an avenue for help, recourse, and advice, and an intent to bond with others in these spaces while also enhancing their own personal objectives (Ellison et al., 2014).

Akin to the cognitive dimension that characterizes this category, the presence of the theme of certitude can be captured in the way in which people expressed a certain extent of certainty while attempting to mask a certain degree of uncertainty (Boyd et al., 2022). For example, a post in r/csc stated – "*I have tried the best I could, beyond that I'll just wait for the results".* Associated with such messages, were also posts that captured a deep sense of reflection, insight, and inner wisdom, manifesting in the form of spiritual or moral discussions (Sengupta & Semaan, 2021). Such spiritual essence was often captured in the way in which these actors attempted to heal from failure while also encouraging others in the community to become more resilient (Vaast & Levina, 2015). An example post from r/ggw capturing such sentiment stated – "*I have resolved to keep going on with my life, no matter what the outcome, it would be rather painful otherwise, we learn and we move forward".*

When looking at the centrality metrics, for betweenness and PageRank, I find a large proportion of overlap, although less than that of champions but greater than the other two categories (self-directed agents and resource managers) for both r/ggw & r/cw. It is interesting that for r/ggw & r/cw, this category of actors shares the maximum overlap with the list of top actors in the closeness centrality list. In r/csc, for closeness, while the extent of overlap is not as high as compared to the categories of self-directed agents and resource managers, I find that many of those who rank at the top of the closeness list also fall into this category. This could be attributed to the fact that a large proportion of engagement associated with these actors (those who belong to this psychosocial profile) revolve around dealing with failure, struggles of *impression management,* and seeking help during such times. As alluded to before, this theme is very evidently linked with closeness across the forums and thus, this observation seems salient and insightful. In conclusion, pivots are communal and agentic, through the fusion of these characteristics, add to the communal endeavor and expand the pool of expertise. Further, these pivots also act as pillars for support, and advice and thus form the backbone of communal enterprise across the three forums.

3) **Self-directed agents:** These actors tip to the more agentic side, in the communal-agentic spectrum. Thus, agentic attributes are more prominent when investigating the associated LIWC metrics for this category. These actors have a high indicator of cognitive processes (higher than that of pivots), especially in the certitude category. Further, a strong presence of agentic indicators such as the use of 'I' was also observed. Interestingly, this category has a high manifestation of discrepancy. This theme of discrepancy indicates that there is a disparity between the two states of existence (Boyd et al., 2022). It captures the essence of conflict or some form of dissimilarity (Boyd et al., 2022). While the social markers such as emotion, and

feeling are also salient, these are less prevalent as compared to the categories of champion and pivot. Key conversational insights are presented below:

Interestingly, this category was highly present in r/csc, as compared to the other two categories. On investigating the trends, it is evident that those actors who fall in this category, usually use examples from their experiences and lives to share or inspire others in the community. It in a way emphasizes individual experiences and differences, which can also be important to ensure that everybody feels welcome in the community (May et al., 2019). Such posts usually attempted to provide more insights into how the organizational context, especially the technical workplace functioned and thus were often prefaced with *"I would" or "From my experience"* – which is why these seem so salient in the agentic dimensions of LIWC. An example, discussing ways to counter procrastination stated, "*Procrastination affects me too, I have found diving and setting priorities to my work very useful. The key for me is to set routines. But everyone finds a different route, this is what I do and find works for me"*. Such posts reveal an intent to help, however also signal a sense of precaution while giving advice to ensure that personal preferences are made evident, capturing a sense of self-regulation and monitoring of speech (Dunn et al., 2014). Such kind of self-regulation can also be a cause for the higher cognitive dimension (Dunn et al., 2014).

A major observation associated with this category is that one of the actors is a moderator on r/ggw. While this might seem counterintuitive, on investigating the activity trace associated with this actor, I find that this actor often shoulders the responsibility for enforcing norms for post removal and usually words their response saying – "*I feel posting such content is against a rule for this forum. I shall discuss further with admins and take necessary action"*. Further, beyond being a custodian this actor also engages in self-reflective conversations saying, *"I always feel I am the only one, yet on further reflection, I have realized that there might be others who might*

be struggling just as I am". Such comments further reinforce the cognitive aspect and also portrays a way in which individuals try to reason their position within a larger collective.

Thus, in a sense, such forms of phrasing may seem detached from the collective, yet latent in them is a core commitment to helping others, while also ensuring that the individual aspect of one's rationale is highlighted and signified. Interestingly, in r/csc, for all of the three-centrality metrics, there is a significant proportion of overlap of actors, this highlights that while this forum is framed around a highly agentic perspective, there is also an underlying communal motive to share the individual's perspective for a larger collective good (Wu et al., 2016).

4) **Resource managers:** In terms of LIWC attributes, these actors present an interesting mixture of psychosocial markers. The most distinguishing attributes that help to carve the boundary of this category include the markers of perception, work, leisure, and money (Boyd et al., 2022). It is also interesting to note a high agentic presence in this category. Second to self-directed agents, the use of several function words that indicate an agentic disposition was observed (Decter-Frain & Frimer, 2016). Out of all the four categories, this one ranked the lowest in capturing any effects of community (group cohesiveness, emotion, feeling, social orientation). All these indicate a very clear objectified existence and focus on the self. Further explanation of these themes and their association with this category will be unpacked using activity traces from the forums.

On careful inspection, I find that across all three forums (r/csc, r/cw & r/ggw), these actors engage in conversations associated with sharing references and links. For example, one actor in r/cw posted – "*There are two components of success, networking, and knowledge. In this article series, I discuss tips and tricks for developing yourself and finding the right people to connect with. To read more, check out this link".* These posts also help justify the strong presence of the

perception category, as evident in this conversation, there is a strong intuition and experiential wisdom that comes forth (Gray et al., 1997). Perceptive remarks reveal an intent for not only sharing one's materials and promoting one's work (which is a very agentic action) but also an understanding of the goals of the community and aligning content accordingly. Such endeavors may induce cognitive effort, which is further captured in the dimensions of perception. While the communal intent is more subtle and subdued, sharing resources can also indicate a desire for helping the community grow and can stimulate knowledge growth within these spaces (Hall & Graham, 2004). An example comment in this regard in r/ggw stated, - "*Hello all, I just watched this podcast and really linked the tips and strategies, here is the link if anyone would also like to give it a try".* Such posts are highly agentic in nature (given the focus on the self) and an assertion of one's own likes and dislikes. But still have a communal outlook in terms of caring for others with sharing resources that may benefit others (Cross et al., 2017).

Interestingly, there were a few automated agents, spanning the different forums, that participated by sharing links or updating links that were not correctly provided by others. Thus, in a sense, they help to curate and retain information, while only engaging by providing references. Notable in this regard, is an automated agent (not automoderator) that (as discussed before) only engages in the r/csc community by creating threads and urging others to post to topic-specific discussions. Further, this seems to be a common trend of participation in r/csc, many actors who rank in this category (in that forum) often share links to resources for career preparation, and conceptual materials, in addition to providing guidance on how to navigate technical careers. Such forms of sharing depict an on-demand learning and sharing outlook, which is more impersonal and captures a weaker association with the group (Budhathoki & Haythornthwaite, 2013).

165

In terms of the three centrality metrics, in r/cw & r/ggw, the percentage of overlap with the set of top actors is nearly negligible. This further indicates the greater communal and collective affinity cultivated in these spaces. In sharp contrast in r/csc, this category represents the largest extent of overlap for all three-centrality metrics. This further corroborates the observation that the nature of knowledge production and sharing in this space is by nature more agentic and akin to that of a crowd model of association, where a greater sense of collective purpose and fellow feeling is nearly absent (Haythornthwaite, 2009).

Having concluded the discussion on the emergent psychosocial dimensions and how they align with the content and network investigations, in the next section I summarize key observations that may help to capture essential dimensions of synergy and distinction across the three forums.

4. c A summative comparative discussion

This concluding narrative attempts to coalesce the different streams of investigations discussed. The goal thus is to provide the reader with some key observations (discussed before) to highlight their importance for the comparative investigation and also help to bridge these key findings with the discussion that shall commence in the next section. These key themes include

- A clear distinction between the collective practice of the general forum and the two women-centric forums.
  - This is evident in the nature of conversational themes and the way in which they manifest. Particularly, using the example of *survival & empowerment,* while the women centric groups depict a collective orientation and communal outlook, the general forum captures a more detached, impersonal, and isolating approach to calls for support.

o The nature of roles and their patterns of engagement within the community differ. For example, in the women-centric forums, the roles of champions and pivots are more prevalent and occupy central positions in the emergent network structure. In contrast, the general forum is dominated by groups that are more agentic in focus. Important in this regard is that some actors who participate in r/ggw and r/csc seem to assume a new more agentic disposition in r/csc. While in r/ggw they participate in conversations on *reflection on ethics* and fall into the champion category, in r/csc, their role corresponds to that of a self-directed agent, depicting more caution and less mention of issues of identity and struggles that marginalized groups face. This further highlights the agentic focus of r/csc, as greater collective bonding around the structures of oppression is absent and replaced by a detaching, isolating, and impersonal approach toward the exchange of information and knowledge.

o The network measures at the macro and micro level also corroborate this distinction and difference in relational focus. For example, using the network-level measures of transitivity and reciprocity, the women-centric forums offer a richer communal outlook than r/csc. Further, on investigating the actions of key actors at the micro level, those in the women-centric forum are focused on community building, empowering, and validating one another, whereas those in r/csc take a more agentic outlook and provide more practice and informational guidance. Deeper and more provocative discussions around gender, identity, and expression do not capture the essential patterns of discourse in this channel (r/csc).

o Building on the above point, both network, and psycholinguistic markers capture the effects of automated agents in r/csc. Automoderator assumes the central role and even falls into the champions category, due to its central position and impact on controlling the conversations of the community. Similar inferences can also be extended to another automated agent that only creates new topical siloes to manage the way different topics and discussions commence. Role-wise, given that it only participates in creating new channels of conversation and does not partake in gatekeeping, it falls in the resource manager category. Yet, while similar automated agents exist in the women-centric forums, human moderators hold more central positions (as in r/ggw) and exercise more control over automated agents, assume responsibility for their actions, and are overall more engaged with the community.

o Differing mentoring patterns and styles emerge. The style in women-centric forums is carried out in a more personalized, communal, and collective way, expressions of parity and solidarity being chief indicators in this regard. The style in r/csc shows a more impersonal approach, akin to the way in which masculine styles of mentoring may also depict symbolic forms of oppression and domination (McKeen & Bujaki, 2007).

o In conclusion, all these observations support that between the general and women-centric forums, several distinctions occur that signal a difference in relational outlook and collective identification.

● Between the women-centric groups (r/cw & r/ggw) similarities are many, but key distinctions also exist:

o Based on content themes, it is evident that while r/ggw takes a stride towards collective empowerment and questioning the status quo of the technical workplace (manifesting as conversations around *reflection on ethics*), r/cw takes a subtle subversion, akin to the theme of resilience through resistance approach (Ryan, 2015). Thus, the conversations in r/cw depict strategies to develop the strength to counter actions that may dampen one's spirit. Further instrumental advice on how to perform according to the norms of the workplace, depict another such strategy, akin to the stance of resilience through resistance. This is further corroborated by the observation that several of the key centrality metrics indicate that top actors in the community also engage in conversations akin to the theme and collective purpose of learning to adjust and align with the expectations of the organizational habitus.

o Further amplifying the above-stated distinction is the observation of greater moral psycholinguistic markers as observed in the conversations of r/ggw. This further strengthens the stance on advocacy and call to action as this community depicts.

o Interestingly, many of the actors who exist in both these spaces display similar patterns of engagement. Most fall into the category of pivots.

o Yet, a point of distinction with regard to role formation is the category of resource managers. There is evidence of this role manifesting to a greater extent in r/cw as compared to r/ggw. This also shows that r/ggw is a more focused community, with a clear mission and purpose, whereas r/cw is more open with a larger spectrum of possible action and engagement.

- o Overall, this comparison highlights how calls for justice and care can blend yet assume completely different collective orientations, as evident in the differences between conversation focus of the two women-centric forums.

Having summarized the essential takeaways and key characteristics of each of the three forums, the subsequent section will discuss how these empirical dimensions add to the theoretical premise of this dissertation.

5. Discussion

5. a Section Goals and Objectives

The previous sections have highlighted several different facets of this dissertation. Section 1 has laid the foundational stone, 2 provides the theoretical and empirical stage of prior scholarship that this dissertation pivots on and is guided by, 3 provides a detailed overview of the key methodological paradigms and their rationale of application, and 4 provides a detailed account of the results. This fifth chapter blends the empirical insights of this work with the key pillars from extant literature to complete the narrative and provide a deeper understanding of the implications and merits of my dissertation in the context of the larger scholarly arena.

The key goal this dissertation set out to capture was to understand how the collective practice of virtual spaces can provide an alternate stage for extended participation and how such a stage can offer conduits of expression and collaboration for historically underrepresented groups such as women in the technical workforce to develop and sustain their occupational identity (Ashforth & Schinoff, 2016). In order to capture the nuances of emergent communal practice and how these impact an individual's ability to thrive in these spaces, I set out to provide a comparative view of

three different forums - to understand how the collective identity nurtured in these spaces may impact the way and extent to which actors participate in these spaces.

The key objective this section serves is to establish, using the empirical findings unpacked using the various methodological toolkits and levels of analysis presented in sections 3, and 4, how the emergent habitus or collective practice can be understood. Building on insights by Decter-Frain and Frimer (2016), one of the central findings from the analysis is the communal-agentic spectrum that dictates the locus of action and participation in these communities. Yet such observations may contextually vary. For example, in my case, the communal vs agentic orientation might be influenced by the aspect of gender, and occupational identity in addition to intergroup dynamics of collaboration (Iosub et al., 2014). The findings of my analysis further expand this ontological separation, by establishing such binding attributes exist as a spectrum instead of a clear binary separation.

The dynamics of the emergent online habitus may display an intricate blend of multiple kinds of overlapping practices that in their combination may craft a complex yet distinguishing identity for each online community (Sengupta, 2021). Thus, the goal of this portion of the narrative will be to carve out the emergent habitus using a blend of theoretical and empirical markers. Essentially the aim is to discuss how relationality emerges in these forums and the way in which such relational characteristics impact the way in which these communities develop and nurture different forms of communal expression.   Further, the outcome of such a habitus or practice within which individuals are enmeshed is the nature of participation or the way in which community members attempt to configure their ontological security within the confines of the community dynamics. Such a sense of security can be essential for one's survival and feeling of belongingness within such virtual units (Lucero, 2017). Akin to the notion of the duality of

structure, we see how the emergent habitus and the associated relational perspective may impact certain outcomes and in turn, such outcomes can also shape the way in which the collective practice is defined and sustained.

The practice of care is also deeply intertwined with the habitus and the relational fabric each community carves out. In a way, it is a function of the type of habitus or collective practice that is nurtured and sustained. Through the analysis and the relational spectrum, we can infer differing perspectives and kinds of care that emerge in these spaces. In this regard, the goal will be to build on the distinction between ethics of care and ethics of justice and to further highlight how the moral habitus that is likely associated with relational perspectives, may help to capture the collective values that drive the norms laid out in these channels (Gilligan, 1993; Martey & Stromer-Galley, 2007; Saatcioglu & Ozanne, 2013). Thus, the second theme of discussion in this portion of the narrative shall delve further into how care is performed and contextually situated within each forum.

While understanding the habitus is essential, it is also integral to understanding how a habitus or collective practice is sustained and the associated labor perspectives that may be involved (Li et al., 2022). While prior work in this regard, has investigated the premise of emotional labor of moderators (Dosono & Semaan, 2018), the goal of my discussion on this topic is to expand the focus from emotional labor, to also look at other actors and their contributions toward enriching the community in various different ways. Through the psychosocial portraits, laced with key observations from the network investigations, my goal will be to unpack the way in which key actors exert influence and control. In doing so, I also discuss the application of other forms of related concepts such as relational labor and emotional labor and work. Using such concepts, the goal is to further enrich and expand the understanding of the task of maintaining online channels,

especially that of nurturing and sustaining care practices, an arena that to the best of my knowledge yet remains underexplored. Blending such discussions with the communal-agentic relational spectrum provides a more nuanced view of how a stronger commitment to community can entail more toil, emotional labor, relational labor, and emotional work for the community members, which can call for a deeper need for assessing the sustainability of online forums through the lens of labor (Lopez, 2014).

Finally, it is essential to recognize that a virtual community is a sociotechnical resource and thus the technical dimension is important to be discussed in conjunction with the social processes. The habitus may be impacted by the nature of technical features that scaffold virtual avenues. Yet, the habitus or the collective practice may also ascribe meaning and importance to such tools, rendering their purpose, and communal embeddedness unique yet impactful (Jhaver et al., 2019). When viewed through the perspectives of adaptive structuration theory (expanding on the pivot of structuration theory), such technical artifacts embody the spirit of the developers and their visions about the use of the system, whereas the social facet or the way in which group processes develop around such tools can be seen as embodying the appropriation and contextual meaning of these systems (DeSanctis & Poole, 1994). Thus, establishing a reciprocal impact and mutually constituted effect. Important in this regard are the effects of automation and its associated implications. I provide a discussion about the impact, embeddedness, and variations in the appropriation of these agents across the different forums, to further discuss how automated agents play a role in shaping the emergent habitus and in turn, may possess varying levels of control and meaning across forums, which too can have implications for moderation, expression, and participation, especially for historically underrepresented groups such as women (as explored in this context).

Throughout this narrative, including these essential thematic pivots that I shall draw on to structure the discussion on the habitus that emerges, the goal will be to outline the way in which the communal vs agentic relational separation is captured through these conceptual arcs. The goal thus will be to combine the constructivist oeuvre with the discussion on the communal vs agentic relational spectrum to further deepen the habitus conceptualization. Beyond the conceptual grounding, to practically situate this narrative, the goal will also be to provide associated implications for each of the conceptual dimensions. In the concluding portion of this section, I shall provide a summative overview of the concepts discussed and then finally provide some cumulative thoughts toward design and policy implications that combine and build on the implications associated with each of the conceptual arcs. In elaborating on these conceptual arcs, analytical perspectives may repeat, however, their context of application and conceptual situatedness may vary.

5. b. The Conceptual Dimensions of Discussion

5.b. 1 Key Conceptual Foundations to Envision the Emergent Collective Habitus in the Online Forums

The goal of this portion of the narrative is to lay out the emergent habitus or collective practice that manifests in these online avenues explored. Through the different dimensions of analysis, we can see how through the intersection of the gendered habitus, organizational habitus, and the emergent habitus of online community dynamics, a unique set of perspectives, goals, and values for each community is carved out. As described earlier, a habitus can be defined through the combined impact of the positions that the actors in the habitus configure for themselves and the disposition they exhibit when performing their roles. In the context of my analysis, such positions are elucidated by the qualitative insights from the social network analysis. While the

dispositions and associated psychosocial markers are captured through content analysis and linguistic investigations. Particularly, using the combined perspectives from the four emergent psychosocial portraits, their actions (as highlighted through the network interactions), and trends of participation as captured through the content investigations, we glean greater insight into the way in which the habitus is often partitioned and distributed across various groups of actors and actions.

The intersections of these different forms of habitus as highlighted earlier signal that the final collective practice may represent a blending of norms from offline contexts (e.g., norms of the technical workplace, performance of gender in the offline context) and norms that emerge in the online context (e.g., norms of reciprocity, exchange of ideas, disclosure) (De & De, 2014; Vaskelainen & Piscicelli, 2018). For example, several discussions in both r/ggw and r/csc involving communal pivots revolve around communal bonding and establishing virtual peer support for collective learning, exchange of ideas, and engaging in a collective effort towards professional enrichment. Such goals and perspectives are akin to the norms around peer learning and group-centered efforts that are popular in the technical workplace context (Jarrett et al., 2019). Such perspectives from the offline context of the technical workplace, blend with the way in which people engage and share experiential wisdom facilitated by online conversational tools, creating a novel blend of such exchanges and thereby establishing a practice of collaborative learning support in the online context (Curtis & Lawson, 2001).

Further, essential in this consideration is understanding the way in which the gendered habitus manifests in the constellation of various forms of habitus that define the practice of these spaces. In line with constructivist motives, feminist musings in this regard, highlight how the interface of gender and technology is fluid and context-dependent (Wajcman, 2010). Expansions of such

studies further detail how gender in such contexts emerges as a form of practice that shapes and is shaped by the sociotechnical forces that operate (Corple, 2016). Such a practice may bear similarities with the way in which the gendered habitus exists in offline contexts, yet may also depict how offline constructs surrounding gendered practice may also manifest and characterize gendered practices in the online context. To highlight such insights, I further blend the discussion with concepts from data feminism as detailed earlier in section 2.

The key essence of the gendered habitus is its implicit often symbolic nature of manifestation, imposing invisible yet throttling restrictions on a woman's identity (Ridgeway, 2011). Based on the results, we can see that the gendered habitus that manifests in the context of the workplace is discussed in several different ways in the women-centric forums. For example, in r/cw, we can see extended discussions on self-presentation and associated expectations of performative etiquettes are frequently discussed. The network analysis further elucidated that such discussions achieve high traction within the community, as actors who create such posts often rank high as per the closeness centrality metric. Beyond self-presentation, as described in chapter 2, embedded in the gendered habitus may also be a habitus of domination, which may in turn result in symbolic violence inflicted on women and other socially peripheral groups.

A habitus of domination and ensuing symbolic violence was evident in several conversational traces that fell under the conversational categories of reflection on ethics, navigating toxicity, and impression management. For example, under the theme of navigating toxicity (especially in r/ggw), many conversations revolved around being undervalued by coworkers, managing workplace relational turbulence, and workplace bullying and overall delved into the way in which symbolically the hegemonic nature of operation of the technical workplace perpetuates historically embedded social prejudices and stereotypes (Anderson & MFTC, 2021). Given that

the LIWC investigation in this regard signals a gendered pattern of conversation, we can further glean insights into the type of gendered habitus that manifests in these women-centric spaces (Iosub et al., 2014).

Further, several conversations in r/ggw, capture the emergent *submissive dispositions* that are associated with the expectations of conduct that women are subjected to in workplace contexts (Krosnell, 2005). For example, a conversation in r/cw (that I categorized under navigating toxicity) stated – "*I am afraid to open up too much, I am often disliked by my superiors since I usually voice my opinions and attempt to make a contribution to project planning"*. This captures how embedded within the gendered habitus is also a form of symbolic expression of subjugation that imposes limits on expression and participation. Such examples, highlight and are akin to the notion of the systems of exclusion detailed under the framework of data feminism that portrays how occupational domains, especially the technical workplace may create several challenges and obstacles for those from minoritized and underrepresented groups. Thus, these examples highlight how the conversational practice of the women-centric forums involves contesting the gendered habitus that manifests in the occupational context, especially that of the technical workplace.

Yet, in this collective practice, also emerges are perspectives towards care, protection, and solidarity, highlighting and amplifying perspectives about feminine attributes (as manifesting in the conversational themes) may act as a form of social capital that enables the capacity to perform certain kinds of roles (such as that of a caregiver) (Huppatz, 2009). The importance of such perspectives is further indicated by the central positions that actors exhibiting such roles capture in these communities. For example, we can see that communal champions, who are highly prolific in engaging in conversations around empowerment and advocacy, are also the key

as per the centrality metrics. Thus, in the women-centric forum, we see a form of *doing gender* as proposed by Dillabough (2006), that involves discussing, dismantling, and deliberating the kind of gendered habitus that manifests in the offline context. In doing so, they also create a form of moral habitus in conjunction with the gendered habitus. Such a moral habitus is particularly, pronounced in the moral characteristics of r/ggw, which are captured through the various linguistic dimensions. However, in each of the women-centric forums, a gendered habitus of its own is created, bolstered by the feminine capital that helps to configure an alliance depicting a form of *sisterhood* (Huppatz, 2009). Capital is essentially a relational construct as is gender (Bourdieu, 2001). Thus, such a sisterhood represents how the deeper relational outlook cultivated in these women-centric forums, captured through the greater presence of communal roles (champions and pivots) essentially depicts a habitus for *survival.* This habitus of survival may offer a *sanctuary* to those who are experiencing exclusions induced by multiple structures of oppression and domination.

In contrast, r/csc depicts a form of genderless milieu, characterized by discussions that do not engage with the gender attribute but focus on a standardized objective view of the technical workplace (Ruel, 2018). As indicated through the analysis, several markers of competitiveness, masculine toxicity, and hegemonic practices that impose a form of symbolic structure of oppression are evident in the conversational dynamics of this forum (Peterson, 2007). This observation follows that actors who rank high as per the betweenness centrality metric in r/csc often attempt to regulate the patterns of contribution by preventing conversations that discuss or contest how online community members validate and vote on content. The psycholinguistic measures of conversation also indicate a greater presence of masculine norms indicated by the less filtered and restrained form of conversation, expressions of anger, and anxiety (Iosub et al.,

178

2014). Further elucidating this view, is the fact that certain conversations in r/csc erase the gendered attribute. For example, a community member asked – "*I am looking for jobs, but am struggling. Where am I wrong? Does it matter that I identify as a woman?"* In response, community members suggested getting resume help but did not highlight the gendered identity dimension as raised by the actor asking the question. Many similar posts that hinted at women's struggles in the technical workplace were often suggested to be redirected to r/ggw by actors who operate in both domains. All these examples further highlight an objectified outlook that, in many ways, can be considered examples of the notion of privilege hazard.

This example bears synergy with the technochauvinistic mindset of the technical domain, which has historically been dominated by a masculine outlook manifesting through the erasure of more nuanced aspects of identity and association (Broussard, 2018). In a way, it is akin to the example from the data feminism context wherein the automated hiring system was flawed as it was designed using data that was collected mostly from male employees (D'Ignazio & Klein, 2020). This bias, similar to the context of the conversational trace I have presented, highlights that the implicit effects of social inequity are often missed due to a lack of experience and understanding of its embeddedness in everyday routines which results in a form of privilege hazard. A close twin of the notion of privilege hazard or an outcome of this kind of a lack of understanding and appreciation of lived experience (especially that of the historically underrepresented) is the image of absence. In many ways, the lack of recognition and importance to the gendered tensions and the objectified view of offering knowledge-centric and agentic nature of help and guidance as we see in r/csc creates an image of absence – where social identity and its due dignity and respect are cloaked and masked by a standardized one *size fits all approach* – as we see in the patterns of engagement from r/csc. Thus, a silenced muted form of gendered habitus emerges in

this form, that in many ways extends toxic legacies imbued in sociocultural subjugation and symbolic violence directed at women and other historically minoritized voices. The agentic stance of this forum (r/csc), further highlights the lack of inclusivity and empowerment, rendering this space as a mere knowledge repository, that only extends the collective informational wisdom of the technical domain.

The contrasting forms of habitus that emerge in the women (r/ggw & r/cw) vs the general forum (r/csc), present an interesting point of distinction. While r/ggw & r/cw depict a habitus of survival grounded in community and collaborative vision, the emergent habitus of r/csc resembles several facets of the habitus of domination and oppression and has only a weak collective stand oriented towards the purpose of knowledge sharing and informational exchange. In contrast, the collective practice in the women-centric forum is aimed at developing an empowering voice toward dismantling the symbolic violence that has long created oppressive regimes in the occupational context (Ellemers et al., 2013). It is interesting to note, that the very systems of exclusion that the women-centric forums aim to dismantle, implicitly manifest in the culture of the r/csc community. The use of automoderator and its importance in the context of the r/csc community (as indicated by the network measures) further highlights its technochauvinistic stance. This shall be discussed further in subsequent portions of this narrative. Thus, all these pointers reveal that the collective practice may greatly differ depending on who participates, whose experiences and voices are valued and the values that are encouraged and supported in these forums (Weld et al., 2021).

The aspect of values will be a recurring theme of discussion, but in this context, it is salient as values can be integral to laying out the norms of participation in a habitus. For example, the women-centric forums depict the values of openness, advocacy, and equivocality rooted in their

care-centric visions. The absence of similar values in r/csc can also be likened to the image of absence and may result due to a form of privilege hazard that may potentially manifest due the lack of an appreciation of lived experiences of the minoritized which can often desensitize the dominant/the privileged rendering them oblivious to the importance of such values and perspectives (D'Ignazio & Klein, 2020). When performing according to the norms of the habitus it is integral for one to imbibe the emergent values of a collective space. The assimilation of collective values can impact the function that community members assume. In a way, this point highlights how context plays a key role in binding structure and agency. These value-centric perspectives could potentially be the driver behind the role-changing behaviors of actors between r/ggw & r/csc. The recognition of the values of advocacy, openness, and inclusivity as extolled by the r/ggw community could potentially nudge an actor to participate in conversations that spark discussions on struggles that women may face in the technical domain. This could potentially also be a contributing factor behind an actor's role switching from pivots (in r/csc) to champions (as in r/ggw).

Finally, as indicated in section 2, Bourdieu's conceptualization of the habitus is closely linked with the concept of ontological security from Structuration theory (Giddens, 1991; Bourdieu, 2001). In performing the habitus and as one learns to imbibe and configure oneself along the value trajectory set for them as per the norms of the field to which the habitus is attached, one establishes ontological security. Thus, ontological security is integral in acclimating to one's social position and exhibiting the associated disposition. Yet, configuring such ontological security can come with its own challenge and is contingent on one's social surroundings and the individual's sense of embeddedness within those surroundings. For example, Herman (2015), writes about the struggles that women face when they do not find an alignment (thus are not able

to configure their sense of ontological security) with the norms of the workplace they are enmeshed in.

In my analysis, the women-centric forums thus serve as conduits of deliberation and discussion to address and redress such struggles so that women can find an avenue to disclose the challenges of crafting their sense of ontological security. The categories of impression management and navigating toxicity are particularly linked with such an observation. This depicts how community members seek to reclaim the lack of ontological security they face in the offline world within the context of online channels. Yet, participating in these online channels comes with another kind of ontological security – the need to understand and perform according to the norms of the communal space of the virtual venue. As highlighted in section 2, the lack of such ontological security can lead to community members feeling excluded and undervalued (Corple, 2016). Thus, when participating in these spaces, community members need to delicately handle and balance these two kinds of ontological security.

The social roles and linguistic markers further elucidate this intricate balancing act. For example, the champions need to balance their communal and experiential wisdom in relaying and relating with other more inexperienced members, when guiding them to establish their footprint. Further, the fact that the nature of conversational habits in the women-centric forums appear less authentic could also indicate that while conducting such a balancing act one needs to be cautious and carefully balance their performance and expression. The case of role changes between r/ggw & r/csc and the case of those who ask certain posts be redirected to r/ggw from r/csc depict the need for ontological security in the online context, captured through the adherence to the norms established in the online forum. Understanding and configuring such ontological security requires wisdom and guidance, both offline and online. Thus, roles such as champions and pivots

are essential in helping other community members acquire their sense of belongingness or ontological security. The case of ontological security emphasizes the need for finding and providing care, which helps to bridge the transition of the narrative to the next conceptual arc, which discusses the practice of care and acts of caring that shape yet distinguish each of these forums. But before concluding this section, I shall touch upon the implications associated with the concepts discussed here.

Implications: The importance of this conceptual arc is to provide a theoretical basis and guide the subsequent sections that fall into this discussion. Through this discussion the focus has been to engage with several different sociological frameworks that pivot how the habitus framework can be applied to the context of online communities, especially to cast a comparative light. To the best of my knowledge, this is the first study to do so. Further, I provide rich empirical detail to outline and operationalize the way in which offline and online constructs blend to situate the nature of habitus that manifests. In laying out such novel conceptual foundations, I also present in conjunction with applications of concepts from data feminism and ontological security to highlight how such concepts intertwine and weave the way in which a performative habitus is crafted and sustained. From a practical standpoint, such an understanding can particularly help in understanding cross-platform engagement and how the values, and norms shape the nature of performance. This is particularly salient and vital for those who span multiple platforms, the way they engage or don't engage can provide deeper insight into the policy or the lack of recognition of core values as is evident in the case of r/csc. Design and policy interventions, in terms of the type of technical features (e.g., bots engaged) and the associated policy (how these are engaged) thus become crucial. This issue will be further discussed under the fourth conceptual arc of this section.

5.b. 2 Infrastructure and Infrastructuring for Care Through Open Online Forums

The goal of this section is to delve into the way in which the practice of care emerges in the forums I explore. Care as alluded to earlier, is deeply entrenched in the nature of relationality and the kind of affinity and collective practice that is nurtured in the forums. Thus, guided by the notion of *ethics of care as* proposed by Gilligan (1993), I focus on the moral commitment to others that drives the practice of care. The women-centric forum gives many indications of such a practice centered around the *ethics of care* manifesting in this space. As indicated by the LIWC analysis, the categories of prosocial and clout being highly salient in r/ggw depict a strong focus on caring and catering to others. This is also made evident by the fact that the communal roles of champions and pivots capture the most dominant positions in the emergent network of the platform (indicated through the social network analysis). The clout variable demonstrates a strong sense of identity and thus its prominence in characterizing the women-centric forums depicts a strong communal bond and feelings of a unified collective existence (Huppatz, 2009).

The high values for the macro-level network metrics of transitivity and reciprocity further support this claim. The higher values for the metric of authenticity (as indicated by the LIWC analysis) substantiate that community members are highly cognizant of each other when expressing and collaborating. All these observations are akin to the *ethics of care* framework and depict a form of gendered orientation to care. In contrast, r/csc presents a more objective approach, that is more self-directed (i.e., more agentic) and less interpersonal (Decter-Frain & Frimer, 2016). The prominence of the automated agents and their key role in guiding the conversations of the general forum (r/csc) further substantiates the lack of communal identity and agentic mindset – where the impact of the automated agent is judged more objectively and not on the more communal metric of acceptance and appropriation. As discussed before, the

chauvinistic trends of masculine superiority as depicted by key actors who rank high in the betweenness metric further justify the lack of the relational perspective in r/csc. Akin to the gendered premise of the *ethics of care* perspective, we can also see such a distinction manifesting and contrasting the relationally driven care orientation across the forums. The discussion of the differing nature of the gendered habitus that has been highlighted in the previous conceptual arc can further help to substantiate this. This is captured through the way in which the gendered habitus as practiced in the women-centric forums nurtures a communal spirit akin to that of a *sisterhood*, whereas, in the general forum, the approach is to focus on a standardized individuated notion of the technical workplace lacking an expression of parity and unity (Peterson, 2007).

When comparing the two women-centric forums, we see how the *ethics of care* or the nature of the *sisterhood* that emerges holds slight but essential markers of distinction. This is particularly driven by the greater orientation to advocacy and crusading for uplifting the voices of women and other minoritized groups as evident in r/ggw, which is not a dominant trend in r/cw. This is chiefly indicated through the greater presence of the theme of *reflection on ethics* in the conversations of r/ggw. The fact in the moral LIWC category is more salient in r/ggw further reinforces this distinction. It is particularly interesting as this observation highlights how the practice of justice, empowerment, and advocacy can be both individual and collective (Lin & Yang, 2019). It is individual, as many of these posts are aimed at providing individuals a platform for finding support and guidance, but in doing so also develop a perspective towards supporting a cause for communal betterment. For example, in r/ggw, many of the conversations by actors who rank high in the closeness centrality metric, often call for participation in group events and encourage individual members to participate as well to develop community and find

support. A conversation in this regard stated, "*Please consider attending, it is a great event to find others and bond".* Many such conversations also depict a more personalized stance, *"If you are coming, let me know, and let's meet!".* These acts of resource sharing are common in the theme of *resource development* and thus through this topical category in addition to providing practical insights, community members also addressed ways of enhancing their collective footprint (particularly in the context of r/ggw). In contrast in r/cw, while there are expressions of collective identity, it is restricted to providing guidance and support towards developing one's professional footprint. Fraternizing and building community beyond were not themes that manifested in these conversations. This distinction is important as it helps to position how different communities may support and nurture varied forms of care outcomes. Thus, all these insights may have paved the way in which care ecologies emerge in the context of online communities, especially delving into issues surrounding women's empowerment (Bowlby & McKie, 2019).

The above discussion highlights the type of relationality that is nurtured and the way in which it cultivates a different communal stance towards care or the lack thereof (as seen in r/csc). While the orientation is essential, it is also important to understand the various mechanisms of care and how they facilitate resilience and support building. Below are the key processes that help to orient the kinds of caring that emerge:

1) **Guiding figures and role models:** This category of actors particularly manifests in the roles of champion, highly prominent in r/ggw followed by r/cw. This is essential as prior scholarship in career development especially for women has highlighted the role guides play in facilitating newcomers to gradually transition into their professional footprints (Kyriakidou, 2011). The champions category particularly demonstrates this in two ways, they hold the communal wisdom

186

and thus can guide and mentor other members to find the resources, and connections they need through the virtual forum and can also share and support those in need of encouragement and motivation. They provide care by understanding the needs of individuals and the community and act to not only advance the goals of the individuals but also the community as a whole. These champions play a pivotal role in crusading for justice and spearheading the efforts surrounding advocacy, empowerment, and fostering a space for inclusivity and open discussion. Thus, through such acts of care, champions in r/ggw play the crucial role of modeling how the community can be used as space for spearheading a movement for change that can have larger collective outcomes. Sharing of information about meetups for women and other marginalized groups, and calls for community bonding (as depicted by actors who rank high in the closeness centrality metric) all demonstrate such initiatives.

2) **Resilience through resistance:** Complementing the above theme of guiding figures, this theme forms the heart of the resilience narrative I share in this write-up. This theme is inspired by prior work drawn from studies in offline contexts that highlight how in the case of the Palestinian conflict, women adapted ways to subvert the forces of oppression and pressure to adhere to Zionist claims while retaining their identity and adapting to the hardships of life under occupation (Ryan, 2015). Drawing inspiration from this motivating body of work, in especially r/cw in addition to r/ggw, I find that many of the champions provide strategies to develop resistance for subverting gendered tensions in the everyday workplace context. For example, in r/cw, as alluded to earlier, key actors often express ways to silently but resolutely act against harms inflicted in the workplace context. Such conversations also suggest strategies to subtly refute, yet maintain the norms and etiquettes of the workplace. For example, an example post in r/ggw stated:

"Don't engage, that will not help. Just respond to the note and ask for the next steps from your senior [implying a male colleague]".

Thus, through sharing resistive strategies and tacit wisdom, community members performed the *sumud – a tactic of resistance imbued in resilience,* that can be helpful in getting by and adapting to shock (Ryan, 2015). These help to develop everyday resilience as well as aid in finding a pillar of support from the community members who too have had similar experiences (Semaan, 2019). In a way, this theme is another example that highlights how the gendered habitus formed in the women-centric forums may entail sharing wisdom and knowledge about ways to counter challenges imposed by the habitus of domination and systems of exclusion that manifest in the workplace context. Thus, further highlighting how the performance of gender and care are intertwined as proposed by Gilligan (1993). Additionally, this theme highlights a form of care wherein community members draw on personal experiences and strategies towards developing resilience to share with others who may be facing similar issues, thereby depicting an exchange of experiential wisdom.

3) **Peer mentoring and pivots:** As alluded to earlier, pivots play the essential role of supporting one another through acts of extended collaboration and call for participation and engagement. Many of these posts center on engaging and networking within the community, as described earlier. Such actions depict a form of care for creating affinity and a collective bond among community members (Ren et al., 2012). In the relational spectrum, based on the insights from the cluster analysis, this cluster depicts a more individualistic or agentic stance as compared to champions. Yet, actions that help create peer parity, increase engagement with expressions of unity, and, nurture an initiative for collaborative knowledge acquisition and enrichment indicate the emergence of communal empowerment (Lin & Yang, 2019). While guiding figures and role

models are central to the practice of care, the exchanges that guides participate in occur between members at differing expertise levels. Thus, it involves those who are highly engaged in the community and have a lot of experience and expertise regarding the community and the technical workplace relaying their knowledge and expressing concern, protection, and mentoring those who may be new to the community or are still finding their way in the technical workplace. This demonstrates an exchange between actors at two different expertise levels (one more akin to that of an expert or a community leader and the other being someone who is more of a novice or new entrant). However, in the case of the pivots, peer-assisted learning engages those who are at the same expertise level, which can have advantages in terms of ease of communication, increasing feelings of inclusion, and fostering an overall sense of belongingness in the community (Huijser et al., 2008; Sengupta & Haythornthwaite, 2020).

4) **Moderation, community management, and care:** It is interesting to note the contrast in the approach of community management followed by r/ggw and r/csc. Based on the network insights we see that the automoderator reigns supreme in the r/csc space. The moderation role is restricted to very specific and mechanistic knowledge exchange procedures, such as controlling traffic and regulating the span and breadth of the discussions. Whereas, in r/ggw we can see the moderators engaging in several discussions and are open to reason, often explaining their discussions to the community. Thus, the moderators of r/ggw demonstrate a more subjective stance rooted in nurturing communal affinity. This too in a way forms a manifestation of the *ethics of care* framework, wherein moderators show concern and value for other community members, value their opinions, and thoughts, unlike r/csc, wherein a strict codified moderation practice devoid of subjective value is followed. The moderation approach of r/ggw further elucidates subjectivity and the value of relationality, rather than an objectified standardized *one size fits all* approach. In

189

a way, we see how even moderation practices, community perspectives, and orientations may emerge as important drivers of action.

The practice of moderation in r/ggw, rooted in community, is akin to the model of *moderation as nurture* proposed by Yu et al. (2020) – nurturing and caring for the communal voice, encouraging participation and retention of community members. This is particularly evident in the way in which the moderators of r/ggw, ensure that the forums remain protected and exclusively for the historically marginalized and minoritized. As described earlier, moderators of r/ggw repeatedly filter conversations and remind all engaging, the channel is exclusively for those (women and non-binary identities) who may not find a space for expression in multiple contexts such as the technical workplace or in the context of online ecosystem as well (Lucero, 2017). Further, moderators in this space also participate as self-directed agents – which really captures expressions of accountability and responsibility towards the community. This is particularly pronounced in the way in which moderators' express value around dissent and openness. In r/ggw, one of the main reasons, moderators fall into the category of self-directed agents is that they often take ownership of their actions and justify their decision from their own individual perspectives, while also extending room to others in the community to express their thoughts and feelings about decisions made by the moderation team. This, as highlighted in the *moderation as nurture* model by Yu et al. (2020), depicts a form of care towards valuing and encouraging deliberation in the community. Such actions by moderators can be pivotal to ensuring that community members feel welcome to exchange ideas and be included in the conversations of the community (Weld et al., 2021).

In this conceptual arc, the narrative has focused on providing a deeper understanding of how a form of care infrastructure or ecology of care emerges (Bowlby & McKie, 2019). Through the

190

combined methodological inspections involving content, psychosocial attributes, and network analysis, I discussed the overall approach to care or the lack of it (as perceived in r/csc) and presented a typology of care functions across the different forums. Building on the theme of everyday resilience being bolstered through ICT-enabled infrastructuring practices (Semaan, 2019), we see how these venues develop diverse models of infrastructuring practices that render each of these forums unique in their appeal and footprint. The communal form of infrastructure provides a more interpersonal touch that caters to a set of collective objectives, whereas the agentic orientation of r/csc assumes a more informational, on-demand knowledge exchange perspective. Further four key acts of caring and approaches towards nurturing the community are further discussed. It is important to note how community values manifest in the way care is practiced. This was particularly salient in the way in which care is provided through moderation in r/ggw. Thus, the nature of values upheld by the community is a key driver of the kind of practice as well as care routines that define the care infrastructure that emerges. Infrastructuring is rooted in action and the four pillars of care as mentioned here help to elaborate on the way in which caring is performed and sustained. Expanding on prior insights from investigations by Dye (2021), we can see how these forums (especially r/ggw & r/cw) help to provide care, support and act as tools for resilience building in tackling everyday crises and oppressive regimes that exist in the workplace context.

Implications: These insights and conceptual dimensions reveal the importance of multiple forms of care practices that emerge and how the relational orientation nurtured impacts the practice of care. Particularly, adding to prior scholarship on how ICTs enable infrastructuring for care, this discussion helps to provide nuances into how community practices and values shape the orientation towards care and the type of care practices that take place in these forums (Semaan,

2019). Further, this discussion highlights how the gendered habitus plays an essential role in the kind of moral outlook and the practice of care nurtured. To the best of my knowledge, the application of the *ethics of care framework,* in the context of online communities remains an underexplored area. Thus, I contribute to this avenue of scholarship, by furthering the way in which the *ethics of care* manifests in online channels and can characterize the relational outcomes nurtured. Such application can further help to unpack the way in which the emergent community dynamics mirror values and constructs from offline contexts and how such practices impact the efficacy of these channels. In the long run, such insights can also pave the way toward a deeper understanding of the way in which care can be incorporated into the policy (i.e., moderation) and design (type of affordances that can be envisioned). Care has been advocated as extremely important in the context of moderation practices (Yu et al., 2020). Centering or understanding the importance of care can be extremely important to ensure that the voices of the community are heard and communal practices and policies are crafted such that promote values of openness, transparency, and equivocality (Weld et al., 2021). For example, as alluded to earlier, there are instances in r/csc, where the voices of certain actors are shunned by other more prolific actors, or certain issues (such as identity expression and its impact on professional development) are undervalued, thereby curbing expression. These actions can be detrimental to participation and engagement, especially for newcomers, and can also dampen the spirit of the community. Advocating and promoting care-centric values and goals in these communities can therefore be essential to potentially address such barriers to conversation and community (Weld et al., 2021). Further, repurposing the community initiative through care can be essential for design considerations for virtual communities particularly to address and empower voices that may feel submerged in the larger context of the online ecosystem, due to lack of representation

and recognition (Kraut & Resnick, 2011; Corple, 2016). Overall, these perspectives, help to

unpack the way in which newcomers can be ingratiated (i.e., the role of guiding figures or peer

mentors in this regard) and can also pave the way towards initiatives that can be critical to retain

and sustain participation, especially that of newcomers. These considerations can be pivotal for

the refinement of community policies (surrounding conversation and participation) and the way

in which automation (or automated agents) engages with the community and impacts the

dynamics of these spaces (Weld et al., 2021). Overall, these insights are essential for ensuring

sustainability and nurturing all those who participate in these forums, instead of catering to a

single *one size fits all* approach (Nartey, 2022).

5.b. 3 Sustaining the Collective Habitus: Recognizing and Valuing Contribution to Community

Every sphere of life is a performance and is driven by the goal and norms of the habitus within

which the performative context is crafted (Giddens, 1991; Bourdieu, 2001). The previous

conceptual arcs have highlighted the practice, the outcomes, and the goals that the community

nurtures and supports. Yet, it is important to understand that these goals are contingent upon the

contributions of community members. Akin to the produsage model by Bruns (2007), the goals

and contributions are malleable and are driven by the community members – they produce and

reproduce the norms and values of the spaces in which they participate and operate. Thus,

understanding the forces (actions, collective measures) that sustain these spaces become pivotal

(Kraut & Resnick, 2011). Particularly, this is also to address and raise concerns about the issues

of retention and participation of marginalized voices in these online venues (Nartey, 2022).

Through the analytical lens of the roles and associated insights as gleaned from the

aforementioned inspection, the goal will be to provide a deeper reflection and detail the way in

which various dimensions of labor and work may constitute and shape the patterns of contributions observed. A key observation of my work is that roles that emerge in the women-centric forums are more communal, whereas those in the general forum (r/csc) are more agentic. Thus, the onus of carrying the community forward and the work that community members practice, recognize, and value may greatly differ. The goal of this conceptual arc thus is to pull the direction of the discussion to a deeper reflection on the type of labor and work that needs to be done to sustain the practice and its manifold outcomes. Studies on infrastructure further motivate the need to make visible the invisible forces that shape the way in which infrastructure is performed (Bowker & Star, 1998). Thus, in understanding the way in which care is performed, and the connection between care and relationality (as connected through the ethics of care framework), it becomes essential to discuss the invisible forms of work and labor that manifest in these spaces and are crucial to sustaining the nature of care infrastructure crafted. Further, as observed, relationality and the gendered habitus bear a close connection and thus it is important to also understand how work and labor may also impact or be impacted by the gendered habitus.

In essence, such a discussion may also offer a close connection with the way in which labor is constituted and shaped in the offline world, upon which the very premise of this dissertation is founded (Ellemers et al., 2004). Thus, expanding the distinction between the forums, through the labor dimension. In this regard, it is important to note that the number of contributions may differ across the forums, particularly that of r/cw and r/csc. Yet, through the previous conceptual arcs, I have shed light on several care practices that operate in r/cw which play a pivotal role in creating a unique identity and purpose for this community rooted in care, relationality, and service. In contrast, r/csc depicts a stance that is less relational and focused more on information growth and exchange. Thus, the labor involved especially from the care perspective may greatly differ across

the forums, creating another marker of separation that can be inferred. For example, the experiential sharing and providing tactics aimed at resilience that is practiced in the women-centric forums (particularly prominent in r/cw), may involve deeper engagement and emotional association, which is greatly absent as has been observed in r/csc.

Further, generating calls for action, community, and practicing advocacy may further pose several dimensions of work and toil to keep the flame of activism alive within the community. Such calls for collective action and advocacy may entail affective labor, as indicated by Rovira-Sancho (2022). Similar to the context of the #metoo movement in Mexico as observed by Rovira-Sancho (2022), in my analysis, conversations that fall under the category of reflection on ethics or those that advocate community building among women and the historically marginalized, perform the task of arousing community spirit and attempt to motivate feelings of contributing towards collective empowerment. The category of champions is particularly salient in this regard. Further, the presence of the prosocial and moral linguistic markers further signifies such forms of labor manifesting in this space. Akin to the findings of Dosono & Semaan (2019), we also see evidence of emotional labor and emotion work manifesting in the women-centric forums. For example, expressions of parity, unity, and sharing of experiential trauma, all depict such forms of labor and work. Expressions associated with the theme of resilience through resistance also depict the way in which emotional labor and work are involved in associating and sharing relevant insights, often which entail disclosing personalized experiences and sagas of struggle (Lu et al., 2022). Yet, such expressions of affective and emotional labor and work are absent in r/csc. In contrast, in r/csc, as described earlier, most exchanges are information-centric, capture a weak communal attachment and often depict a detached style of domain-relevant

information. This also highlights how the ethics of care, gendered habitus, and dimensions of affective and emotional work and labor may intertwine (Wharton, 2009).

Relational labor too, in addition to affective and emotional labor, manifests in these channels. Given the premise of the ethics of care and the thrust on relationality that creates the differentiation between communal vs agentic models of operation, one can align the notion of relational labor with the way in which these communities operate, especially as observed through the roles that rank higher in the communal spectrum (such as champions & pivots). Relational labor indicates a different yet related form of labor that involves the cost of maintaining relationships (Baym, 2015). As detailed in section 2, it is rooted in performance and involves accruing the benefits of such relational association. While in the original article, the benefits of relational labor have been associated with monetary gains, in the case of open online forums, the associated benefits may include may dimension of personal gains (such as altruistic returns of caring as proposed by Xu and Li, (2015) or through standardized community metrics of repute (Anderson, 2015). Relational labor manifests chiefly in women-centric forums. Champions in their effort to connect, encourage participation in several different ways. Further, many community members express the willingness to exchange personalized messages (statements such as "*Do DM me!*") and also show an effort towards communal alignment. Pivots, too in their act of providing peer mentoring and collaborative learning initiatives depict a way in which relational labor is performed and maintained. Thus, the different roles indicate different kinds of relational labor that manifest in these forums. All involve engaging the community and increasing communal unity and affinity, yet champions delve deeper into arousing collective spirit through conversations on empowerment, and advocacy, and by acting as guiding figures. In contrast, pivots depict relational labor that engages the community through sharing of

information, calling for group initiatives toward learning and collaboration. Further, as indicated by all the network metrics in the women-centric forums, relational actions of creating community spirit, and building opportunities for networking and mentoring, all depict affinity building, concern, feelings of protection, and an outlook to serve and support in solidarity. Further, the lower values of authenticity, yet higher values of clout, as indicated through the LIWC metrics, all point to a strong group identity, commitment, and effort to ensure that the way in which one conducts themselves aligns with the goals and values of the community. All such actions and indicators signal the performance of relational labor, especially in women-centric spaces.

As indicated in section 2, relational labor is highly malleable and can assume different connotations depending on the collective practice that shapes and is shaped by relationality. While relational labor may not manifest in the same way in r/csc, akin to pivots, in a more individuated context, we can associate a form of relational labor contouring the way in which community members attempt to nurture by sharing individual strategies and tips with the community – which shows a form of relational outlook in terms of commitment to provide strategies that may help community members. It is a form of relationality that takes into account a standardized view of the community as those associated with the technical workplace and removes any markers associated with a more nuanced and multifaceted view of identity. The agentic roles that manifest in this space also indicate a weaker communal stance. Such variations in the manifestation of relational labor also highlight how relational labor may in itself depict a spectrum ranging from a performance that is more communal (as in the women-centric forums) to one that is more agentic and individuated (as in the general forum, r/csc).

Implications: Such insights can help to bridge theory by drawing connections from previous studies in CMC (such as relational labor) with the labor of role performance and sustenance in

197

these online channels (Baym, 2015). Affective and emotional dimensions of labor and work are other avenues that emerge. A comparative view further enriches the contextuality and connection of these concepts with gender which can provide conceptual nuance. To the best of my knowledge, this is the first invocation of the construct of relational labor in the context of online forums such as Reddit, which beyond theory can have several practical recommendations as well in terms of the way in which the different forms of labor are rewarded and valued in the community fabric (Dosono, 2018). An understanding of labor can further help to unpack the reasons that may impact the sustainability and patterns of engagement in online forums. For example, it is evident that the amount of labor in r/csc is less as compared to the other forums, thus while r/csc may have significantly more conversations, the nuance, the impact, and the depth of the contributions on the women-centric forums may be richer and call for deeper costs of time, commitment and communal accountability (Weld et al., 2021). Thus, standardizing evaluation and recognition of contribution may erase the value of such laborious efforts taken by the more hidden or historically suppressed voices of society (in this case women working in the technical workplace) and thus call for broadening the way in which participation and engagement are measured and rewarded (May et al., 2019).

From a practical standpoint, an understanding of labor and role formation can also pave the way toward recognition for the activities of care beyond the standard norm of platform affordances, that limit the extent of validation, especially for historically underrepresented voices (Corple, 2016). The goal of making the different dimensions of labor *visible* is also in line with the tenets of data feminism, which highlights the importance of bringing to the surface the type of work that is often undervalued or disregarded in the hierarchical conventions surrounding evaluating labor. These key perspectives highlight how oppressive regimes may create norms that uphold a

standardized practice around the kind and extent of labor recognition. For example, historically care work has been given lesser value than other forms of labor, which in itself also bears gendered connotations (Koskinen Sandberg et al., 2018). Akin to the context of this discussion, data feminism also provides examples of how structures of oppression that manifest in the online context may not give due credit to volunteer efforts and initiatives such as that of moderators and crowd workers (Li et al., 2022). Aligned with the calls of understanding the need for increased participation of marginalized voices as raised by Dosono, 2018; the goal of this conceptual arc has been to draw attention to how nuances of labor may further help to unpack the initiatives that minoritized voices take on in order to counter technochauvinism and structures of oppression that manifest both in offline and online contexts. For example, beyond the context of moderation, the communal roles unpacked in this narrative contribute immensely to guiding and maintaining community, thus it is essential to recognize and address the value of the pivotal contributions they make. These contributions may get submerged and hidden in the technochauvinistic front presented on such forums expressed through standardized metrics of content presentation and recognition.

 Thus, in a way, such insights follow the call for broadening the spectrum of thought around the conceptualization of these sociotechnical vessels, as laid out by feminist HCI (Bellini et al., 2018). In doing so, this narrative also attempts to destabilize and topple the symbolic structures of hegemony and oppression that may impact the way in which these systems are designed. Akin to discussions in data feminism around oppression perpetuated through standardized classification systems, similar shortcomings and symbolic oppressive regimes seep into the mode of content presentation of the online forums I explore (D'Ignazio & Klein, 2020). For example, given the knowledge-centric perspective on r/csc, an upvote on this platform may simply indicate

acceptance of the information shared. Yet, care as performed in the women-centric forums (say r/cw) entails more complex and laborious information-sharing practices. Thus, an upvote in these forums may indicate acknowledgment of care, and expressions of parity, which may not be similar to the approach of r/csc. This highlights a key disparity and the inability of such systems to capture the more nuanced meanings associated with such voting mechanisms.

Equating votes and contributions based on standardized metrics, may in a way devalue the dimensions of labor and render certain critical aspects of labor (such as relational labor) invisible. This calls for a need to repurpose the way in which such content presentation and evaluation schemes as designed and maintained such that they capture the voices and efforts of the historically excluded (such as women) (Nartey, 2022). In a way, this also calls for a reconfiguration of values incorporated (Weld et al., 2021). Valuing the contribution and participation of all voices is needed, yet lacking, thus calling for a need to reprioritize how such values are designed and incorporated into these sociotechnical systems (Corple, 2016). For example, the typology of care and the type of roles provided in this dissertation can pave the way towards a deeper understanding of how care can be understood and thus can be considered as a basis for design and policy recommendations associated with these platforms. From the design perspective, an example can be to introduce contribution markers (beyond the existing conventions) to capture the performance and labor associated with care. From the policy perspective, moderation guidelines can be structured to incorporate the construct of *moderation as nurture* and other similar visions rooted in care to increase retention and foster deeper communal perspectives in these forums, the absence of which can dampen the spirit of participation as has been observed in the case of r/csc. Also, it is important to note that communal contributions such as those on resilience through resistance in r/cw may involve

several dimensions of complex labor and work, the lack of recognition of which may throttle contribution and in turn impact the survival of such forums. Thus, reassessing evaluation standards for community-centric conversations can be critical for the long-term sustenance of virtual forums as these play a crucial role in providing a communal shield to minoritized voices.

 In conclusion, this section expanded the discussion from exploring practice to understanding forces that are often overlooked or rendered invisible in the relational fabric that defines the practices observed at the macro level of online forums. The hope of such a discussion is to also provide how group dynamics and technological facets impact one another and have a combined effect on trends of participation. In a similar vein, the next and final conceptual arc of this section discusses an important sociotechnical issue that may impact the kind of practice and member engagement and recognition observed on these platforms.

5. b. 4 The Case of Automated Moderators - A Discussion of Automated Agents in the Online Landscape

An intriguing and somewhat unexpected insight from the analysis was the case of automated agents. In the results section, I have discussed how these agents control and regulate traffic and thus in a way emerge as de facto managers of these channels, as observed in the case of r/csc, regulating access and flow of participation. In this regard, my investigations highlighted the way the use of automated agents may differ across channels. For example, r/csc seems to have a central dependence on automoderator, whereas r/ggw, while automoderator is at play, human moderators exert greater control over its actions and are more engaged with the community. This further shows the agentic vs communal distinction between the nature of affinity cultivated in these spaces. Such insights raise questions and concerns about the role of such agents in the

community and how the actions of these automated actors shape and are shaped by the community.

Whenever AI is included in the loop, a question emerges about the extent of autonomy of non-human agents (Jhaver et al., 2019). Models of distributed autonomy have gained vital significance in the case of moderation and its associated implications (Kou & Gui, 2021). Essentially, the key question and concern raised in these studies have been regarding the impact of automated agents on governance and participation (Jhaver et al., 2019). Similar concerns are also raised in the way in which automated agents engage in the communities I explore. In that regard, it is important to point out a distinction that emerges. In r/ggw the moderators while employing the automoderator agent, depict control over the extent to which the actions of autonomous actors. Further, the conversations of the moderators also depict an awareness of the shortcomings of automated content monitoring. For example, in r/ggw, automoderator was employed in a discussion on an informal meetup that started to gain widespread popularity and the moderators employed the automated agent to restrict the flow of traffic. Thus, some posts were flagged and removed, as per the quota of contributions for the thread as set by the moderators. In responding to concerns raised about the removal of content, one of the moderators on r/ggw stated – *"we understand your concerns and apologize, but we simply cannot manage this thread without its [auto moderator's] help. We shall hope you will understand"*.

This comment shows how moderators empathize with the community and hold accountability for their actions as well as that of the automoderator. The comments and approach towards automoderator here, show an understanding of its limitations and the fact that such actions can potentially harm. Further, automoderator was not one of the central actors as per any of the centrality metrics in r/ggw, which further validates the observation that the community curbs the

202

extent and nature of deployment of such tools, which could indicate the fact that the community

is aware of the potential harms that automated agents pose to community building and thus want

to constrain its involvement in the collective space (Kou & Gui, 2021). These findings also

highlight the way in which the *ethics of care* manifests in r/ggw, captured through the concern

for the community as well as an awareness of the ramifications of automated agents on the

community dynamic. The distinction in the way in which automoderator functions across the two

spaces, captures how automated actors are integrated into the relational spirit of these channels.

Further, such relational integration may also be associated with the gendered habitus that

manifests across the forums.

The general forum (r/csc) on the other hand, does not depict a similar control over the actions of

the automoderator, in fact, certain actors who rank high as per the centrality measures, often

justify the action of the automated agent by saying statements of the order – "*It's

[automoderator] is just doing its job].* Further, unlike the moderators on r/ggw who engage with

the community and also demonstrate accountability, providing reasons for removing posts and

comments, no such engagement is found on r/csc. Further automoderator operates by a strict

regime of algorithmic practice. Its conversations take a very objective stand and provide no

evidence of subjectivity or contextual nuance. To provide a few examples of this, automoderator

frequently engages in posts such as – "*Sorry for the removal. You do not meet the minimum

karma requirement, so this post has been removed.", "This post has been removed, as it does not

contain a body or text".* All these examples further exemplify a form of technochauvinistic

mindset, wherein the technical feature is believed to be supreme, and the marginal cases where it

fails or does not fully do due justice to all voices in the community thus become a matter of

concern. Further, the lack of recognition of contextual nuance and subjective significance can

become a severe detriment to participation and motivation (Jhaver et al., 2019). This concern

arises from the fact that the decisions and actions of the automoderator are governed by

simplistic mathematical conventions and may miss the nuance and essence of experience

(D'Ignazio & Klein, 2020). For example, it could be the case that the post which did not have a

body associated with it attempted to share content that would connect with the community and

enrich the discussions in different ways. Many of these posts discuss strategies about careers and

often aim to foster community rapport. Further, by restricting the number of posts, essential

wisdom and advice that could further enrich the ensuing discussion might be missed, all

highlighting the limitations of such agents, yet no intervention or action controlling the

automated agents and addressing their impacts is observed in the conversations of this forum.

As indicated in the discussions of data feminism, every morsel of data represents an embodied

entity that is contextual and imbued with cultural and social significance (D'Ignazio & Klein,

2020). Encapsulated within such digital bytes of information are key social markers of power,

identity, and everyday politics (D'Ignazio & Klein, 2020). Thus, the lack of proper assessment

and evaluation of contributions by automated agents can really impact the experiential wisdom

and can confine the discussions of the forums along specific standards that may not echo the

broader needs and voices of all those in the community. Thus, in the larger context, the impact of

including automation and the extent of its power and control on the nature and type of

engagement it affords is questioned. While there are benefits of these tools in managing

information, there are also several concerns raised about the way in which such agents operating

on a strict and standardized schema of conventions may lead to the erasure of certain types of

experiences and thereby constrain the extent of communal enterprise developed in these

communities. As Broussard (2018) narrates, such technochauvinistic perspectives often echo

stereotypes and symbolic oppression and are driven by historically imbued structures of inequity and disparity that give rise to such bounded visions. Further, the lack of contextual information highlights how systems of exclusion may exist in these forums, which impair equitable participation and recognition of contribution. This further expands on the markers of masculine toxicity that may exist in these spaces as previously found in the other insights associated with r/csc and the nature of interaction it affords.

It is interesting to note that these automated agents still assume the role of communal champions in both r/ggw and r/csc, that they are part of. This could be driven by the fact that they play a central role in the community to control traffic and organize information, depicting a form of communal wisdom, although bounded and limited in several different ways. Yet, the way in which these agents are given due importance across the forums greatly differs as has been discussed. There are a few other automated agents that also exist in these forums, these include those that create channels to control and divert traffic across various topical threads (especially in r/csc) and bots that provide links. This shows that these bots play a role in maintaining information in these forums, yet do not play as critical a role as automoderator – in terms of controlling access and engagement of community members. Drawing a connection with structuration theory, we can see how these automated agents create structures of signification, domination, and legitimization, by the way in which they manage, control, and regulate information flow and community engagement. For example, the actions of an automoderator in removing posts depict a certain form of domination and authority. Further, the actions of many of these agents in dividing and pooling knowledge depict a way of signifying what and how information should be generated and will be managed within the platforms (especially in r/csc). Together, all these actions depict a form of an emergent structure of legitimization.

In accordance with adaptive structuration theory, the way in which these automated agents are included in the web of communal interactions depicts the *spirit* – the perspectives of the site designers and policy framers (such as moderators), but the differing norms of use capture different ways in which these agents are appropriated across the community (the distinction observed between r/csc and r/ggw), depending on the relational orientation of the community (DeSanctis & Poole, 1994). The spirit in this case can represent the way in which these agents are often designed to keep in mind the objectives of the site designers and maintainers, resulting in several shortcomings and can limit fair participation, especially for minoritized voices as has been widely criticized in extant scholarship (Mowle, 2021). Appropriation and the nature of control exerted on such automated agents thus can play a crucial role in the way in which the actions and decisions of these agents impact the community and its visions. We can see this distinction manifesting between r/ggw & r/csc, as alluded to before. Such a discussion also brings into context the way in which values are intertwined with the way in which automated agents operate and are incorporated into the communal fabric (Kou & Gui, 2021). These agents can shape the values of the community by regulating content and access to information sharing, yet the way they are configured also depicts how values are embedded into the way in which these systems operate (Jhaver et al., 2019). Thus, the values of the community which may arise in conjunction with the gendered habitus and moral perspectives may also be a deciding factor in the extent of autonomy afforded to these agents and hence can shape the power bestowed upon such automated actors and the influence exerted by these agents on community members (Gorwa et al., 2020).

Implications: The implications of an infusion of automated actors can be manifold. Prior work has investigated the extent of bot engagement, moderation, and in terms of other associated acts

of participation (Weld et al., 2021). Through this section, drawing on concepts and discussion from social constructivism and data feminism, I have expanded the existing theoretical gamut of understanding how automated agents impact virtual communities, especially from the point of view of the historically excluded and underrepresented. Through the combined application of these frameworks, I have explicated how these agents may capture community wisdom, but may act very normatively and follow strict guidelines for participation, actions which may limit expression and magnify systems of exclusion, especially in the context of minoritized groups such as women (actors who do not presently have a fair share of representation on Reddit) (Anderson, 2015; D'Ignazio and Klein, 2020). The lacuna of these automated agents may be induced by their inability to fully capture and grapple with the lived experiences of community members, which may impair participation (Gorwa et al., 2020). While automation comes with the benefit of efficiency, it also has the drawback of enforcing standardized practices, which may miss out on experiences that fall beyond the norm.

Meredith Broussard aptly captures this shortcoming in her account of technochauvinism through the detailing of the concept of *Sentience* (Broussard, 2018). Sentience is essentially the capacity to express and capture emotions and feelings (Broussard, 2018). Using the example of self-driving cars, she highlights several circumstances where the lack of such nuance and appreciation of the value of lived experiences can create ethical dilemmas and render such automated agents, which are often exalted for their superior and faster decision-making categories may fall short and perpetuate social harms and structures of oppression, instead of posing solutions (Broussard, 2018). We can see the lack of sentience manifesting in the lack of empathy and understanding of the impact of its actions on community engagement that is depicted by the automoderator, it simply fails to reason or capture larger objectives and

207

recognize that every contribution may bring unique perspectives and enrichment to the community. Such actions may damage the morale of newcomers and those whose goals and needs are not recognized by such automated agents. For example, as highlighted earlier, somebody attempting to share humor and build camaraderie is restricted by automoderator from participating, such actions may draw feelings of exclusion and cause disengagement (Simpson & Semaan, 2021). Thus, future design and policy initiatives in these spaces need to find ways to incorporate and think of how sentience can be incorporated into the capabilities of such agents.

In this regard, addressing the limitations of these agents and aligning the values incorporated into these tools using the lens of feminist HCI can be an effective approach (Bellini et al., 2018). The goal of feminist HCI is to call for a reassessment of how of values that space these spaces and advocates for the need to incorporate the voices of those who participate in these spaces, yet may fall beyond the norm – the voices and experiences of the marginalized (Fiesler et al., 2016). Echoing similar perspectives data feminism and associated initiatives aimed at broadening the status quo of technical fields, call for the need of capturing *who* is represented rather than focusing on standards of output and growth (D'Ignazio & Klein, 2020). Further, given the premise of care, the future of these agents can be envisioned to also incorporate dimensions of care and a deeper view of relational thinking rather than the focus on objective empirical metrics (Mishra et al., 2018).

In this regard, the division and exchange of autonomy become crucial (Broussard, 2018). We can see that in r/ggw such a balance is to some extent already manifesting, as moderators engage and express their initiatives to monitor automated agents as well as express their awareness of their potentially consequential harms. For example, in r/csc or other forums as well, metrics of evaluation as infused into the automated tools can be adjusted such that if a post depicts certain

characteristics, the decision about these posts is deferred to human counterparts. In this regard, the typology of care and roles I have highlighted can be used to computationally train automated systems to recognize and cater to the voices of the community. Instead of standard statistical techniques that guide the way in which these automated systems function, the goal of my analysis has been to not only highlight the role of automation but also to call for recognizing context and potentially think about how context can be infused into the way in which these tools function and act. Thus expanding on discussions on the ethics of such automated tools, the goal here is to more closely examine the impact and the effects of such tools on community, especially for those individuals who historically may not be represented in the population for whom these agents are designed (Broussard, 2018; D'Ignazio & Klein, 2020). Yet, as recent scholarship surmises, the ethics of automated tools, is not a panacea, and should be restricted to frameworks and system building, but involves a larger societal assemblage with every actor playing its due role in ensuring that the harms of these systems are minimized. For example, in r/csc, the lack of engagement and insight into the actions of the moderators can cause further problems of regulation and can expand the harm induced by such tools (Simpson & Semaan, 2021). Thus, this calls for a deeper need to reassess the way in which policy and norms surrounding the monitoring automated tools in the context of such communities are constructed and enforced (Jhaver et al., 2019).

In conclusion, expanding the previous conceptual arcs, in this specific conceptual discussion, I have pivoted on one of the key sociotechnical dimensions that emerged from my analysis – automated agents, their embeddedness, and impact. Through the various examples and connections with theoretical and conceptual considerations, my goal has been to call for a broader need towards recognizing and valuing the subjectivity that such automated tools may fail

to encompass. In the broader agenda, the goal is to advocate for communities that value participation and engagement of all, especially marginalized and historically minoritized (such as women), and to ensure that the sociotechnical infrastructure of these online forums is designed and structured to support such needs (Weld et al., 2021). Next, I move on to the concluding chapter, which summarizes and presents a few final remarks about this dissertation.

6. Conclusion

6.1 A Brief Summary of the Goals of the Dissertation

In this final section, I provide a synopsis of the investigative journey traversed through this dissertation, summarizing the key takeaways and contributions. Finally, to end this narrative I detail future work and certain considerations associated with my positionality as a researcher while conducting this exploration. The key premise and objective of this dissertation have been to address the way in which access and opportunity can be curtailed for certain groups in the workplace context depending on sociocultural barriers and prejudices. Women historically have faced several such sociocultural limitations in fulfilling their professional footprints (Ellemers et al., 2004). Recent studies have also indicated how sociocultural prejudices may exist and intensify in the context of the technical workplace (Ruel, 2018). While, with the changing tide of social practices, bolstered by the waves of feminist movements, women have acquired a place in the workforce, several studies have alluded to how symbolic and historically entrenched forces of oppression may still threaten their successful integration into the workplace context (Krosnell, 2005; Ruel, 2018).

Inspired by these studies, the goal of my exploration has been to seek the way in which online communities may offer opportunities for communal bonding, and provide *sanctuaries* of refuge,

solidarity, and knowledge that can help women to develop and sustain their occupational identity. The avenue of online communities is explored as several prior studies have surmised the potential of these channels to provide support, resilience, and guidance beyond the context of knowledge sharing and procurement (Andalibi et al., 2018). Yet, studies have also cautioned about how hegemonic regimes and practices that transcend and blend into the conversational habits of these online spaces, can often threaten the sanctity of these spaces, especially for marginalized and historically minoritized voices (Scheuerman et al., 2018). Thus, the collective practice established in these spaces can be critical to understanding the purposes they serve (Martey & Stromer-Galley, 2007). Marrying these seemingly disparate yet aligned avenues of scholarship, my work compares and contrasts three different subreddits, to understand the way in which these channels may help provide valuable insights and support to women as they navigate their professional journey. I chose three subreddits – one a general hub on technical careers (r/cscareerquestions or r/csc), a forum on working women (r/careerwomen or r/cw), and one that lies at the intersection of these (r/girlsgonewired or r/ggw). The rationale for conducting such a comparative analysis has been to further provide nuance for the need for channels that advocate for voices of the historically underrepresented (such as women) that may get buried and be denied due respect in the larger ecosystem of online enterprise (Corple, 2016).

To frame this comparative analysis, I use the lens of social constructivism grounded in Structuration theory and the Habitus framework (particularly the framing of gendered habitus) of Pierre Bourdieu, to highlight several different conventions around how gender is constructed and performed, and enmeshed into the shared collective practice of the online forums. Further, I draw on discussions and concepts from emergent discourses on data feminism and technochauvinism to provide theoretical pivots toward the shortcomings of practice in the technical domain that

may relegate women and other underrepresented identities to the periphery. Further, the goal of drawing on such theoretical tenets is also to potentially discuss how the technical aspect of the sociotechnical milieu crafted in these online channels may also introduce limiters on participation and engagement.

Connecting these foundational theoretical tenets to prior scholarship on infrastructure and infrastructuring through ICTs, I build and expand on studies that have surmised how such infrastructure can be pivotal for creating routines around care and resilience (Semaan, 2019; Dye, 2021). Since this study is rooted in how gender is constructed in practice and sustained through the establishment of relationality, I draw on the ethics of care framework by Carol Gilligan (1993), to situate the connection between care and gender. Having laid the foundations of the phenomenon of interest, I provide a description of online vessels and highlight pertinent scholarship to guide how communities form, emerge, and are sustained. Critical in this regard is the discussion on work and labor, this is motivated by the fact that contributions to these virtual spaces are often voluntary and thus understanding motives and the nature of work needed to sustain these collectives becomes pivotal. Building on this eclectic theoretical collage, my goal is to explore the way in which routines of care and resilience building may emerge and how that is driven by the nature of relationality that is nurtured across the forums.

Empirically, I presented a multi-method, multi-level investigation. I used the combined analytical lens of content analysis, social network analysis, and psycholinguistic analysis using LIWC to triangulate inferences based on data collected from these forums (Kou et al., 2018). The data is aggregated at both the content and actor levels to understand both the micro and macro levels of observations and to create a robust frame of comparative analysis. The content analysis yielded six distinct themes. These themes highlighted how each forum assumes a different

conversational persona and pattern of conversation. Most distinctively we can see how certain themes like *reflection on ethics*, help to address how the forum r/ggw carries a unique purpose – it provides a platform for advocacy and empowerment, calling for inclusion and respect for minoritized identities in the technical workplace. In doing so, we see how it shares certain features with r/cw (providing support and aiding resilience building), yet the pressures of the technical workplace cause unique regimes of collective action to emerge. To further consolidate these findings, I presented results from social network analysis at both the collective (macro) and individual (micro) levels. The collective level provided key insights into the way in which each of the collectives assumed distinctive characteristics. Using the metrics of transitivity and reciprocity, I highlighted how r/ggw appears to be the composite and closely bonded group followed by r/cw and r/csc. At the individual level, the metrics of betweenness, closeness, and PageRank further elucidate different actions by key actors. In r/ggw, top actors participate in discussions that center on the values of inclusivity, advocacy, and empowerment. Complementing this, in r/cw, key actors provide instrumental strategies for surviving and navigating the organizational habitus. This is akin to the theme of resilience through resistance and demonstrates how these collectives capture unique stances and purposes. An interesting observation for r/csc is the role of the automoderator and other automated agents, capturing the key spots as per the PageRank and betweenness centrality metrics. These agents centralize, control action, and regulate information flow. Further, certain key actors in r/csc depict a cold, isolating, and dominating stance towards the community, which is akin to traits of masculine toxicity as observed in prior studies (Parent, et al., 2019).

Finally, the psycholinguistic investigations conducted using LIWC (at the macro level) reveal further distinctions between the three forums, in terms of the collective perspectives that emerge.

213

Clustering key LIWC metrics at the micro level yielded four distinctive psychosocial portraits of the participants in these spaces. All insights blended together to reveal a relational spectrum ranging from highly communal to highly agentic that emerges in these forums, through the insights drawn from the data. r/csc ranks higher in the agentic end of this spectrum, whereas r/ggw ranks the highest in the communal side of the spectrum. Thus, through the analysis, we can see how roles and relationality set the tone and drive the nature of the collective practice that emerges, which in turn impacts the way in which individuals align themselves with the goals and values of the community. The shifting of roles of actors between r/ggw and r/csc further provides insights into the way in which the agentic vs the communal approach manifests in the community culture which ultimately impacts the voices of those who participate in these enclaves, rendering each forum unique in its purpose and collective vision. In aggregate, my comparative investigations indicate how the women-centric forums emerge as collectives of empowerment, aiming to guide historically minoritized voices to find a platform in the occupational context and battle implicit systems of exclusion that manifest in these spaces, imposing a habitus of domination. The weaker communal orientation of r/csc makes it a weakly bounded collective of information exchange, acting merely as an on-demand knowledge center, without depicting a strong cohesive essence and collective identity as a community.

Building on the important theme of aiding women professionals, especially those working in the technical frontier, the ultimate aim of this dissertation has been to highlight how online channels can provide various dimensions of care, support, and guidance as one navigates everyday struggles and symbolic oppression they may be subjected to due to their social position. In the discussion section, I connect these observations with the key theoretical bearings of my dissertation and discuss how these concepts manifest and characterize the nature of conversation

214

in these online spaces. In the next two segments, I summarize key insights from the discussion section, to highlight critical theoretical and empirical implications. I also provide a consolidated list, summarizing the key contributions of this dissertation.

6.2 A Summative List of Implications Associated with this Dissertation

Through the comparative analysis conducted at multiple levels, I have grounded my exploration in capturing the habitus that emerges through multiple methodological insights.

- I provide theoretical connections to further fully lay out the communal vs agentic manifestation and how that connects with the theoretical precursors presented.
- I use different theoretical avenues to enrich the comparative discussion and to lay out the facts of the habitus (in terms of understanding the habitus and also capturing the way in which the habitus is sustained).
  - **Unpacking the emergent habitus and especially the gendered habitus**: In the discussion, I elucidated how the emergent habitus of online community dynamics represents an intersectional confluence of several different forms of habitus that transcend into the virtual space from offline contexts, assuming unique connotations in the virtual space. The key insight was how each forum through the presence or absence of gender crafts a manifestation of the gendered habitus. In the women-centric forums (r/ggw and r/cw), this habitus depicts a form of *sisterhood,* a collective that through various information pathways attempts to help women navigate the gendered habitus that manifests in the workplace and threatens their day-to-day occupational identity development. Yet, this sisterhood has slight but important distinctions. r/ggw is rooted in collective activism and advocacy, empowering narratives that aim to dislodge the structures of oppression

215

and hegemonic regimes that relegate women and other minoritized voices to the periphery. r/cw on the other hand attempts to empower by instilling resistive strategies and helps create a pool of experiential wisdom aimed at resilience building. In many ways, these emerge as a habitus of survival. In contrast, r/csc, captures a genderless milieu, often depicting a less communal outlook. Using concepts from data feminism, I also discussed how r/csc depicts an image of absence in terms of the lack of recognition of gender, and privilege hazard that further indicates the glaring apathy and toxic masculine traits of this forum. Further, the way in which automated agents control and exert unchecked authority in r/csc also shows its technochauvinistic bearings.

o **Ontological security and online forums**: In several different ways I also allude to how online forums involve tackling multiple dimensions of ontological security. This discussion in many ways complements the way in which the habitus is crafted in the online sphere and how the gendered habitus manifests in this context. As discussed, in the women-centric forums (r/ggw & r/cw), many participants share, vent, disclose and attempt to reclaim their lost sense of ontological security when navigating the gendered habitus in the offline context. Yet, while engaging in these narratives, community members also develop a sense of ontological security when imbibing and learning the way in which these online collectives operate and develop norms of practice.

o **Care infrastructure and infrastructuring practices**: In the discussion section, I highlighted how the relational orientation and the gendered habitus emerge in the online context. I also alluded to the way in which each virtual enclave crafts a

unique premise of care and resilience building. In the women-centric (r/ggw &

r/cw) spaces, the ethics of care is indicated based on the way in which the

community is centered and valued. The lack of similar orientation depletes the

capacity of r/csc to develop a strong communal sense and cater to the individual

needs of the community and projects a normative, standardized view of the

technical workplace, where identity is not given due significance. Four

dimensions of care or acts of caring are also posited. Important in this regard is

the way in which care is performed through moderation. In r/ggw, moderations

depict a sense of care in their moderation activities (can be likened with

moderation as nurture), whereas in r/csc, automoderator is the main form of

moderation engagement, which has several limitations and poses barriers to

equitable participation, as discussed.

o **Dimensions of labor and work to sustain the emergent collective practice:** In

the discussion section, I alluded to how several dimensions of affective, and

emotional labor and work manifest, guided by prior contextually pertinent studies

(Rovira-Sancho, 2022). Further, in a novel expansion, I also explained how

relational labor and work are performed in these spaces, especially in the women-

centric forums that rank high in the communal perspective. The cost and toil of

relationality, sustaining, and expanding community can be laborious – connecting

that with relational labor and work was the key aim of this initiative. These

routines and initiatives are further connected with the way in which the gendered

habitus and ethics of care manifest, especially in the context of r/ggw & r/cw, to

further illuminate the need and value of such spaces geared towards promoting professional footprints of historically minoritized voices (such as women).

- o **Sociotechnical underpinnings and AI in the assemblage of actors of the virtual space:** In the final conceptual arc of the discussion, using structuration theory and particularly adaptive structuration theory, I alluded to how community practices intertwine with technical aspects (in the case of my analysis – that was demonstrated by the actions of automated agents). Further, I draw on the conceptual premise of technochauvinism and emerging conversations on ethical considerations of such agents to discuss barriers, limitations, and potential harms induced by regimes of oppressive automated management of participation, engagement, and knowledge sharing may create (Broussard, 2018; Simpson & Semaan, 2021). Using conceptual guides from data feminism and technochauvinism, I also highlight the lack of consideration of context and the failure to recognize the embodiment of lived experience in the digital traces of information, impact the efficacy and potential of such sociotechnical enclaves to act as conduits for developing a shared understanding, orientation to empowerment and advocacy to embolden conversations that fall beyond the standard spectrum of domain-specific knowledge sharing and information management (Broussard, 2018; Lucero, 2017; D'Ignazio & Klein, 2020).

- Beyond the theoretical insights, I also discussed several dimensions of design and policy considerations. Key highlights in this regard include:

  - o **Care as a sensitizing construct**: Akin to the frame of ethics of care, we can see how a valuable practice around care is crafted in the women-centric spaces (r/ggw

218

& r/cw). Care in these channels is deeply rooted in valuing and recognizing community, fostering a sense of belongingness, and cultivating a style of moderation activities that focus on nurturing and inclusion. Such forms of caring as I argue in the discussion section can be considered for designing affordances and tools of navigation. For example, such design guides might include voting schemes that capture care and tagging mechanisms that make visible the way in which care manifests in the emergent discourses. On the policy side, using the example of r/ggw, we can see how valuing care in the moderation principles can be essential for the community, the absence of which in r/csc, makes it a blank slate, devoid of any rich humanistic appeal, existing as an isolated island of information and knowledge exchange. Thus, upholding care (using the typology of care as I have proposed in the discussion section) in the way in which moderation philosophy and practices are outlined can be essential to ensuring that these online communities function as spaces that nurture and include *all* voices, including the historically underrepresented and marginalized (Yu et al., 2020).

o **Valuing care and relational dimensions of labor and work**: As argued in the discussion section, present routines of valuing contributions impose normative standards that equate various dimensions of informational facets. In doing so, the importance of contextual nuance is diminished and erased. For example, a contribution in r/cw that discusses resilience through resistance cannot be equated with a contribution in r/csc that simply provides a reference to a programming course. The power of experiential wisdom in the contributions of r/cw, cannot be recognized through the present schemes of valuing contribution which can have

219

drastic effects on the motives of participation, especially that of underrepresented voices (May et al., 2019). Thus, it is essential to think about potential tools and guidelines in these communities to further encourage sharing of nuanced experiential wisdom and value the labor of creating and maintaining community, and fostering collective affinity, all of which are missed for the normative *one size fits all* convention that presently manifests in these online venues (Corple, 2016).

o **Automation and community:** Automation as I argued in the discussion, works according to a set of standardized metrics and practices, which may miss essential contextual nuance (D'Ignazio & Klein, 2020). I also provided examples of how being guided by statistical metrics can throttle participation and affect the contextual richness of these forums. Further, I highlighted the need to recalibrate and reconfigure the guiding principles for creating and maintaining such systems. The balance of autonomy in conjuction with the notion of the ethics of care as a guiding premise (as captured to some extent in r/ggw) are other essential value propositions I suggested. Overall, in thinking about the ethical consequences of the engagement of automation and its impact on community building and maintenance, I alluded to incorporating the view of looking at a holistic perspective and not just treating the ethical discourses as a *panacea*. The goal is thus, to think beyond system design and policy, but to also raise awareness about these issues at all levels and across all actors (site designers, moderators, information preservers, policymakers as well as the community members or the proletariat of the online universe, who play the most vital role in the puzzle in creating, maintaining and curating information).

- Across all these points, the key insight is to recognize the importance of recalibrating the values of these channels (in terms of human and non-human assemblages) to understand the ramifications of these sociotechnical systems and their long-term sustenance, especially to promote inclusivity and equivocality of historically minoritized voices such as women.

Overall, several theoretical and practical insights are discussed and proposed to validate the efficacy or to provide potential measures towards increasing the applicability of these channels in the context of nurturing guidance, support, and care especially catering to the needs and visions of those who fall beyond the standard norm.

6.3 A Consolidated List of Key Contributions

Theoretical contributions:

- I provide a novel application and amalgam of theoretical frames, comprising of Structuration theory and the gendered habitus from Bourdieu's conceptual tools, to contextualize the study conducted and act as an analytical frame.
- I provide a novel theoretical extension and connection between constructivist frameworks (habitus, ontological security) and feminist frameworks (Care work and labor). To the best of my knowledge, this is the first study that applies the ethics of care framework in conjunction with the discourse on the gendered habitus in a comparative light, especially in the context of online communities.
- I provide a novel theoretical application and extension of relational labor to situate and uphold the impact of relationality and the way in which relational outcomes are valued and nurtured in the online context, which can have potential ramifications in terms of recognition and establishing the value of contribution.

- I also craft a novel application of ideas and principles from data feminism and other synergistic discourses to highlight how structures of oppressive symbolically exist and magnify curtailing engagement and participation in the online universe.

- Building on the above point, using a novel combination of principles from feminist HCI and data feminism, I also highlighted the potential shortcomings and need for a deeper understanding of the way in which automation is integrated. Further using the same guiding principles, I also highlight the way in which the standardized guidelines and design practices of such sociotechnical enclaves may throttle diverse participation, due to the erasure of context, the lack of recognition of lived experiences, and the missing embodiment of context through and in information.

- Such theoretical models can further add to the dialogue on how online channels can be designed to better serve the needs of marginalized and underrepresented groups such as women, especially in relation to supporting their career objectives and professional development.

Empirical & practical contribution:

- Methodologically, I provide a novel analytical framework for conducting comparative investigations, using a multifaceted approach with three methodological tools and with two levels of analysis. While the methods individually have their merits, I detail how a comparative investigation can be undertaken for each method. Finally, I provide an approach for analytically synthesizing and blending them together to yield holistic

insights. The code associated with conducting this detailed empirical investigation is shared as a GitHub repository[9].

- In another novel empirical and methodological dimension, I address how psychosocial attributes (using psycholinguistic analytical tools such as LIWC) can be used to further provide nuance towards emergent roles and motives of participation. To the best of my understanding, this is the first investigation that conducts a cluster analysis of relevant LIWC categories, aligned with the motive of role formation – which I call psychosocial portraits of participation. Conducting both content and actor-level investigations further provides nuance and depth to this multifaceted collage of methodological and empirical perspectives.

- Practically, through the empirical insights and theoretical investigations, I provide a foundation that addresses how online channels are and can help women in technology-focused fields, a dimension yet not explored by present scholarship, especially adding to career research in HCI (Tomprou et al., 2019). Such insights can further pave the way towards understanding the utility and viability of using such platforms to forward the goals of career mentoring and collective guidance.

- Further, I detail several limitations and possible avenues of consideration in terms of design and guiding policies for online enclaves. Particularly, I address visions surrounding the recognition of contribution (Corple, 2016) and the incorporation of automated agents (Simpson & Semaan, 2021). Such discussions can provide guidance towards designing and aligning the goals and values of these channels to cater to those

---

[9] https://github.com/sree249/DissertationCode

beyond the standard norm and thus align with feminist HCI visions of inclusion and participation (Bellini et al., 2018).

- I also provide a novel comparative perspective on how care infrastructure is laid out in the context of online communities. In this regard, I propose a typology of care and support formation using the roles and conversational themes gleaned. Such a typology can pave the way toward a deeper understanding of how such spaces develop norms to support and cater to the needs of the marginalized and historically minoritized (such as women). Further, I also provide considerations for moderation policies using the viewpoint of care as a nurturing construct, beyond the standard normative convention of moderation and gatekeeping (Jhaver et al., 2019).

- Finally, as highlighted in several potential implications in the discussion section, the key theme I engage with is to question the status quo of existing online channels and ways in which these insights can help scaffold initiatives to empower underrepresented voices writ large. Sharing the findings with the online communities (especially such as those as cscareerquestions that glaringly fall short of understanding the need to center identity) and discussing the implications with organizations that cater to the professional development needs of underrepresented voices, can further help to strengthen the cause and vision of such initiatives. This can also help such organizations to bolster the nature of programming and support that is given to women and other underrepresented groups in the context of pursuing scientific careers (Ruel, 2018). Further from the perspective of strengthening the efficacy of online channels of discussion, using the comparative analysis provides a robust basis to envision design principles and policies (such as

governance and moderation practices) of online venues of convergence, especially in
relation to supporting collective voices of marginalized and minoritized users.

6.4 Avenues for Future Research and Final Remarks on Research Philosophy

In this final concluding paragraph, I highlight areas of future expansion to further bolster the
visions of this work, rooted in the premise of aiding historically underrepresented voices (such as
women) to find an avenue of support and care to further their professional aspirations and visions
(especially in the context of the technical workforce). Before discussing future work, I also
acknowledge my position as a researcher and that the results presented here as being drawn from
a mixed methods study conducted on secondary data sources collected from online forums.

As a woman working and negotiating with the culture of the technical workforce, the study
context is motivated and premised by some of my own experiences and visions. Aligned with my
own insights, recent scholarship has also pointed to the struggles and lack of equitable access and
recognition that women especially women of color experience in the lifeworld of the technical
domain (Ong et al., 2011). Such explorations further necessitate the need to inspect more deeply
the practices and shortcoming of these domains. Professional development of the historically
underrepresented remains in many ways a pressing social need (Dillahunt et al., 2014). Another
essential premise that guides my investigation is the need to find caring and understanding
connections who can hear and support those in turmoil (Andalibi et al., 2018). Beyond the
scholarly motives, this initiative draws inspiration from Anton Chekhov's short story Grief, that
highlights the gnawing pain of loneliness that may arise out of the lack of human connect
(Chekhov, 1885). Further, the story goes on to narrate the way in which the protagonist finds
solace and comfort in disclosing his pain to the most unthinkable yet his most loyal companion,
the protagonist's horse. Using the horse as a metaphor and inspired by prior research on online

communities as sources of expanded support and resilience building tactics, I explore the avenue of online forums as enclaves of refuge, companionship of likeminded peers and sanctuaries of compassion and equitable expression (De Choudhury & De, 2014; Sengupta, 2021). Institutional regimes that lock and to some extent constrain our style of expression are standards, and standards may fail to fully fathom the depth and emotional voracity and complexity of many (Li & Browne, 2000). Thus, another chief goal and motivation of mine has been to integrate such views and thoughts with the way I explore and contextualize the theoretical guides of my work. Hence, the emphasis and core founding concepts of this narrative revolve around care, resilience and endurance. Yet, context may mediate the type of care needed. My goal here has been to focus on one such case. Thus, this work is focused on foregrounding the nature of practices and particularly struggles that women face and continue to face in the technical context which may not be visible and thereby creates a pressing need for empowerment and emancipation. Future work can further tackle the dimensions that may need further exploration, some of which shall be discussed in subsequent paragraphs. Beyond the motivational and analytical tenets of this work, the observations and associated discussion are driven and bounded by secondary data collected from publicly available APIs, as discussed in section 3. Any kind of data usage, especially that collected from online sources needs careful attention and acknowledgement of those who created this data and therefore are the owners of the information used to conduct this analysis (Proferes et al., 2021). In that regard, I have followed the ethical visions proposed by Proferes et al. (2021) for conducting Reddit research and have followed the guidelines for maintaining contributor anonymity and user privacy. Next, as the final segment of this saga, I propose key empirical investigations which can be explored under the umbrella of future work.

Future work can qualitatively and quantitatively expand this investigation in several ways. First, I shall detail some methodological expansions. Firstly, future explorations can further investigate potential outliers and contributions that may introduce skewness in the nature of inferences drawn. This is particularly motivated by the differences between the total number of contributions across the forums. Although all the insights are presented with keen attention to this fact and techniques such as normalization, additional preprocessing and sampling strategies were employed for conducting and validating the robustness of the analysis, deeper investigations can be conducted to more thoroughly understand the impact of outliers from a methodological and phenomenological perspective. For content analysis to add further validity to the observations, text classification methods such as BERT, and sophisticated models such as GP-3, can be used to enhance the robustness of results (Kowsari et al., 2019). Further, in terms of the social network analysis, all kinds of conversations are treated identically in my exploration, yet as proposed by Pete et al. (2020), a potential extension can be to create networks where each type of conversation (thread, post, comment) is treated differently, so as to gain nuance into how these different levels and layers of conversation can impact the network dynamics observed. Finally, it is important to address that time plays an integral aspect in the growth and proliferation of collaborative practice. Hence, future explorations can also consider looking at trends in temporal patterns. For example, investigations can consider how content, network associations, as well as psychosocial attributes, vary over different temporal scales (Yang et al., 2019). Such temporal insights can theoretically help to provide an understanding of how the structuration process emerges, that is how practice is established and in turn, helps provide a deeper argument towards the sustainability of online forums.

227

Finally, to complement the investigations through secondary data sources as unpacked above, qualitative and quantitative investigations can further help to discern how individuals perceive and align themselves with the goals of the online communities to which they belong. This is particularly pertinent to address a limitation and potential line of further expansion of this work. This entails the way the construct of *woman* is envisioned. The goal of my exploration has been to focus on the construct of womanhood as a whole, it is however far more complex, nuanced and not monochromatic as treated in this study. Inspired by perspectives such as intersectionality that in way acts a prism to highlight the different dimensions that give rise to the construct of womanhood, may call for a deeper investigation into the various facets that intertwine and give rise to this notion. Essentially, this perspective indicates that the struggles of women may contextually vary and thus should not be treated on a standardized or uniform scale. Pertinent in this regard, are studies that highlight the plight of women in non-western contexts and point to the important distinction between the struggles of women operating in non-western societies in comparison to their western counterparts (Mohanty, 2003). Further, as alluded to earlier, this investigation draws inspiration from my own experiences as a woman of color operating in a STEM discipline, hence future explorations can look into further nuances along that trajectory grounded and bolstered by black feminist scholarship (Collective, 1983). In this regard, socioeconomic and cultural angles can be further unpacked particularly using the qualitative frames in conjuction with the findings of my exploration. Survey investigations in this regard can explore factors such as attachment, and social capital and how these impact the way in which relational outcomes such as care and support are provided and nurtured, especially from the point of view of marginalized and historically underrepresented community members (such as the case of women in the technical workforce as explored here). Finally, qualitative investigations such as

semi-structured interviews can help to complement such investigations, to ideate and engage with participants to explore the design and policy recommendations.

In summary, I embarked on this narrative to highlight how online enclaves can provide opportunities for collaborative enterprise and nurture visions of collective empowerment, in order to bolster the call for everyday resilience building. Through the various analytical frames and points of discussion, I detailed how gender, care, and community intertwine and impact one another resulting in differing forms of collective practices emerging. Further, insights also point to the potential shortcomings of present online channels, in aiding the needs and voices of those who participate (especially the historically underrepresented). Contrasting observations from enclaves that scaffold community among the minoritized highlight how facets of care, collective morality, and prosocial initiatives drive action and participation in these venues. Drawing on these comparative insights my goal has been to shed light on the issues, struggles, and lack of recognition of those who fall beyond the status quo, addressing the urgent need for incorporating and channeling the lived experiences of the historically excluded and oppressed as advocated by the principles of data feminism and feminist HCI (Corple, 2016; Bellini et al., 2018; D'Ignazio & Klein, 2020).

7. Appendix

7.1 Glossary of Terms:

A compendium of terms commonly referenced and used across this dissertation.

1. **Structuration theory**: Postulated by British sociologist, Anthony Giddens, the goal is to create a dialogue between the macro and micro branches of Sociology (Giddens, 1984). The aim

is to highlight how structure represents a collective order, constituted by repeated actions over time and space. In turn, such an order also impacts the way in which subjects who belong to that order act and perform. This interplay of structure and agency is the crux of Structuration theory. More details on this are provided in Chapter 2, section 2.b. i.

2. **Structure**: It is a property of social systems. Structure according to Giddens is social practice repeated across time and space (Giddens, 1984). Essentially it refers to set routines that the individual or a group reproduces across various dimensions of time and space thereby establishing a patterned order of day-to-day life (Giddens, 1984). Rules and resources are essential facets of establishing structure. Three types of structure are mentioned in structuration theory: structure of legitimization, domination, and signification (Giddens, 1984). In many cases, these three forms of structure act together giving rise to a social system. More details can be found in Chapter 2, section 2.b. ii.

3. **Agency**: Agency is the capacity of the agent to produce action (Giddens, 1984). Thus, agency shapes and influences the power the agent possesses or how an agent uses the three variants of structure (signification, legitimation, and domination) in action. Agency is shaped by the way the agent socializes with others and learns the ways of the world. It is through this process that the agent establishes relationships and configures a role for itself which in turn dictates the way agents reproduce structure. A critique of Structuration theory is that there is not a clear line of demarcation between structure and agency. More details can be found in chapter 2, section 2.b. ii.

4. **Duality of structure**: The key essence of structuration theory. This concept essentially captures the interplay of structure and agency (Giddens, 1984). It is characterized by the binding

of structure and agency through specific contextual spatiotemporal boundaries. More details on this concept can be found in Chapter 2, section 2. b (i, iii).

5. **Ontological security**: It captures an essence of social embeddedness – that is how an individual aligns themselves to a specific social order (Giddens, 1984). As the outcome of social integration, an agent learns to develop rituals of trust and tact, these habitual behaviors are a manifestation of ontological security. It depicts an agent's sense of belongingness and adherence to structure. More details on this concept can be found in Chapter 2, section 2.b.

6. **Habitus**: Postulated by Pierre Bourdieu, the habitus refers to - the fact that an individual's values, beliefs, instincts, and moral ideologies are shaped by and shape one's embeddedness or social position (Bourdieu, 2001). It thus captures the dualistic perspective that Bourdieu's theories highlight between one's social position and acquired disposition. In Bourdieu's world, the habitus is more of a tacit notion and not something that is consciously learned but it is something acquired through repeated performance. More details on this concept can be found in section 2. c. i.

7. **Gendered habitus**: It is one of the seminal contributions of Bourdieu's conceptual toolkit. The gendered habitus is an extension of the general premise of the habitus. The gendered habitus in essence as per Bourdieu's theoretical stance is a form of gendered practice, that like the habitus is deeply rooted in everyday life and cultural practice (Bourdieu, 2001). It is in Bourdieu's view, something that happens subconsciously and is so deeply etched into cultural practices, that it becomes a routinized act that remains in certain sense unquestionable, appearing as if it is natural which results in a form of a gendered social condition (Dillabough, 2006). More details can be found in chapter 2, section 2. c. ii.

8. **Data feminism**: It is a way of thinking about data, both their uses and their limits, that is informed by direct experience, by a commitment to action, and by intersectional feminist thought (Collins, 2002; D'Ignazio & Klein, 2020). It essentially is not just a critique of the output of technology using the use case of data-driven systems but is a call for a much-needed reprioritization and restructuring of the values, goals, and objectives of such domains. Rooted in feminist philosophy that advocates for justice and co-liberatory initiatives, its aims are also to broaden the scope and definition of data-centric knowledge and work, deepening ethical stances by contesting the existing hegemonic bounds that symbolically annihilate the voices and visions of the historically underrepresented (D'Ignazio & Klein, 2020). More details can be found in chapter 2, section 2.c.iii.

9. **Systems of exclusion**: It is a conceptual tool that basically questions the motive and impact of data-driven systems (D'Ignazio & Klein, 2020). It essentially questions the way in which power is construed wherein such systems are designed to profit the privileged and surveil the marginalized (D'Ignazio & Klein, 2020). Thus, such systems become the very embodiment of social inequality and oppression, which this concept aims to critique. The notion of systems of exclusion can be envisioned to not only critique the impact of technical systems but can also be used to question to status quo of such technical communities. Several examples in chapter 2, section 2.c.iii highlight how women and other minoritized groups continue to be victimized due to the ways in which such systems are designed and the extent to which such systems enable visibility to all individuals.

10. **Image of Absence**: An outcome of the kind of systems of exclusion that manifest in the technical workplace, this concept refers to the erasure of voices and perspectives of those who do not fall in the perceived dominant group (D'ignazio & Klein, 2020). The lack of representation

and recognition, the cloaking of voices and visions of the historically underrepresented thus results in an image of absence. Pertinent examples and associated details are further discussed in chapter 2, section 2.c.iii.

11. **Privilege hazard**: This notion depicts a form of *empiricism of lived experience* wherein those actors who have not experienced marginalization are not sufficiently equipped to capture the intricacies of such experiences (D'Ignazio & Klein, 2020). It captures social inequity and the way in which it manifests in the ethos of the technical workplace and through technical artifacts. It highlights how some have the power, privilege, and social position to be seen and thus counted, represented in the way in which these technical systems are designed, while others may be pushed to the periphery due to their lack of representation and historic premise of subjugation. Pertinent examples and associated details are further discussed in chapter 2, section 2.c.iii.

12. **Technochauvinism**: It refers to a belief that technology is superior to all social and humanistic considerations, yet deeply entrenched in this ideology were social prejudices and beliefs of intellectual inequality, wherein women were often assumed to perform inferior roles (Broussard, 2018). In many ways, it highlights the premise upon which systems of exclusion arise. Discussed in chapter 2, section 2.c.iii are also potential ways in which technochauvenism impacts the way in which historically minoritized voices are undervalued and not given due recognition due to hegemonic regimes (Peterson, 2007).

13. **Ethics of care**: Postulated by American social psychologist, Carol Gilligan, the core essence of this perspective is that moral orientations differ based on gender (Gilligan, 1993). Men and women have different stances on morality. Such differing viewpoints affect the way in which they function in society and perform the act of care. Through her investigations on women's

perspectives on abortion, Gilligan found that women tend to be rooted in interpersonal relationships, as compared to men. Such differences in moral outlooks and relationality form the foundational basis of this framework. More details can be found in chapter 2, section 2.d. ii.

14. The triage of care, support, and resilience: In this narrative, care is treated as the collective practice of helping, nurturing, and catering to the needs of others (Bassett, 2002). Support and provide strategies for resilience building are treated as ways to offer care (De Choudhury & De, 2014; Andalibi et. al, 2018). Support is envisioned through acts of solidarity and expressions of understanding (De Choudhury & De, 2014). Resilience is cultivated through sharing strategies for empowerment and developing endurance (Semaan, 2019). More details can be found in chapter 2, sections 2.d (ii, iii).

15. **Infrastructure**: Drawing on sociotechnical conceptualizations of infrastructure, in this narrative infrastructure refers to the assemblage of human and non-human entities acting together in unison to support and nurture some form of a collective enterprise (Bowker & Star, 1998). Infrastructure (as the name suggests), involves a form of structure and the associated use conditions or the emergent practice that defines the way in which the non-human artifacts involved in this infrastructure are used. The sociotechnical view on infrastructure emphasizes more on the relational fabric that characterizes the nature of the infrastructure that emerges (Bowker & Star, 1998). Thus, infrastructure involves a dynamic system impacted by technical, social, and institutional factors (Bowker et. al, 2009). Infrastructure is also a dynamic construct that evolves as the underlying organizational facets mutate. More details on this construct can be found in chapter 2, section 2.d.iii.

16. **Care infrastructure**: This concept in many ways builds on the infrastructure framework and involves discussing the way systems around care are developed. The infrastructure of care involves and relies on reparative and restorative work carried out through dynamically interconnected ecologies of material and social practices (Alam & Houston, 2020). For example, hospitals as sites of care, have an infrastructure that involves not only the amenities such as labs, pharmacies, and wards, but also involves the human layer that provides support and establishes the norms associated with this infrastructure, thereby setting the nature and extent of care provided. More details are provided in chapter 2, section 2.d.iii.

17. **Emotional labor**: Emotional labor indicates the regulation and management of emotional dynamics when placed in a specific managerial role (Hothschild, 2015). The context of the application and scope of this dissertation involves investigating the emotional toll associated with managing online communities that moderators have to engage in (Dosono & Semaan, 2019). Further details can be found in Chapter 2, section 2.e.iii.1 and chapter 5, section 5.b.3.

18. **Relational labor**: This concept lays out the labor embedded in establishing and maintaining 'connect', especially in the context of virtual forums (Baym, 2015). Drawing on the work of musicians to connect with their fans through social media channels, this article highlights the labor of performing, hosting, and understanding the needs of the audience. In a sense, this form of labor may yield monetary income (i.e., for articles it may result in subscriptions) but the key here is a form of attachment that is established and the skills needed to retain and bolster that attachment (Baym, 2015). Relational labor thus requires skills, practice, and the vision to adapt and relate with the needs the of audience (Baym, 2015). The goal of using this concept in my dissertation is to present a novel line of inquiry into how this type of labor manifests in

maintaining and nurturing a community in open online forums. Further details can be found in Chapter 2, section 2.e.iii.1 and chapter 5, section 5.b.3.

19. **Affective labor**: Affective labor involves the labor involved in producing or modifying the emotional experiences of people (Bassett, 2002). This is particularly relevant in the context of care, as care workers engage with patients and have to manage varying kinds of sentiments and emotions (Bassett, 2002). Particularly, relevant in the context of my dissertation is the nature of affective labor involved in bolstering online digital campaigns (Rovira-Sancho, 2022). Further details can be found in Chapter 2, section 2.e.iii.1 and chapter 5, section 5.b.3.

20. **Emotion work**: This concept in many ways is similar to the notion of emotional labor. As proposed by Hochschild (2015), this term indicates the emotional toll that arises in the everyday context due to the need to manage and preserve different forms of relationships established and nurtured. The goal of using this term is not just to state or create a distinction between labor and work, but to generate a larger discussion on the nature of labor and work that is undertaken in online communities to sustain and nurture participation (Sakariassen, 2021). Further details can be found in Chapter 2, section 2.e.iii.1 and chapter 5, section 5.b.3.

7.2 Insights from Multinomial and Logistic Regression:

The table below highlights the different indicators that were found to be significant from the multinomial regression analysis. This represents the output obtained from conducting a multinomial logistic regression to investigate the way in which LIWC predictors manifest in the different forums. Particularly, the general forum r/csc was treated as the baseline. Thus, the goal was to inspect the differences that arise between the women-centric forums and the general

forum. The names of the indicators below correspond to the way in which they are defined in the LIWC-22 dictionary (Boyd et. al, 2022). Further details are provided regarding these variables in as applicable section 4.b.iii & 4.c. ii. The adjusted R-squared value (or the McFadden R-squared) value was found to be 0.83.

__Table A.1: Significant predictors from multinomial logistic regression__

Sl No.	Coefficients	Forums	Log-odds	P-Value
1	cogproc	cw	0.0542828	< .01
2	cogproc	ggw	0.0700758	< .01
3	discrep	cw	0.1126111	< .01
4	discrep	ggw	0.1114037	< .01
5	tentat	cw	-0.0639369	< .01
6	tentat	ggw	-0.0262716	< .01
7	centitude	cw	-0.0297666	0.0328472
8	centitude	ggw	-0.0453054	< .01
9	emo_anx	cw	-0.8022880	< .01
10	emo_anx	ggw	-0.8694509	< .01
11	emo_anger	cw	-0.3067615	< .01
12	emo_anger	ggw	-0.3313960	< .01

13	emo_sad	cw	0.2146353	< .01
14	emo_sad	ggw	0.1664377	< .01
15	swear	ggw	0.2095834	< .01
16	prosocial	cw	0.8392093	< .01
17	prosocial	ggw	0.8348810	< .01
18	moral	cw	0.3569013	< .01
19	moral	ggw	0.4894373	< .01
20	comm	cw	0.8623050	< .01
21	comm	ggw	0..8893786	< .01
22	male	cw	-0.0688837	< .01
23	male	ggw	-0.0620356	< .01
24	tech	cw	-0.0996383	< .01
25	tech	ggw	-0.0225099	< .01
26	work	cw	0.1093714	< .01
27	work	ggw	0.1115810	< .01
28	fatigue	cw	-0.2900598	< .01
29	fatigue	ggw	-0.3769981	< .01
30	reward	cw	-0.7939160	< .0

31	reward	ggw	-0.8653441	< .01
32	risk	cw	0.5900640	< .01
33	risk	ggw	0.6717631	< .01
34	curiosity	cw	0.3535653	< .01
35	curiosity	ggw	0.4059725	< .01
36	attention	cw	0.4642305	< .01
37	attention	ggw	0.5012421	< .01
38	motion	cw	0.7934895	< .01
39	motion	ggw	0.7986324	< .01
40	focuspast	cw	-0.0694924	< .01
41	focuspast	ggw	-0.0299203	< .01
42	focuspresent	cw	0.0200989	< .01
43	focuspresent	ggw	0.0281845	< .01
44	netspeak	cw	-0.1772840	< .01
45	netspeak	ggw	-0.1320608	< .01

The table below, complements the analysis and interpretation as outlined in 4.b.iii & 4.c. ii. The AIC value for this analysis was 2307. The significant predictors follow the same nomenclature as in table A.1.

Table A.2: Significant predictors from logistic regression (between r/ggw & r/cw)

Serial #	Coefficients	Log-odds	P-Value
1	we	0.159428	0.041276
2	they	0.196991	< .01
3	tentat	0.045707	0.045802
4	moral	0.236690	0.018729
5	ethnicity	1.333612	0.032648
6	lifestyle	0.169676	0.025358
7	home	-0.272114	0.030431
8	work	-0.178652	0.017205
9	money	-0.248791	< .01
10	reward	-0/167013	0.037434
11	risk	0.138470	< .01
15	focuspast	0.037738	0.032698
16	assent	-0.088410	< .01
17	nonflu	0.301541	0.042874

8. 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.

Alam, A., & Houston, D. (2020). Rethinking care as alternate infrastructure. *Cities*, *100*, 102662.

Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American behavioral scientist*, *59*(2), 254-269.

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*.

Anderson, M. A., & MFTC, J. B. (2021). Clash of Values: Workplace Bullying and Moral Injury. *Counseling and Family Therapy Scholarship Review*, *3*(2), 2.

Antoci, A., Sabatini, F., & Sodini, M. (2012). See you on Facebook! A framework for analyzing the role of computer-mediated interaction in the evolution of social capital. *The Journal of Socio-Economics*, *41*(5), 541-547.

Antoni, A., Reinecke, J., & Fotaki, M. (2020). Caring or not caring for coworkers? An empirical exploration of the dilemma of care allocation in the workplace. *Business Ethics Quarterly*, *30*(4), 447-485.

Arguello, J., Butler, B. S., Joyce, E., Kraut, R., Ling, K. S., Rosé, C., & Wang, X. (2006, April). Talk to me: Foundations for successful individual-group interactions in online communities. In *Proceedings of the SIGCHI conference on Human Factors in computing systems* (pp. 959-968).

Ashforth, B. E., & Schinoff, B. S. (2016). Identity under construction: How individuals come to define themselves in organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, *3*(1), 111-137.

Bagozzi, R. P., & Dholakia, U. M. (2002). Intentional social action in virtual communities. *Journal of interactive marketing*, *16*(2), 2-21.

Barakat, H., & Redmiles, E. M. (2022, May). Community under surveillance: Impacts of marginalization on an online labor forum. In *Proceedings of the International AAAI Conference on Web and Social Media* (Vol. 16, pp. 12-21).

Bassett, C. (2002). Nurses' perceptions of care and caring. *International journal of nursing practice*, *8*(1), 8-15.

Batson, C. D., Batson, J. G., Todd, R. M., Brummett, B. H., Shaw, L. L., & Aldeguer, C. M. (1995). Empathy and the collective good: Caring for one of the others in a social dilemma. *Journal of personality and social psychology*, *68*(4), 619.

Bavelas, A. (1950). Communication patterns in task-oriented groups. *The journal of the acoustical society of America*, *22*(6), 725-730.

Baym, N. K. (1995). The emergence of community in computer-mediated communication.

Baym, N. K. (2015). Connect with your audience! The relational labor of connection. *The communication review*, *18*(1), 14-22.

Beaudreau, S. A., Storandt, M., & Strube, M. J. (2005). A comparison of narratives told by younger and older adults. *Experimental Aging Research*, *32*(1), 105-117.

Bourdieu, P. (2001). *Masculine domination*. Stanford University Press.

Bourdieu, P., & Wacquant, L. (1992). *Réponses* (Vol. 4). Paris: Seuil.

Bowker, G. C., Baker, K., Millerand, F., & Ribes, D. (2009). Toward information infrastructure studies: Ways of knowing in a networked environment. In *International handbook of internet research* (pp. 97-117). Springer, Dordrecht.

Bowker, G. C., & Star, S. L. (1998). Building information infrastructures for social worlds—The role of classifications and standards. In *Community computing and support systems* (pp. 231-248). Springer, Berlin, Heidelberg.

Bowlby, S., & McKie, L. (2019). Care and caring: An ecological framework. *Area*, *51*(3), 532-539.

Boyd, R. L., Ashokkumar, A., Seraj, S., & Pennebaker, J. W. (2022). The development and psychometric properties of LIWC-22. *Austin, TX: University of Texas at Austin*.

Begel, A., & Simon, B. (2008, March). Struggles of new college graduates in their first software development job. In *Proceedings of the 39th SIGCSE technical symposium on Computer science education* (pp. 226-230).

Bellini, R., Strohmayer, A., Alabdulqader, E., Ahmed, A. A., Spiel, K., Bardzell, S., & Balaam, M. (2018, April). Feminist HCI: taking stock, moving forward, and engaging community. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1-4).

Benefield, G. A. (2018). *Effects of Group Openness to Diversity, Closure, and Linguistic Patterns in Virtual Teams.* University of California, Davis.

Blanchard, A. L., Welbourne, J. L., & Boughton, M. D. (2011). A model of online trust: The mediating role of norms and sense of virtual community. *Information, Communication & Society*, *14*(1), 76-106.

Blevins, J. L., Lee, J. J., McCabe, E. E., & Edgerton, E. (2019). Tweeting for social justice in#

Ferguson: Affective discourse in Twitter hashtags. *new media & society*, *21*(7), 1636-

1653.

Borgatti, S. P., Jones, C., & Everett, M. G. (1998). Network measures of social

capital. *Connections*, *21*(2), 27-36.

Borgatti, S. P. (2005). Centrality and network flow. *Social networks*, *27*(1), 55-71.

Bruns, A. (2007, June). Produsage. In *Proceedings of the 6th ACM SIGCHI Conference on

Creativity & Cognition* (pp. 99-106).

Bruns, A., & Schmidt, J. H. (2011). Produsage: A closer look at continuing developments. *New

Review of Hypermedia and Multimedia*, *17*(1), 3-7.

Blustein, D. L., & Noumair, D. A. (1996). Self and identity in career development: Implications

for theory and practice. *Journal of Counseling & Development*, *74*(5), 433-441.

Brooke, S. J. (2021). Trouble in programmer's paradise: gender-biases in sharing and

recognising technical knowledge on Stack Overflow. *Information, Communication &

Society*, *24*(14), 2091-2112.

Broussard, M. (2018). *Artificial unintelligence: How computers misunderstand the world*. mit

Press.

Bryant, C. G., & Jary, D. (Eds.). (2001). *The contemporary Giddens: Social theory in a

globalizing age*. New Your: Palgrave.

Bryson, J., Wilson, J., Plimmer, G., Blumenfeld, S., Donnelly, N., Ku, B., & Ryan, B. (2014).

Women workers: caring, sharing, enjoying their work–or just another gender

stereotype? *Labour & Industry: a journal of the social and economic relations of

work*, *24*(4), 258-271.

Budhathoki, N. R., & Haythornthwaite, C. (2013). Motivation for open collaboration: Crowd and community models and the case of OpenStreetMap. *American Behavioral Scientist*, 57(5), 548-575

Burt, R. S. (2017). Structural holes versus network closure as social capital. *Social capital*, 31-56.

Burt, R. S. (2018). Structural holes. In *Social Stratification* (pp. 659-663). Routledge.

Butler, J. (2013). *Excitable speech: A politics of the performative.* Routledge.

Cai, C. J., Carney, M., Zada, N., & Terry, M. (2021, May). Breakdowns and breakthroughs: Observing musicians' responses to the COVID-19 pandemic. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (pp. 1-13).

Carastathis, A. (2014). The concept of intersectionality in feminist theory. *Philosophy compass*, 9(5), 304-314.

Cazacu, S., Hansen, N. B., & Schouten, B. (2020, December). Empowerment Approaches in Digital Civics. In *32nd Australian Conference on Human-Computer Interaction* (pp. 692-699).

Chandrasekharan, E., Samory, M., Jhaver, S., Charvat, H., Bruckman, A., Lampe, C., & 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.

Chandrasekharan, E., Gandhi, C., Mustelier, M. W., & Gilbert, E. (2019). Crossmod: A cross-community learning-based system to assist Reddit moderators. *Proceedings of the ACM on human-computer interaction*, 3(CSCW), 1-30.

Charmaz, K. (2014). *Constructing grounded theory*. sage.

Chekhov, A. P. (1885). Grief. *Mosoblsovnarkhoz.*

Chen, Y. Z. (2020). Gendered symbols and habitus in collective action: Street protests in

Taiwan, 1997–2006. *Asian Journal of Women's Studies*, 26(1), 55-73.

Chen, K. (2013). *The Pro-anorexic Internet Community: A Study of Self or Other-focused*

Attention and Social-emotional Cognition. The Chicago School of Professional

Psychology.

Cherny, L. (1999). *Conversation and community: Chat in a virtual world* (No. hal-02297990).

Chikersal, P., Tomprou, M., Kim, Y. J., Woolley, A. W., & Dabbish, L. (2017, February). Deep

structures of collaboration: Physiological correlates of collective intelligence and group

satisfaction. In *Proceedings of the 2017 ACM Conference on Computer Supported*

Cooperative Work and Social Computing (pp. 873-888).

Collective, C. R. (1983). The Combahee River Collective Statement. Home Girls: A Black

Feminist Anthology 264-74.

Collins, P. H. (2002). Black feminist thought: Knowledge, consciousness, and the politics of

empowerment. Routledge.

Corple, D. J. (2016). *Beyond the Gender Gap: Understanding Women's Participation in*

Wikipedia (Doctoral dissertation, Purdue University).

Corsun, D. L., & Costen, W. M. (2001). Is the glass ceiling unbreakable? Habitus, fields, and the

stalling of women and minorities in management. *Journal of Management Inquiry*, *10*(1),

16-25.

Crawford, K. (2009). Following you: Disciplines of listening in social media. *Continuum*, *23*(4),

525-535.

Crenshaw, K. (1990). Mapping the margins: Intersectionality, identity politics, and violence

    against women of color. *Stan. L. Rev.*, *43*, 1241.

Cross, S., Waters, Z., Kitto, K., & Zuccon, G. (2017, March). Classifying help seeking behaviour

    in online communities. In *Proceedings of the Seventh International Learning Analytics &*

    Knowledge Conference (pp. 419-423).

Crowston, K., & Fagnot, I. (2008, July). The motivational arc of massive virtual collaboration.

    In *Proceedings of the IFIP WG* (Vol. 9, No. 5).

Cruz, C., Labonne, J., & Querubin, P. (2017). Politician family networks and electoral outcomes:

    Evidence from the Philippines. *American Economic Review*, *107*(10), 3006-37.

Damianakis, T., Wilson, K., & Marziali, E. (2018). Family caregiver support groups: spiritual

    reflections' impact on stress management. *Aging & Mental Health*, *22*(1), 70-76.

Dantec, C. A. L., & DiSalvo, C. (2013). Infrastructuring and the formation of publics in

    participatory design. *Social Studies of Science*, *43*(2), 241-264.

Davidson, B. I., Jones, S. L., Joinson, A. N., & Hinds, J. (2019). The evolution of online

    ideological communities. *PloS one*, *14*(5), e0216932.

Decter-Frain, A., & Frimer, J. A. (2016). Impressive words: linguistic predictors of public

    approval of the US congress. *Frontiers in psychology*, *7*, 240.

De Choudhury, M., & De, S. (2014, May). Mental health discourse on reddit: Self-disclosure,

    social support, and anonymity. In *Eighth international AAAI conference on weblogs and*

    social media.

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use:

    Adaptive structuration theory. *Organization science*, *5*(2), 121-147.

Dietz-Uhler, B., Bishop-Clark, C., & Howard, E. (2005). Formation of and adherence to a self-disclosure norm in an online chat. *CyberPsychology& Behavior, 8*(2), 114-120.

Dillard, C. B. (2016). To address suffering that the majority can't see: Lessons from black women's leadership in the workplace. *New Directions for Adult and Continuing Education*, *2016*(152), 29-38.

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.

Dillabough, J. A., & Acker, S. (2002). Globalisation women's work and teacher education: A cross-national analysis. *International Studies in Sociology of Education*, *12*(3), 227-260.

Dillahunt, T., Wang, Z., & Teasley, S. D. (2014). Democratizing higher education: Exploring MOOC use among those who cannot afford a formal education. *International Review of Research in Open and Distributed Learning*, *15*(5), 177-196.

D'Ignazio, C., & Klein, L. F. (2020). *Data feminism*. MIT press.

Dosono, B. (2018, January). AAPI identity work on Reddit: Toward social support and collective action. In Proceedings of the 2018 ACM Conference on Supporting Groupwork (pp. 373-378).

Dosono, B. (2019). *Identity Work of Asian Americans and Pacific Islanders on Reddit: Traversals of Deliberation, Moderation, and Decolonization* (Doctoral dissertation, Syracuse University).

Dosono, B., & Semaan, B. (2019, May). Moderation practices as emotional labor in sustaining online communities: The case of AAPI identity work on Reddit. In *Proceedings of the 2019 CHI conference on human factors in computing systems* (pp. 1-13).

Downe-Wamboldt, B. (1992). Content analysis: method, applications, and issues. *Health care for women international*, *13*(3), 313-321.

Dunn, K. E., Rakes, G. C., & Rakes, T. A. (2014). Influence of academic self-regulation, critical thinking, and age on online graduate students' academic help-seeking. *Distance Education*, *35*(1), 75-89.

Dye, M. (2021). Un Grano de Arena: Infrastructural Care, Social Media Platforms, and the Venezuelan Humanitarian Crisis. *Proceedings of the ACM on Human-Computer Interaction*, *4*(CSCW3), 1-28.

Edgerton, J., Peter, T., & Roberts, L. (2014). Gendered habitus and gender differences in academic achievement. *Alberta journal of educational research*, *60*(1), 182-212.

Ehsan, A., Klaas, H. S., Bastianen, A., & Spini, D. (2019). Social capital and health: A systematic review of systematic reviews. *SSM-population health*, *8*, 100425.

Elder, M. D., Jho, J. Y., Rokosz, V. T., Schirmer, A. L., & Schultz, M. (2007). *U.S. Patent No. 7,249,123*. Washington, DC: U.S. Patent and Trademark Office.

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.

Ellison, N. B., Vitak, J., Gray, R., & Lampe, C. (2014). Cultivating social resources on social network sites: Facebook relationship maintenance behaviors and their role in social capital processes. *Journal of Computer-Mediated Communication*, *19*(4), 855-870.

Faraj, S., Kudaravalli, S., & Wasko, M. (2015). Leading collaboration in online communities. *MIS quarterly*, *39*(2), 393-412.

Ferdoush, A. (2018). Seeing borders through the lens of structuration: A theoretical framework. *Geopolitics*, *23*(1), 180-200.

Ferrucci, P., Hopp, T., & Vargo, C. J. (2020). Civic engagement, social capital, and ideological extremity: Exploring online political engagement and political expression on Facebook. *New Media & Society*, *22*(6), 1095-1115.

Fiesler, C., Morrison, S., & Bruckman, A. S. (2016, May). An archive of their own: A case study of feminist HCI and values in design. In *Proceedings of the 2016 CHI conference on human factors in computing systems* (pp. 2574-2585).

Fox, A. K., & Royne Stafford, M. B. (2021). Olympians on twitter: A linguistic perspective of the role of authenticity, clout, and expertise in social media advertising. *Journal of Current Issues & Research in Advertising*, *42*(3), 294-309.

Fowler, B. (2003). Reading Pierre Bourdieu's Masculine Domination: Notes towards an intersectional analysis of gender, culture and class. *Cultural studies, 17*(3-4), 468-494.

Freeman, L. C. (1978). Centrality in social networks conceptual clarification. *Social networks*, *1*(3), 215-239.

Geiger, R. S., & Halfaker, A. (2013, February). Using edit sessions to measure participation in Wikipedia. In *Proceedings of the 2013 conference on Computer supported cooperative work* (pp. 861-870).

Geng, S., Niu, B., Feng, Y., & Huang, M. (2020). Understanding the focal points and sentiment of learners in MOOC reviews: A machine learning and SC-LIWC-based approach. *British Journal of Educational Technology*, *51*(5), 1785-1803.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Univ of California Press.

Gilligan, C. (1993). *In a different voice: Psychological theory and women's development.* Harvard University Press.

Gilligan, C., & Voice, I. D. (1993). Psychological theory and womens development. *Cambridge, MA*.

Gilligan, C. (2014). Moral injury and the ethic of care: Reframing the conversation about differences. *Journal of Social Philosophy, 45(1)*, 89-106.

Godara, J., Isenhour, P., & Kavanaugh, A. (2009, January). The efficacy of knowledge sharing in centralized and self-organizing online communities: Weblog networks vs. discussion forums. In 2009 *42nd Hawaii International Conference on System Sciences* (pp. 1-10). IEEE.

Golder, S. A., & Donath, J. (2004). Social roles in electronic communities. *Internet Research, 5(1)*, 19-22.

Gorwa, R., Binns, R., & Katzenbach, C. (2020). Algorithmic content moderation: Technical and political challenges in the automation of platform governance. *Big Data & Society, 7*(1), 2053951719897945.

Granovetter, M. S. (1973). The strength of weak ties. *American journal of sociology*, 78(6), 1360-1380.

Gray, R., Fitch, M., Davis, C., & Phillips, C. (1997). A qualitative study of breast cancer self-help groups. *Psycho-Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer*, *6*(4), 279-289.

Graybeal, A., Sexton, J. D., & Pennebaker, J. W. (2002). The role of story-making in disclosure writing: The psychometrics of narrative. *Psychology and Health, 17*(5), 571-581.

Groenewegen, P., & Moser, C. (2014). Online communities: Challenges and opportunities for social network research. *Contemporary Perspectives on Organizational Social Networks*.

Gruzd, A., Wellman, B., &Takhteyev, Y. (2011). Imagining Twitter as an imagined community. *American Behavioral Scientist, 55*(10), 1294-1318.

Ha, T., & Nguyen, P. (2020). Social capital, knowledge sharing and firm performance. *Management Science Letters*, *10*(12), 2923-2930.

Habib, H., Musa, M. B., Zaffar, F., & Nithyanand, R. (2019). To act or react: Investigating proactive strategies for online community moderation. *arXiv preprint arXiv:1906.11932*.

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.

Hanappi-Egger, E. (2013). Backstage: The organizational gendered agenda in science, engineering and technology professions. *European Journal of Women's Studies, 20(3)*, 279-294.

Hagen, N. I. (2021). *The Voice of Technology: Understanding the Work of Feminine Voice Assistants and the Feminization of the Interface* (Doctoral dissertation, Harvard University).

Hardy, C. L., & Van Vugt, M. (2006). Nice guys finish first: The competitive altruism hypothesis. *Personality and Social Psychology Bulletin*, *32*(10), 1402-1413.

Hatmaker, D. M. (2013). Engineering identity: Gender and professional identity negotiation among women engineers. *Gender, Work & Organization*, *20*(4), 382-396.

Haythornthwaite, C. (2007). Social networks and online community. In A. Joinson, K. McKenna, T. Postmes, & U-D. Reips (Eds.), The *Oxford handbook of internet psychology*. Oxford University Press.

Haythornthwaite, C. (2009, January). Crowds and communities: Light and heavyweight models of peer production. In *2009 42nd Hawaii international conference on system sciences* (pp. 1-10). IEEE.

Heidemann, J., Klier, M., & Probst, F. (2010). Identifying key users in online social networks: A pagerank based approach.

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.

Herrera, C., & Agoff, M. C. (2019). Goodbye to the golden cage: Transformations in gender norms and family morality for working-class women in occupations considered masculine in Mexico. *Gender, Work & Organization*, *26*(9), 1324-1339.

Hochschild, A. R. (2015). The managed heart. In *Working in America* (pp. 47-54). Routledge.

Hogan, B. (2016). Online Social Networks: Concepts for Data Collection. *The SAGE handbook of online research methods*, 241.

Holmes, M. (2008). *Gender and everyday life*. Routledge.

Hu, L., & Kearney, M. W. (2021). Gendered tweets: Computational text analysis of gender differences in political discussion on Twitter. *Journal of Language and Social Psychology, 40*(4), 482-503.

Huang, K. Y., Chengalur-Smith, I., & Pinsonneault, A. (2019). Sharing is caring: Social support provision and companionship activities in healthcare virtual support communities. *MIS quarterly*, *43*(2), 395-424.

Huijser, H., Kimmins, L., & Evans, P. (2008). Peer assisted learning in fleximode: Developing an online learning community. *Journal of Peer Learning, 1*(1), 51-60.

Huppatz, K. (2009). Reworking bourdieu's Capital': Feminine and female capitals in the field of paid caring work. *Sociology*, *43*(1), 45-66.

Ibarra, H., & Petriglieri, J. L. (2010). Identity work and play. *Journal of Organizational Change Management*.

Inkpen, A. C., & Tsang, E. W. (2005). Social capital, networks, and knowledge transfer. *Academy of management review, 30*(1), 146-165.

Iosub, D., Laniado, D., Castillo, C., Fuster Morell, M., & Kaltenbrunner, A. (2014). Emotions under discussion: Gender, status and communication in online collaboration. *PloS one*, *9*(8), e104880.

Israel, G. D., & Beaulieu, L. J. (2004). Investing in communities: Social capital's role in keeping youth in school. *Community Development*, *34*(2), 35-57.

Ivaturi, K., & Chua, C. (2019). Framing norms in online communities. *Information & Management*, *56*(1), 15-27.

Jackson, C. B., Harandi, M., Østerlund, C., Kharwar, D., & Crowston, K. (2020, January). Linguistic adoption in online citizen science: A structurational perspective. In *40th International Conference on Information Systems, ICIS 2019*. Association for Information Systems.

Janky, B., & Takács, K. (2002). Social control, participation in collective action and network stability. *Budapest University of Technology and Economics*.

Jhaver, S., Appling, D. S., Gilbert, E., & Bruckman, A. (2019). " Did you suspect the post would be removed?" Understanding user reactions to content removals on Reddit. *Proceedings of the ACM on human-computer interaction*, *3*(CSCW), 1-33.

Jhaver, S., Birman, I., Gilbert, E., & Bruckman, A. (2019). Human-machine collaboration for content regulation: The case of reddit automoderator. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *26*(5), 1-35.

Jin, J., Li, Y., Zhong, X., & Zhai, L. (2015). Why users contribute knowledge to online communities: An empirical study of an online social Q&A community. *Information & management*, *52*(7), 840-849.

Johnson, J., Black, R. W., & Hayes, G. R. (2020). Roles in the discussion: an analysis of social support in an online forum for people with dementia. *Proceedings of the ACM on Human-Computer Interaction*, *4*(CSCW2), 1-30.

Johri, A., & Yang, S. (2017, June). Scaffolded help for learning: How experts collaboratively support newcomer participation in online communities. In *Proceedings of the 8th International Conference on Communities and Technologies* (pp. 149-158).

Kadushin, C. (2012). *Understanding social networks: Theories, concepts, and findings*. Oxford university press.

Kamboj, S., Kumar, V., & Rahman, Z. (2017). Social media usage and firm performance: the mediating role of social capital. *Social Network Analysis and Mining*, *7*(1), 1-14.

Kavanaugh, A., Carroll, J. M., Rosson, M. B., Zin, T. T., & Reese, D. D. (2005). Community networks: Where offline communities meet online. *Journal of Computer-Mediated Communication*, *10*(4), JCMC10417.

Kelan, E. (2009). *Performing gender at work*. Springer.

Kennelly, J. (2017). Symbolic violence and the Olympic Games: Low-income youth, social

    legacy commitments, and urban exclusion in Olympic host cities. *Journal of Youth*

    Studies, *20*(2), 145-161.

Kimbrough, A. M., Guadagno, R. E., Muscanell, N. L., & Dill, J. (2013). Gender differences in

    mediated communication: Women connect more than do men. *Computers in Human*

    Behavior, *29*(3), 896-900.

King, K. F., Kolopack, P., Merritt, M. W., & Lavery, J. V. (2014). Community engagement and

    the human infrastructure of global health research. *BMC medical ethics*, *15*(1), 1-6.

Klandermans, B. (2004). The demand and supply of participation: Social-psychological

    correlates of participation in social movements. *The Blackwell companion to social*

    movements, 360-379.

Kohlberg, L. (1986). *Lawrence Kohlberg, consensus and controversy* (No. 1). Routledge.

Koskinen Sandberg, P., Törnroos, M., & Kohvakka, R. (2018). The institutionalised

    undervaluation of women's work: The case of local government sector collective

    agreements. *Work, employment and society, 32*(4), 707-725.

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.

Kou, Y., & Gui, X. (2021, May). Flag and Flaggability in Automated Moderation: The Case of

    Reporting Toxic Behavior in an Online Game Community. In *Proceedings of the 2021*

    CHI Conference on Human Factors in Computing Systems (pp. 1-12).

Kowsari, K., Jafari Meimandi, K., Heidarysafa, M., Mendu, S., Barnes, L., & Brown, D. (2019).

    Text classification algorithms: A survey. *Information, 10*(4), 150.

Kraut, R. E., & Resnick, P. (2011). Encouraging contribution to online communities. Building

  successful online communities: Evidence-based social design, 21-76.

Kronsell, A. (2005). Gendered practices in institutions of hegemonic masculinity: Reflections

  from feminist standpoint theory. *International Feminist Journal of Politics*, *7*(2), 280-

  298.

Kwon, S. W., & Adler, P. S. (2014). Social capital: Maturation of a field of research. *Academy of*

  management review, *39*(4), 412-422.

Kyriakidou, O. (2011). Negotiating gendered identities through the process of identity

  construction: Women managers in engineering. *Equality, Diversity and Inclusion: An*

  International Journal.

Lai, L. S., & To, W. M. (2015). Content analysis of social media: A grounded theory approach.

  Journal of Electronic Commerce Research, 16(2), 138.

Lampe, C., Vitak, J., & Ellison, N. (2013, February). Users and nonusers: Interactions between

  levels of adoption and social capital. In Proceedings of the *2013 conference on Computer*

  supported cooperative work (pp. 809-820).

Larsen, R. J., & Seidman, E. (1986). Gender schema theory and sex role inventories: Some

  conceptual and psychometric considerations. *Journal of Personality and Social*

  Psychology, 50(1), 205.

Lee, C. P., Dourish, P., & Mark, G. (2006, November). The human infrastructure of

  cyberinfrastructure. In *Proceedings of the 2006 20th anniversary conference on*

  Computer supported cooperative work (pp. 483-492).

Lee, S., & Park, D. H. (2019). Community attachment formation and its influence on sustainable participation in a digitalized community: Focusing on content and social capital of an online community. *Sustainability, 11*(10), 2935.

Li, H., & Browne, A. (2000). Defining mental illness and accessing mental health services: Perspectives of Asian Canadians. *Canadian Journal of Community Mental Health*, *19*(1).

Li, Y., Ye, F., & Sheu, C. (2014). Social capital, information sharing and performance: Evidence from China. *International Journal of Operations & Production Management*.

Li, H., Hecht, B., & Chancellor, S. (2022, May). All That's Happening behind the Scenes: Putting the Spotlight on Volunteer Moderator Labor in Reddit. In *Proceedings of the International AAAI Conference on Web and Social Media* (Vol. 16, pp. 584-595).

Liang, Y., & Introne, J. (2019). Social roles, interactions and community sustainability in social q&a sites: A resource-based perspective.

Lin, N. (2017). Building a network theory of social capital. *Social capital*, 3-28.

Lin, Z., & Yang, L. (2019). Individual and collective empowerment: Women's voices in the# MeToo movement in China. *Asian Journal of Women's Studies, 25(1)*, 117-131.

Liu, Y., Kornfield, R., Shaw, B. R., Shah, D. V., McTavish, F., & Gustafson, D. H. (2017). When support is needed: Social support solicitation and provision in an online alcohol use disorder forum. *Digital health*, *3*, 2055207617704274.

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.

Lopez, L. K. (2014). Blogging while angry: The sustainability of emotional labor in the Asian American blogosphere. *Media, Culture & Society, 36*(4), 421-436.

Lovell, T. (2001). Thinking feminism with and against Bourdieu. *The Sociological Review, 49*(1_suppl), 27-48.

Lu, A. J., Gilhool, A., Hsiao, J. C. Y., & Dillahunt, T. R. (2022). Emotional Labor in Everyday Resilience: Class-based Experiences of Navigating Unemployment Amid the COVID-19 Pandemic in the US. Computer supported cooperative work CSCW.

Lucero, L. (2017). Safe spaceas in online places: Social media and LGBTQ youth. *Multicultural Education Review*, *9*(2), 117-128.

Makri, S., & Turner, S. (2020). "I can't express my thanks enough": The "gratitude cycle" in online communities. *Journal of the Association for Information Science and Technology, 71*(5), 503-515.

Manggat, I., Zain, R., & Jamaluddin, Z. (2018). The impact of infrastructure development on rural communities: A literature review. *Sciences, 8*(1), 637-648.

Mantere, S., & Whittington, R. (2021). Becoming a strategist: The roles of strategy discourse and ontological security in managerial identity work. *Strategic Organization*, *19*(4), 553-578.

Maqsoom, A., Mughees, A., Zahoor, H., Nawaz, A., & Mazher, K. M. (2020). Extrinsic psychosocial stressors and workers' productivity: impact of employee age and industry experience. *Applied Economics, 52*(26), 2807-2820.

Marchiori, M., & Latora, V. (2000). Harmony in the small-world. *Physica A: Statistical Mechanics and its Applications, 285*(3-4), 539-546.

Marin, A., & Wellman, B. (2011). Social network analysis: An introduction. T*he SAGE handbook of social network analysis*, *11*, 25.

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.

Martin, P. Y. (2004). Gender as social institution. *Social forces, 82*(4), 1249-1273.

Masolo, C., Vieu, L., Bottazzi, E., Catenacci, C., Ferrario, R., Gangemi, A., & Guarino, N. (2004, June). Social Roles and their Descriptions. In *KR (*pp. 267-277).

May, A., Wachs, J., & Hannák, A. (2019). Gender differences in participation and reward on Stack Overflow. *Empirical Software Engineering, 24*(4), 1997-2019.

McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia medica, 22*(3), 276-282.

McKeen, C., & Bujaki, M. (2007). Gender and mentoring. *The handbook of mentoring at work: Theory, research, and practice*, 197-222.

McKie, L., & Jyrkinen, M. (2017). MyManagement: women managers in gendered and sexualised workplaces. *Gender in Management: An International Journal.*

McNay, L. (1999). Gender, habitus and the field: Pierre Bourdieu and the limits of reflexivity. *Theory, culture & society, 16*(1), 95-117.

Miller, D. L. (2016, June). Gender, field, and habitus: How gendered dispositions reproduce fields of cultural production. *In Sociological Forum* (Vol. 31, No. 2, pp. 330-353).

Mishra, P., Yannakoudakis, H., & Shutova, E. (2021). Modeling Users and Online Communities for Abuse Detection: A Position on Ethics and Explainability. *arXiv preprint arXiv:2103.17191.*

Mohanty, C. T. (2003). "Under western eyes" revisited: Feminist solidarity through anticapitalist struggles. *Signs: Journal of Women in culture and Society, 28(2)*, 499-535.

Moitra, A., Ahmed, S. I., & Chandra, P. (2021). Parsing the'Me'in# MeToo: Sexual Harassment, Social Media, and Justice Infrastructures. *Proceedings of the ACM on Human-Computer Interaction*, *5*(CSCW1), 1-34.

Monzani, D., Vergani, L., Pizzoli, S. F. M., Marton, G., & Pravettoni, G. (2021). Emotional

Tone, Analytical Thinking, and Somatosensory Processes of a Sample of Italian Tweets

During the First Phases of the COVID-19 Pandemic: Observational Study. *Journal of

Medical Internet Research*, *23*(10), e29820.

Mowle, A. (2021). *Networked Feminism in the Digital Field: A Case Study of

Reddit'sr/TwoXChromosomes* (Doctoral dissertation, Victoria University).

Muchnik, L., Pei, S., Parra, L. C., Reis, S. D., Andrade Jr, J. S., Havlin, S., & Makse, H. A.

(2013). Origins of power-law degree distribution in the heterogeneity of human activity

in social networks. *Scientific reports*, *3*(1), 1-8.

Mugar, G., Østerlund, C., Hassman, K. D., Crowston, K., & Jackson, C. B. (2014, February).

Planet hunters and seafloor explorers: legitimate peripheral participation through practice

proxies in online citizen science. In *Proceedings of the 17th ACM conference on

Computer supported cooperative work & social computing* (pp. 109-119).

Müller-Birn, C., Karran, B., Lehmann, J., &Luczak-Rösch, M. (2015, August). Peer-production

system or collaborative ontology engineering effort: What is Wikidata?. In *Proceedings

of the 11th International Symposium on Open Collaboration* (pp. 1-10).

Mundt, M., Ross, K., & Burnett, C. M. (2018). Scaling social movements through social media:

The case of Black Lives Matter. *Social Media+ Society, 4*(4), 2056305118807911.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational

advantage. *Academy of management review*, *23*(2), 242-266.

Nartey, M. (2022). Centering marginalized voices: a discourse analytic study of the Black Lives

Matter movement on Twitter. *Critical Discourse Studies, 19*(5), 523-538.

Newman, M. (2018). *Networks*. Oxford university press.

Newman, M. L., Pennebaker, J. W., Berry, D. S., & Richards, J. M. (2003). Lying words: Predicting deception from linguistic styles. *Personality and social psychology bulletin, 29*(5), 665-675.

Noldus, R., & Van Mieghem, P. (2015). Assortativity in complex networks. *Journal of Complex Networks*, *3*(4), 507-542.

Nouh, M., & Nurse, J. R. (2015, November). Identifying key-players in online activist groups on the facebook social network. In *2015 IEEE International Conference on Data Mining Workshop (ICDMW)* (pp. 969-978). IEEE.

Nurik, C. (2019). "Men are scum": Self-regulation, hate speech, and gender-based censorship on Facebook. *International Journal of Communication*, *13*, 21.

Obinali, C. (2019). The perception of gender in voice assistants. In *SAIS 2019 Proceedings of the Southern Association for Information Systems Conference* (pp. 22-23).

Ong, M., Wright, C., Espinosa, L., & Orfield, G. (2011). Inside the double bind: A synthesis of empirical research on undergraduate and graduate women of color in science, technology, engineering, and mathematics. *Harvard educational review*, 81(2), 172-209.

Osborne, J. W. (2016). *Regression & linear modeling: Best practices and modern methods*. Sage Publications.

Ottinger, G. (2022). Becoming Infrastructure: Integrating Citizen Science into Disaster Response and Prevention. *Citizen Science: Theory and Practice*, *7*(1).

Pääkkönen, J., Laaksonen, S. M., & Jauho, M. (2020). Credibility by automation: Expectations of future knowledge production in social media analytics. *Convergence*, *26*(4), 790-807.

Pan, W., Shen, C., & Feng, B. (2017). You get what you give: understanding reply reciprocity and social capital in online health support forums. *Journal of health communication*, *22*(1), 45-52.

Parent, M. C., Gobble, T. D., & Rochlen, A. (2019). Social media behavior, toxic masculinity, and depression. *Psychology of Men & Masculinities*, *20*(3), 277.

Pénard, T., &Poussing, N. (2010). Internet use and social capital: The strength of virtual ties. *Journal of Economic Issues*, 44(3), 569-595.

Pennebaker, J. W., Chung, C. K., Frazee, J., Lavergne, G. M., & Beaver, D. I. (2014). When small words foretell academic success: The case of college admissions essays. *PloS one*, *9*(12), e115844.

Peterson, H. (2007). Gendered work ideals in Swedish IT firms: Valued and not valued workers. *Gender, Work & Organization*, *14*(4), 333-348.

Pete, I., Hughes, J., Chua, Y. T., & Bada, M. (2020, September). A social network analysis and comparison of six dark web forums. In *2020 IEEE European symposium on security and privacy workshops (EuroS&PW)* (pp. 484-493). IEEE.

Pfeil, U., Svangstu, K., Ang, C. S., & Zaphiris, P. (2011). Social roles in an online support community for older people. *Intl. Journal of Human–Computer Interaction*, *27*(4), 323-347.

Pluempavarn, P., Panteli, N., Joinson, A., Eubanks, D., Watts, L., & Dove, J. (2011). Social roles in online communities: Relations and trajectories. In *Proceedings of 6th Mediterranean Conference on Information Systems* (Vol. 4, p. 2012).

Pirnejad, H., Niazkhani, Z., Berg, M., & Bal, R. (2008). Intra-organizational communication in healthcare. *Methods of information in medicine*, *47*(04), 336-345.

Poortinga, W. (2012). Community resilience and health: The role of bonding, bridging, and linking aspects of social capital. *Health & place*, 18(2), 286-295.

Preece, J., & Maloney-Krichmar, D. (2003). Online communities: focusing on sociability and usability. *Handbook of human-computer interaction*, 596-620.

Priadana, A., & Tahalea, S. P. (2021, March). Hashtag activism and message frames: social network analysis of Instagram during the COVID-19 pandemic outbreak in Indonesia. In Journal of Physics: Conference Series (Vol. 1836, No. 1, p. 012031). IOP Publishing.

Proferes, N., Jones, N., Gilbert, S., Fiesler, C., & Zimmer, M. (2021). Studying reddit: A systematic overview of disciplines, approaches, methods, and ethics. *Social Media+ Society, 7*(2), 20563051211019004.

Putnam, R. D. (2000). Bowling alone: America's declining social capital. In *Culture and politics* (pp. 223-234). Palgrave Macmillan, New York.

Oliveira, N., Muller, M., Andrade, N., & Reinecke, K. (2018). The exchange in StackExchange: Divergences between Stack Overflow and its culturally diverse participants. *Proceedings of the ACM on Human-Computer Interaction*, *2*(CSCW), 1-22.

O'Neill, T. (2018). 'Today I speak': Exploring how victim-survivors use Reddit. *International journal for crime, justice and social democracy*, *7*(1), 44.

Rabbany, R., Elatia, S., Takaffoli, M., & Zaïane, O. R. (2014). Collaborative learning of students in online discussion forums: A social network analysis perspective. In *Educational data mining* (pp. 441-466). Springer, Cham.

Ralph, N., Birks, M., & Chapman, Y. (2015). The methodological dynamism of grounded theory. *International Journal of Qualitative Methods*, 14(4), 1609406915611576.

Reay, D. (1998). *Class work: Mothers' involvement in their children's primary schooling*. Taylor & Francis.

Reay, D. (2002). Shaun's story: troubling discourses of white working-class masculinities. *Gender and education*, *14*(3), 221-234.

Reay, D. (2015). Habitus and the psychosocial: Bourdieu with feelings. *Cambridge journal of education*, *45*(1), 9-23.

Recuero, R., Amaral, A., & Monteiro, C. (2012). Fandoms, trending topics and social capital in Twitter. *AoIR Selected Papers of Internet Research*.

Rehm, M., Mulder, R. H., Gijselaers, W., & Segers, M. (2016). The impact of hierarchical positions on the type of communication within online communities of learning. *Computers in Human Behavior*, *58*, 158-170.

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.

Resnick, P. (2001). Beyond bowling together: Sociotechnical capital. *HCI in the New Millennium, 77*, 247-272.

Reus, B., Moser, C., & Groenewegen, P. (2022). Expanding organisational knowledge online: the role of bridging members in knowledge expansion in online groups. *Innovation*, *24*(1), 144-167.

Reyes, A., & Bonnin, J. E. (2017). Negotiating use, norm and authority in online language forums. *Current Issues in Language Planning*, *18*(2), 136-160.

Robbins, M. L., Wright, R. C., María López, A., & Weihs, K. (2019). Interpersonal positive

      reframing in the daily lives of couples coping with breast cancer. *Journal of psychosocial*

      oncology, *37*(2), 160-177.

Rogers, L. J., Wilson, K. G., Gohm, C. L., & Merwin, R. M. (2007). Revisiting written

      disclosure: the effects of warm versus cold experimenters. *Journal of social and clinical*

      psychology, *26*(5), 556.

Ridgeway, C. L. (2011). *Framed by gender: How gender inequality persists in the modern*

      world. Oxford University Press.

Rodgers, S., & Chen, Q. (2005). Internet community group participation: Psychosocial benefits

      for women with breast cancer. *Journal of Computer-Mediated Communication*, *10*(4),

      JCMC1047.

Rovira-Sancho, G. (2022). Activism and affective labor for digital direct action: the Mexican#

      MeToo campaign. *Social Movement Studies*, 1-18.

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.

Ruel, S. (2018). The "silent killers" of a STEM-professional woman's career. *Equality, Diversity*

      and Inclusion: An International Journal.

Ryan, C. (2015). Everyday resilience as resistance: Palestinian women practicing

      sumud. *International Political Sociology*, *9*(4), 299-315.

Saha, K., Kim, S. C., Reddy, M. D., Carter, A. J., Sharma, E., Haimson, O. L., & De Choudhury,

      M. (2019). The language of LGBTQ+ minority stress experiences on social

      media. *Proceedings of the ACM on human-computer interaction*, *3*(CSCW), 1-22.

Sakariassen, H. (2021). Women's emotion work on Facebook: Strategic use of emotions in public discourse. *Computers in Human Behavior Reports*, *4*, 100148.

Saifuddin, S. M., Dyke, L., & Hossain, M. S. (2021). Doing and undoing gender: women professionals' persistence in technology occupations. *Equality, Diversity and Inclusion: An International Journal*.

Schwartz, H. A., Eichstaedt, J. C., Kern, M. L., Dziurzynski, L., Ramones, S. M., Agrawal, M., & Ungar, L. H. (2013). Personality, gender, and age in the language of social media: The open-vocabulary approach. *PloS one*, *8*(9), e73791.

Scheuerman, M. K., Branham, S. M., & Hamidi, F. (2018). Safe spaces and safe places: Unpacking technology-mediated experiences of safety and harm with transgender people. *Proceedings of the ACM on Human-computer Interaction*, *2*(CSCW), 1-27.

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.

Sencerz, S. (1986). Moral intuitions and justification in ethics. *Philosophical Studies*, 77-95.

Sengupta, S. (2019, November). What are Academic Subreddits Talking About? A Comparative Analysis of r/academia and r/gradschool. In *Conference Companion Publication of the 2019 on Computer Supported Cooperative Work and Social Computing* (pp. 357-361).

Sengupta, S., & Haythornthwaite, C. (2020, January). Learning with comments: An analysis of comments and community on Stack Overflow. In *Proceedings of the 53rd Hawaii International Conference on System Sciences*.

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, October). '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. In *Companion Publication of the 2021*

  Conference on Computer Supported Cooperative Work and Social Computing (pp. 158-

  162).

Sengupta, S., & Tacheva, J. (2022, February). Flames of Justice in a Virtual Garden: An

  Analysis of a Digital Campaign on Twitter Surrounding the Death of an Indian Celebrity.

  In *International Conference on Information* (pp. 243-258). Springer, Cham.

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.

Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. W. (1986). Group processes in computer-

  mediated communication. *Organizational behavior and human decision processes*, 37(2),

  157-187.

Sharif, A., & Magrill, B. (2015). Discussion forums in MOOCs. *International Journal of*

  Learning, Teaching and Educational Research, *12*(1), 119-132.

Shay, J. (2014). Moral injury. *Psychoanalytic psychology*, *31*(2), 182.

Shelton, M., Lo, K., & Nardi, B. (2015). Online media forums as separate social lives: A

  qualitative study of disclosure within and beyond Reddit. *IConference 2015 Proceedings*.

Shimohara, K. (2012). Relationality Design and Relationality-oriented Systems Design.

  In *Advances in Knowledge-Based and Intelligent Information and Engineering*

  Systems (pp. 1962-1971). IOS Press.

Silva, E. B. (2005). Gender, home and family in cultural capital theory. The *British journal of*

  sociology, 56(1), 83-103.

Simpson, E., & Semaan, B. (2021). For You, or For " You"? Everyday LGBTQ+ Encounters

with TikTok. *Proceedings of the ACM on human-computer interaction, 4*(CSCW3), 1-34.

Skorikov, V. B., & Vondracek, F. W. (2011). Occupational identity. In *Handbook of identity*

theory and research (pp. 693-714). Springer, New York, NY.

Spivack, A. J., & Desai, A. (2016). Women entrepreneurs' work-family management strategies: a

structuration theory study. *International Journal of Entrepreneurship and Small*

Business, *27*(2-3), 169-192.

Spottswood, E. L., & Wohn, D. Y. (2020). Online social capital: recent trends in

research. *Current opinion in psychology*, *36*, 147-152.

Star, S. L., & Ruhleder, K. (1994, October). Steps towards an ecology of infrastructure: complex

problems in design and access for large-scale collaborative systems. In *Proceedings of*

the 1994 ACM conference on Computer supported cooperative work (pp. 253-264).

Staudt Willet, K. B., & Carpenter, J. P. (2020). Teachers on Reddit? Exploring contributions and

interactions in four teaching-related subreddits. *Journal of Research on Technology in*

Education, *52*(2), 216-233.

Steinfield, 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.

Stewart, M., & Schultze, U. (2019). Producing solidarity in social media activism: The case of

My Stealthy Freedom. *Information and organization*, *29*(3), 100251.

Stolz, S., & Schlereth, C. (2021). Predicting tie strength with ego network structures. *Journal of*

Interactive Marketing, *54*(1), 40-52.

Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & education*, *50*(4), 1183-1202.

Sun, Y., Graham, T., & Broersma, M. (2018). Environmental talk in the Chinese green public sphere: A comparative analysis of daily green-speak across three chinese online forums. In *Managing democracy in the digital age* (pp. 243-263). Springer, Cham.

Sun, N., Rau, P. P. L., & Ma, L. (2014). Understanding lurkers in online communities: A literature review. *Computers in Human Behavior*, *38*, 110-117.

Sun, Y., Guo, Y., & Zhao, Y. (2020). Understanding the determinants of learner engagement in MOOCs: An adaptive structuration perspective. *Computers & Education*, *157*, 103963.

Suomela, T., Chee, F., Berendt, B., & Rockwell, G. (2019). Applying an ethics of care to internet research: Gamergate and digital humanities. *Digital Studies/Le Champ Numérique*, *9*(1).

Tacheva, Z., Krsova, L., & Ivanov, A. (2021). *Examining the social media antecedents of racial justice: Evidence from Twitter.*

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.

Tams, S., & Arthur, M. B. (2010). New directions for boundaryless careers: Agency and interdependence in a changing world. *Journal of Organizational Behavior*, *31*(5), 629-646.

Tatnell, R., & Malpas, P. J. (2012). The morality of care: case study and review. *Journal of Medical Ethics*, *38*(12), 763-764.

Taylor, S. E., & Lobel, M. (1989). Social comparison activity under threat: downward evaluation and upward contacts. *Psychological review*, *96*(4), 569.

Thapar-Björkert, S., Samelius, L., & Sanghera, G. S. (2016). Exploring symbolic violence in the everyday: Misrecognition, condescension, consent and complicity. *Feminist review*, *112*(1), 144-162.

Thom-Santelli, J., Cosley, D., & Gay, G. (2010, April). What do you know? Experts, novices and territoriality in collaborative systems. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1685-1694).

To, A., Sweeney, W., Hammer, J., & Kaufman, G. (2020). " They Just Don't Get It": Towards Social Technologies for Coping with Interpersonal Racism. *Proceedings of the ACM on Human-Computer Interaction*, *4*(CSCW1), 1-29.

Tomprou, M., Dabbish, L., Kraut, R. E., & Liu, F. (2019, May). Career mentoring in online communities: Seeking and receiving advice from an online community. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-12).

Trinkenreich, B., Wiese, I., Sarma, A., Gerosa, M., & Steinmacher, I. (2022). Women's participation in open-source software: a survey of the literature. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, *31*(4), 1-37.

Turiel, E. (2006). The development of morality.

Vaast, E., & Levina, N. (2015). Speaking as one, but not speaking up: Dealing with new moral taint in an occupational online community. *Information and Organization*, *25*(2), 73-98.

Van House, N. A. (2011). Feminist HCI meets Facebook: Performativity and social networking sites. *Interacting with computers*, *23*(5), 422-429.

Varis, P., & Hou, M. (2019). Digital approaches in linguistic ethnography. In *The Routledge handbook of linguistic ethnography* (pp. 229-240). Routledge.

Vaskelainen, T., & Piscicelli, L. (2018). Online and offline communities in the sharing economy. *Sustainability, 10*(8), 2927.

Vedhara, K., Morris, R. M., Booth, R., Horgan, M., Lawrence, M., & Birchall, N. (2007). Changes in mood predict disease activity and quality of life in patients with psoriasis following emotional disclosure. *Journal of psychosomatic research*, *62*(6), 611-619.

Vegt, I. V. D., & Kleinberg, B. (2020, October). Women worry about family, men about the economy: Gender differences in emotional responses to COVID-19. In *International Conference on Social Informatics* (pp. 397-409). Springer, Cham.

Verberne, S., Batenburg, A., Sanders, R., van Eenbergen, M., Das, E., & Lambooij, M. S. (2019). Analyzing empowerment processes among cancer patients in an online community: a text mining approach. *JMIR cancer*, *5*(1), e9887.

Vitak, J., Chadha, K., Steiner, L., & Ashktorab, Z. (2017, February). Identifying women's experiences with and strategies for mitigating negative effects of online harassment. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing* (pp. 1231-1245).

Vogel, E. A., & Rose, J. P. (2016). Self-reflection and interpersonal connection: Making the most of self-presentation on social media. *Translational Issues in Psychological Science*, *2*(3), 294.

Vogel, E. A., & Pechmann, C. (2021). Application of Automated Text Analysis to Examine Emotions Expressed in Online Support Groups for Quitting Smoking. *Journal of the Association for Consumer Research*, *6*(3), 315-323.

Vydiswaran, V. G., & Reddy, M. (2019). Identifying peer experts in online health forums. *BMC medical informatics and decision making*, *19*(3), 41-49.

Wajcman, J. (2010). Feminist theories of technology. *Cambridge journal of economics*, *34*(1), 143-152.

Waltonen-Moore, S., Stuart, D., Newton, E., Oswald, R., & Varonis, E. (2006). From virtual strangers to a cohesive learning community: The evolution of online group development in a professional development course. *Journal of Technology and Teacher Education*, *14*(2), 287-311.

Wang, X., Zhao, K., & Street, N. (2017). Analyzing and predicting user participations in online health communities: a social support perspective. *Journal of medical Internet research*, *19*(4), e6834.

Wharton, A. S. (2009). The sociology of emotional labor. Annual review of sociology, 147-165.

Weld, G., Zhang, A. X., & Althoff, T. (2021). Making Online Communities' Better': A Taxonomy of Community Values on Reddit. *arXiv preprint arXiv:2109.05152*.

Wellman, B. (1996, April). For a social network analysis of computer networks: a sociological perspective on collaborative work and virtual community. In *Proceedings of the 1996 ACM SIGCPR/SIGMIS conference on Computer personnel research* (pp. 1-11).

Welser, H. T., Gleave, E., Fisher, D., & Smith, M. (2007). Visualizing the signatures of social roles in online discussion groups. Journal of social structure, 8(2), 1-32.

Welser, H. T., Cosley, D., Kossinets, G., Lin, A., Dokshin, F., Gay, G., & Smith, M. (2011). Finding social roles in Wikipedia. In *Proceedings of the 2011 iConference* (pp. 122-129).

Wheeler, E., & Dillahunt, T. R. (2018, April). Navigating the job search as a low-resourced job

       seeker. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing*

       Systems (pp. 1-10).

Williams, M. J. (2016). Justice and care in the city: uncovering everyday practices through

       research volunteering. *Area*, *48*(4), 513-520.

Wise, A. F., Hausknecht, S. N., & Zhao, Y. (2014). Attending to others' posts in asynchronous

       discussions: Learners' online "listening" and its relationship to speaking. *International*

       Journal of Computer-Supported Collaborative Learning, 9(2), 185-209.

Wohn, D. Y. (2019, May). Volunteer moderators in twitch micro communities: How they get

       involved, the roles they play, and the emotional labor they experience. In *Proceedings of*

       the 2019 CHI conference on human factors in computing systems (pp. 1-13).

Woods, C. J. (1996). Gender differences in moral development and acquisition: A review of

       Kohlberg's and Gilligan's models of justice and care. *Social Behavior and Personality: an*

       international journal, *24*(4), 375-383.

Wu, J., Xiong, H., & Chen, J. (2009, June). Adapting the right measures for k-means clustering.

       In *Proceedings of the 15th ACM SIGKDD international conference on Knowledge*

       discovery and data mining (pp. 877-886).

Xu, B., & Li, D. (2015). An empirical study of the motivations for content contribution and

       community participation in Wikipedia. *Information & management*, *52*(3), 275-286.

Yan, E., & Ding, Y. (2009). Applying centrality measures to impact analysis: A coauthorship

       network analysis. *Journal of the American Society for Information Science and*

       Technology, *60*(10), 2107-2118.

Yang, T., Xie, J., Li, G., Mou, N., Li, Z., Tian, C., & Zhao, J. (2019). Social media big data mining and spatio-temporal analysis on public emotions for disaster mitigation. *ISPRS International Journal of Geo-Information*, *8*(1), 29.

Yarger, L., Payton, F. C., & Neupane, B. (2019). Algorithmic equity in the hiring of underrepresented IT job candidates. *Online information review*, *44*(2), 383-395.

Yip, M., Shadbolt, N., & Webber, C. (2012, June). Structural analysis of online criminal social networks. In *2012 IEEE International Conference on Intelligence and Security Informatics* (pp. 60-65). IEEE.

Younas, F., Naseem, M., & Mustafa, M. (2020, June). Patriarchy and social media: Women only facebook groups as safe spaces for support seeking in Pakistan. In *Proceedings of the 2020 International Conference on Information and Communication Technologies and Development* (pp. 1-11).

Yu, B., Seering, J., Spiel, K., & Watts, L. (2020, April). " Taking Care of a Fruit Tree": Nurturing as a Layer of Concern in Online Community Moderation. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1-9).

Zaki, M. J., Meira Jr, W., & Meira, W. (2014). *Data mining and analysis: fundamental concepts and algorithms*. Cambridge University Press.

Zhao, L., Lu, Y., Wang, B., Chau, P. Y., & Zhang, L. (2012). Cultivating the sense of belonging and motivating user participation in virtual communities: A social capital perspective. *International Journal of Information Management*, *32*(6), 574-588.

Zhang, J., & Luo, Y. (2017, March). Degree centrality, betweenness centrality, and closeness
centrality in social network. In *2017 2nd international conference on modelling,
simulation and applied mathematics (MSAM2017)* (pp. 300-303). Atlantis Press.

Zhang, R., N. Bazarova, N., & Reddy, M. (2021, May). Distress disclosure across social media
platforms during the COVID-19 pandemic: Untangling the effects of platforms,
affordances, and audiences. In *Proceedings of the 2021 CHI Conference on Human
Factors in Computing Systems* (pp. 1-15).

Zhong, Z. J. (2011). The effects of collective MMORPG (Massively Multiplayer Online Role-
Playing Games) play on gamers' online and offline social capital. *Computers in human
behavior*, *27*(6), 2352-2363.

Curriculum Vitae

Subhasree Sengupta
Email: susengup@syr.edu

Subhasree Sengupta
Email: susengup@syr.edu

Education:

August 2018 – present   Syracuse University (SU), Syracuse, NY
Ph.D., Information Science and Technology.
Advisor: Dr. Jasmina Tacheva

May 2021 - August 2021   Cornell University, Ithaca, NY
Certificate in Human centered design.

August 2016 - May 2018   University of Southern California (USC), Los Angeles, CA
Master of Science, Computer Science.

August 2012- May 2016   University of Minnesota, Twin Cities, Minneapolis, MN
Bachelor of Science, Computer Science
Minors: Statistics and Mathematics
Graduated with Summa Cum Laude & High distinction

Research interests:

Topic areas:

Computer Supported collaborative learning and work, ICT enabled resilience and empowerment, Collective action and social justice campaigns, Human-AI collaboration, Human centered data science.

Methodological areas:

Text mining, Social network analysis, Applied machine learning, Speculative design and Design fiction

Work Experience:

Aug 2020 – Present University   **Graduate Teaching Assistant**, School of Information Studies, Syracuse University

- Teaching an independent class on Data and society. the focus of the class is to discuss ethical implications related to use of AI systems in society.
  - Undergraduate class with around 35 students on average.
  - Duties: perform all instructional activities such as conducting the lecture, organization of class materials, assessment and feedback.

- Python instructor: leading a recitation focused class for undergraduate students, with average class size being around 25 students.
  - Duties include: recitation preparation and grading.

Aug 2018 – May 2020 **Graduate Research Assistant**, Syracuse University
- Understanding how virtual channels centered on technical domains can provide support, avenues of knowledge exchange and can help to foster a sense of community especially among women in their process of professional development.
- Conducting a speculative design study to explore the way in which online communities can be better equipped to support marginalized voices (such as women in technology)
- Understanding patterns of discourse, collective action, and mechanisms of community building in a digital campaign surrounding the death of an Indian celebrity on Twitter.
- Conducting a cross-platform comparative investigation of informal learning practices in online programming forums (such as Stack Overflow and r/Askprogramming)

Aug 2016 – May 2018 **Annenberg Research Fellow,** Department of Computer Science, USC

- Developed a robust optimization-based algorithm for suicide prevention initiatives on college campuses.
- Participated in other projects related to applications of artificial intelligence, game theory and social network driven interventions.
- Developed a LSTM based deep learning framework for automated source separation in polyphonic music.

Jan 2015 – May 2016 **Undergraduate Research Assistant**, Department of Computer Science, University of Minnesota
- Developed a time management app prototype, for a Microsoft sponsored project called Time Engine.
- Developed web crawlers to automate data extraction from Foursquare, Flickr, Twitter

May 2015 – Aug 2015 **Information Services Intern**, The Toro Company, Bloomington, MN
- Developed a 'what if' analysis tool, to predict customer growth potential and to provide insights for business development.
- Technical Skills used/learned: SQL, Vbscript, python.

Publications:

Refereed conference proceedings:

- **Sengupta, S.** & Tacheva, J. (January, 2023, Forthcoming). "Digital Sanctums of Empowerment": Exploring Community and Everyday Resilience Building Tactics in Online Professional Communities for Women. To appear in the *Proceedings of the 56th annual Hawaii international conference on system sciences.*
- **Sengupta, S.** & Tacheva, J. (March, 2022). Flames of Justice in a Virtual Garden: An Analysis of a Digital campaign on Twitter Surrounding the Death of an Indian Celebrity. *iConference, 2022.*
- Garg, R., Kapadia, Y., & **Sengupta, S**. (October, 2021). Using the lenses of emotion and support to understand unemployment discourse on Reddit. In *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW1), 1-24.
- **Sengupta, S.** (January, 2021). A Tale of Two Virtual Communities: A comparative analysis of culture and discourse in two online programming communities. In *Proceedings of the 54th annual Hawaii international conference on system sciences.*
- Garg, R., & **Sengupta, S.** (2020). He is just like me: a study of the long-term use of smart speakers by parents and children. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, 4(1), 1-24.
- **Sengupta, S.**, Haythornthwaite, C. (January, 2020). Learning with comments: An analysis of comments and community on Stack Overflow. In *Proceedings of the 53rd annual Hawaii international conference on system sciences.*
- Johnson, I. L., **Sengupta, S.**, Schöning, J., & Hecht, B. (2016, May). The geography and importance of localness in geotagged social media. *In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 515-526). ACM.

Short papers and posters:

-
- **Sengupta, S**. & Tacheva, J. (November, 2021). 'Flames of Justice in a Virtual Garden': A Preliminary Analysis of Tweets Around the Death of an Indian Celebrity. *Proceedings of the 84th Association for Information Science and Technology conference.*
- **Sengupta**, S. & Semaan, B. (October, 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. *In proceedings of the 23rd ACM Conference on Computer-Supported Cooperative Work and Social Computing (Virtual).*
- **Sengupta, S.** (October, 2020). 'Learning to code in a virtual world': A preliminary comparative analysis of discourse and learning in two online programming communities. In proceedings of the *22nd ACM Conference on Computer-Supported Cooperative Work and Social Computing (Virtual).*
- **Sengupta, S.** (October, 2020). A Tale of Two Virtual Communities: A Preliminary Analysis of Discourse in Two Online Programming Support Communities. *Proceedings of the 83rd Association for Information Science and Technology conference (Virtual).*

Book Chapters:
- **Sengupta, S**., Yu, K. and Zahari, B. (2018). Know-Stress: Predictive modeling of Stress among diabetes patients under varying conditions. In *Artificial Intelligence and Social Work*, Cambridge: Cambridge University press.

Teaching experience:

May 2021 – Aug 2021   Teaching mentor, orientation for new Teaching Assistants,
Graduate School, Syracuse University.
Duties: Assist with content preparation & presentation,
small group (of 6 new TAs) management and mentoring.

Jan 2020 – May 2020   Teaching assistant, School of Information Studies, Syracuse University
Course – Data in society. Undergraduate course with 97 students.

May 2016 – Aug 2016   Teaching assistant, Fundamental of Computer Science,
Summer program, Center for Talented Youth, Johns Hopkins University

Aug 2014 – May 2016   Undergraduate Teaching Assistant, Dept. of Computer Science, UMN
Courses: Introduction to programming in Java, C++.

Awards and Scholarships:

- Recipient of **Summer doctoral fellowship award, 2022** from Syracuse University.
- Recipient of **Summer research award, 2022**, ischool, Syracuse University.
- Recipient of **Outstanding Teaching Assistant award, 2022** from Syracuse University.
- Recipient of **Summer research award, 2019**, ischool, Syracuse University.
- Recipient of **Annenberg fellowship** at University of Southern California. Full tuition waiver and stipend, from August 2016 to May 2018. Given to top 1% of incoming graduate students at USC in science and engineering.
- Recipient of **Lando Scholarship**, awarded by Dept. of Computer Science under College of Science& Engineering, UMN.
- Recipient of **MnDRIVE Undergraduate Assistantship** (one of the first winners) awarded by College of Sc.& Engg, UMN.
- Recipient of **Gold Global Scholarship from University of Minnesota** approx. $6500 (per annum) for 4 years, awarded to International Students with outstanding achievements and scholastic records.
- Recipient of **Govt. of India Scholarship** Rs 80000/- per year ($2000/per annum i.e., 8000$ for 4 years) for ranking within Top 1% in Central Board Exams, India, 2012.
- Dean's List for all 8 semesters of undergraduate degree from Fall 2012-Spring 2016.
- Honors Student at UMN, Twin cities.

Technical/Data analytical Skills

- **Computing tools:** Python, Java, C, C++, R, HTML, CSS, JavaScript, SQL, Vbscript.
- **Design/user-centric research tools:** Semi-structured interviews, Survey design, Affinity diagramming, Creation of mockups using Balsamiq and Figma, Co-design investigations, User testing methods

Service and Mentoring:

- Reviewer: CSCW (posters) (2019, 2020, 2021, 2022), CHI (2022), HICSS (2020, 2021, 2022).
- PHD Student representative, in the following ischool committees at Syracuse University:
    - Personnel committee (2021-2022)
    - Faculty search committee (2020-2021)
    - Diversity and inclusion committee (2019-2020)
    - Faculty committee (2019-2020)
    - Doctoral committee (2018-2019)
- Peer mentor for WISE-FPP (Future professoriate program, Women in Science & Engineering) Syracuse University (2020-2022)
- Honors program peer mentor at UMN (2014-2016).
- Mentor for the International buddy program at UMN (2013-2016)