Facilitating Prosociality through Technology: Design to Promote Digital Volunteerism

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by

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Abstract

Volunteerism covers many activities involving no financial rewards for volunteers but which contribute to the common good. There is existing work in designing technology for volunteerism in Human-Computer Interaction (HCI) and related disciplines that focuses on motivation to improve performance, but it does not account for volunteer wellbeing. Here, I investigate digital volunteerism in three case studies with a focus on volunteer motivation, engagement, and wellbeing. My research involved volunteers and others in the volunteering context to generate recommendations for a volunteer-centric design for digital volunteerism. The thesis has three aims:

1. To investigate motivational aspects critical for enhancing digital volunteers' experiences

2. To identify digital platform attributes linked to volunteer wellbeing

3. To create guidelines for effectively supporting volunteer engagement in digital volunteering platforms

In the first case study I investigate the design of a chat widget for volunteers working in an organisation with a view to develop a design that improves their workflow and wellbeing. The second case study investigates the needs, motivations, and wellbeing of volunteers who help medical students improve their medical communication skills. An initial mixed-methods study was followed by an experiment comparing two design strategies to improve volunteer relatedness; an important indicator of wellbeing. The third case study looks into volunteer needs, experiences, motivations, and wellbeing with a focus on volunteer identity and meaning-making on a science-based research platform. I then analyse my findings from these case studies using the lens of care ethics to derive critical insights for design.

The key contributions of this thesis are design strategies and critical insights, and a volunteer-centric design framework to enhance the motivation, wellbeing and engagement of digital volunteers.

Acknowledgement

When I reflect on the process of doing this research and completing the thesis, I think of the passion, the toiling, the perseverance, the personal and professional growth, and the milestones achieved. So many ideas, participants, collaborations, insights, and lessons learnt. This PhD has indeed changed the way I think and perceive, and for the better (mostly).

Many other things happened during this time - a political upheaval in my native hometown Kashmir, the resultant extended communication blackout, death of a beloved grandparent during that time, the Australian bushfires, the pandemic and the subsequent lockdowns, giving birth to and taking care of a baby born in these difficult times, being away from my loved ones and having limited social support during all this time, and the eventual happy reunions. Looking back at this, it is no wonder that I think of this thesis as a personal achievement! However, I am mindful that my work is not a solitary endeavour. The themes of relatedness, gratitude, and care found in my research resonate strongly here.

The expertise of those who guided me, those whose work my research is based on, those I have worked with and for, and those who have provided peripheral research support have all been significant for the completion of this thesis.

First of all, I would have to say I am lucky to have had such great supervision during my PhD.
Naseem (Dr Naseem Ahmadpour), your supervision has been instrumental in producing this thesis. I am grateful for your empathetic guidance, encouragement, and professional mentorship in general. More specifically, I am grateful to you for encouraging diligence in my work, for fostering a supervisory relationship that is flexible but also provides adequate guidance, and also for paving way for learning and professional development opportunities along the way. I am indebted to you for helping me pursue excellence in my work.

Rafa (Prof. Rafael Calvo), for welcoming me into this project, for exposing me to extraordinary ideas, for the professional opportunities, and for the guidance through

Authorship Attribution Statement

This thesis contains material from the publications listed below. For each publication, I have specified the chapters that include material from it. In some chapters (Chapters 3,4, and 5), most of the written material from the publications is lifted as is. In chapters 1 and 2, some passages from the publications are adapted to suit the flow of these chapters. In Chapters 3, 4, and 5 where I present the case studies, I use the first person plural to capture my contribution as well as that of my co-authors.

1. Naqshbandi, K., Hoermann, S., Milne, D., Peters, D., Davies, B., Potter, S., & Calvo, R. A. (2019). CODESIGNING TECHNOLOGY FOR A VOLUNTARY-SECTOR ORGANIZATION. Human Technology, 15(1).

   Written material from this chapter appears as the main body in chapter 3. Material from this chapter also appears in chapter 1 Introduction and Chapter 2 Related Work. I collaborated with Hoermann, Milne and Peters, I specifically worked on the study design and data collection. I also led the data analysis and writing of the paper. Hoermann and Milne also contributed to the analysis. Davies and Potter contributed to the data collection. Calvo provided oversight, feedback and ongoing guidance. All co-authors provided feedback for the final draft of the publication.

2. Naqshbandi, K. Z., Liu, C., Taylor, S., Lim, R., Ahmadpour, N., & Calvo, R. (2020). "I Am Most Grateful." Using Gratitude to Improve the Sense of Relatedness and Motivation for Online Volunteerism. International Journal of Human–Computer Interaction, 36(14), 1325-1341.

   Written material from this chapter appears as the main body in chapter 4. Material from this chapter also appears in Chapter 2 Related Work. I led the design of the studies, data collection, data analysis, and writing of the paper. Taylor, Ahmadpour, and Lim provided inputs into the design of the studies. Liu helped with the study design and experiment set-up. Additionally, Ahmadpour also provided feedback into the writing of the publication. Calvo provided

oversight, feedback and ongoing guidance. All co-authors provided feedback for the final draft of the publication.

3. Naqshbandi, K., Taylor, S., Pillai, A., and Ahmadpour, N. (2020) Designing for Helpers: Identifying new design opportunities for digital volunteerism, in Boess, S., Cheung, M. and Cain, R. (eds.). Synergy - DRS International Conference 2020, 11-14 August, Held online. https://doi.org/10.21606/drs.2020.281

   Written material from this chapter appears in Chapter 1 Introduction and the methods section for the final study of Chapter 4. I led the design of the study, data collection, data analysis, and writing of the paper. Taylor provided input into the design of the study. Pillai helped with the data collection and transcription of data. Ahmadpour provided oversight, feedback and ongoing guidance and contributed to writing. All co-authors provided feedback for the final draft of the publication.

4. Naqshbandi, K.Z., Taylor, S., G. Pillai, A., & Ahmadpour, N. 2021. Labour of Love: Volunteer Perceptions on Building Relatedness in Online Volunteering Communities. Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems(pp. 1-6)

   Written material from this chapter appears in the main body of the final study of Chapter 4. It is also found in Chapter 1 Introduction and Chapter 2 Related Work. I led the design of the study, data collection, data analysis, and writing of the paper. Taylor provided input into the design of the study. Pillai helped with the data collection and transcription of some data. Ahmadpour provided oversight, feedback, writing and ongoing guidance. All co-authors provided feedback for the final draft of the publication.

5. Naqshbandi, K.Z., Jeon,Y.H., Ahmadpour, N., Exploring Motivation, Identity and Meaning-Making in Science-based Research Volunteering. Accepted for publication in the International Journal of Human–Computer Interaction.

   Written material from this chapter appears in the main body of Chapter 5. Some of it is also found in Chapter 2 Related Work. I led the design of the study, data collection, data analysis, and writing of the paper. Jeon provided input into the design of the study and feedback on data analysis. Ahmadpour provided oversight, feedback, writing and ongoing guidance. All co-authors provided feedback for the final draft of the publication.

The final draft of this thesis was proof-read by Philippa Beckman who corrected typographical errors, grammatical mistakes and punctuation, and made sure that the thesis format complied with the university requirements.

Additionally, there are a few other publications that were based on the research presented in this thesis. However, the content of these publications does not appear in this thesis as it does not directly contribute to the thesis narrative. They are presented below:

1. Naqshbandi, K.Z., Milne, D. N., Davies, B., Potter, S., Calvo, R. A., Hoermann, S. (2016, November). Helping young people going through tough times: Perspectives for a peer-to-peer chat support system. In Proceedings of the 28th Australian conference on computer-human interaction (pp. 640-642).

2. Naqshbandi, K., Mah, K., Ahmadpour, N. (2022). Making space for faith, religion, and spirituality in prosocial HCI. Interactions, 29(4), 62-67.

Material presented in this thesis was also adapted for the following invited talks and guest lectures.

1. Online Simulated Patient Interaction and Assessment (OSPIA) platform (2020). Guest Lecture, Design for Health and Medicine Studio (DESN3001), The University of Sydney, Sydney, Australia.

2. Designing for Digital Volunteerism: A case study of volunteers' contribution to "making future doctors" (2021). Invited talk: Lunchtime Research Seminar Series, School of Architecture, Design and Planning | The University of Sydney, Sydney, Australia.

3. Labour of Love: Volunteer Perceptions on Building Relatedness in Online Volunteering Communities (2021). Invited talk: CHI Down Under 2021 event, Melbourne, Australia.

4. Designing for Digital Volunteerism: Technology for Prosociality (2021). Invited talk: Wellbeing Technologies Lab, Dyson School of Design Engineering, Imperial College London, London, UK.

5. Designing for Digital Volunteerism (2021). Invited talk: Action Lab, Faculty of Information Technology, Monash University (Clayton campus, Melbourne, Australia).

6. Thank you for volunteering! Relatedness and Wellbeing through Gratitude in Digital Volunteerism (2022). Guest Lecture, Emerging Interaction Techniques (ITEC 5920), School of Information Technology, Carleton University, Ottawa, Canada.

7. Prosociality in Action: Perspectives on Motivation, Care, and Wellbeing in Digital Volunteerism. Invited talk: Design Talks, University of Technology Sydney (UTS), Sydney, Australia. 2022.

As supervisor for the candidature upon which this thesis is based, I can confirm that the authorship attribution statements above are correct.

Supervisor Name: NASEEM AHMADPOUR

Signature:

Date:

Statement of Originality

This is to certify that to the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any degree or other purposes.

I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.

Signature*

Name KHUSHNOOD Z. NAQSHBANDI

Date

Contents

Introduction 1

> *...for the growing good of the world is partly dependent on unhistoric acts; and that things are not so ill with you and me as they might have been, is half owing to the number who lived faithfully a hidden life, and rest in unvisited tombs."*
>
> — **George Eliot (Mary Ann Evans)**
> Middlemarch

I begin by introducing volunteerism, and then describing the typical characteristics of digital volunteerism, followed by research aims and questions and what motivated those, and a brief explanation of the research design and methodology. The chapter concludes with a brief summary of the thesis chapters.

1.1 Volunteerism and the Society

Volunteerism is an important characteristic of healthy functioning societies and an important 'renewable resource for social problem-solving' (ILO, 2011). In 2015, the United Nations (UN) and International Federation of Red Cross and Red Crescent Societies(IFRC) urged more research to deepen our understanding of volunteerism and inform policies globally (IFRC, 2015; UNV, 2015). In Australia as of 2014, 31% of the adult population were involved in formal organisation-led volunteering. This volunteer work totalled $43bn worth of national economic value (ABS, 2017). A report indicated that 31% of Australian adults were involved in formal organisation-led volunteering in 2014, which is a drop from 34% in 2010. The Australian Bureau of Statistics (ABS) suggested this may be due to the rise of informal volunteering aided by digital solutions (ABS, 2017), mainly found in digital volunteerism. Besides the societal benefits, volunteering is associated with many physical and psychological health and wellbeing outcomes for the individuals and many other favourable social wellness outcomes as seen in traditional, physical forms of volunteerism (Ayalon, 2008; Musick & Wilson, 2003). Indeed, recommendations from the UN's 2018 State of the World's Volunteerism Report (SWVR 2018) (UNV, 2018) as well as the those from the 2017 report by Australian Bureau of Statistics (ABS, 2017) strongly recommend using technology to incentivise volunteering to explore these benefits, and consequently the need for more research to understand the motivations, barriers and enablers of digital volunteering (IFRC, 2015; UNV, 2015). This makes it relevant to further investigate digital volunteerism to explore how technology can play a part in facilitating volunteering and generate the societal benefits associated with it for those who seek it.

1.2 Towards a Definition of Volunteerism

Volunteerism is associated with activities that result in common good. Therefore, it is often considered as a prime representation of prosociality i.e., voluntary behaviour to help or benefit others, along with other behaviours such as charity, cooperation, and caring. Volunteerism is a multifaceted phenomenon which incorporates economic, labour, management and other paradigms. The major characteristics of volunteerism as found in influential literature on volunteerism are:

1. Nature of the act - it should always be volitional, i.e., the volunteer should not be coerced into the act (Cnaan et al., 1996; Haski-Leventhal, 2009; D. H. Smith, 1981).

2. No rewards - Volunteering activities are performed without a remuneration or promise of physical or material rewards (Cnaan et al., 1996; Haski-Leventhal, 2009; D. H. Smith, 1981).

3. Context - Volunteering can be formal or informal (Cnaan et al., 1996; Haski-Leventhal, 2009; D. H. Smith, 1981). Informal volunteering, as opposed to formal volunteering takes place outside the context of organisations. The importance of informal volunteering has come to the forefront in the last two decades (as opposed to the previous century) with the increase in scholarly material on volunteering in non-formal contexts such as community-led grassroots efforts, instances of technology-led volunteering, and others. Also, recent global and local trends in volunteering show much higher incidences of informal volunteering as compared to its formal counterpart, especially post COVID-19 pandemic. (V. Australia, 2021) (Mao et al., 2021).

4. Frequency and duration of the voluntary act — Another factor includes time associated with volunteering — the frequency of the voluntary act (e.g., regular or sporadic volunteering) , as well as the duration for each instance of volunteering (e.g., microvolunteering (Bernstein et al., 2013)) (Cnaan et al., 1996; Haski-Leventhal, 2009; D. H. Smith, 1981).

Further efforts to define volunteering for practical purposes by relevant international and national bodies of various countries have taken into account the newer paradigms that have impacted the nature of volunteering. As an example, Volunteering Australia, the peak national body that is responsible for all matters related to volunteering in the country, has adopted the following concise definition of volunteering in order for it to be inclusive, dynamic and enabling of recent social, economical, technological and other trends and for it to be acceptable from a local and global perspective (Volunteering Australia,2015) —

> "Volunteering is time willingly given for the common good and without financial gain".

This also concurs with the definition of volunteering adopted in the 2002 United Nations General Assembly Resolution (UNV, 2018) -

> "Activities undertaken of free will, for the general public good and where monetary reward is not the principal motivating factor".

These definitions are important as they form an antecedent for reifying the phenomenon of digital volunteerism.

1.3 Digital or Online Volunteerism

Many international and national peak bodies such as the United Nations Volunteers (UNV) (2015) and International Federation of the Red Cross and Red Crescent (IFRC) (2015) have emphasised harnessing technology in order to achieve several goals that are associated with common good, for example, Sustainable Development Goals (SGDs). In recent years, technology has enabled a new paradigm of volunteerism that allows people to volunteer their time and effort in various ways. It has been used to support both formal (Blythe & Monk, 2005) and informal forms (Piatak et al., 2019) of volunteering. It has disrupted, and in most cases, optimised the practices of volunteering (Amichai-Hamburger, 2008). In some instances, volunteering via technology is sporadic or non-repetitive ((Starbird, 2013). These activities can be performed using desktop/laptop, tablets, smartphones, wearables and other forms of digital technology (Preece, 2017; Striner & Preece, 2016). These activities aim to produce content (Ye & Kishida, 2003), extract information (Sharma, 2016), communicate or collaborate (Dailey & Starbird, 2014), enhance understanding (Kuznetsov, 2006), create solutions (S. Park et al., 2017), provide various kinds of support (Jabr et al., 2014), maintain (Geiger et al., 2021) and curate (Alony et al., 2020), among other outcomes.

Thus, digital volunteerism can be defined as the phenomenon where people perform voluntary activities using digital technology for common good and without any financial gain. It has also been referred to as online volunteerism or virtual volunteerism in literature (Amichai-Hamburger, 2008; Murray & Harrison, 2002).[1] This definition is inclusive of many different types of voluntary activities in various virtual spaces. Through this thesis, I aim to show the commonalities in the various disparate instances of digital volunteerism and how volunteer engagement can be achieved via design.

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[1]In the rest of the thesis, the terms digital volunteerism and online volunteerism will be used interchangeably.

1.4 Research Motivation

1.4.1 Designing for Digital Volunteerism

Much research in Psychology and its applications (such as (Fogg, 2002; Fogg, 2009) (Martin et al., 2017) has gone into explaining how to keep people motivated and engaged in intended behaviours. Motivation is one of the important aspects of understanding what drives individuals towards any given work task and accordingly designing for favourable work outcomes (Hackman & Oldham, 1976). Motivation drives people to initiate and continue a task and generally includes the cognitive and affective aspects associated with the drive (Cleary & Zimmerman, 2012). Engagement includes the more observable behavioural aspects and determines the individual's actual involvement with an activity (Reeve, 2012).

A simplistic framing of motivation for volunteering may depict it as motivation for unpaid work as opposed to that for paid work. However, given the social, economic, and cultural paradigms that encompass volunteerism, it is important to understand the complexities that underlie volunteering motivation that go beyond remuneration. For instance, many non-Western cultures involve a lot of volunteer work in local community-led endeavours that benefits the public, but do not use the same expressions and framing of volunteer work that are common in the West, including the term "volunteer", which may denote negative connotations because of its association with the West (UNV, 2018). Volunteering in some contexts may also occasionally entail some form of material compensation, even if it is not monetary, e.g., course credits for voluntary participation in scientific research in some educational institutions. This makes it important to study the complexities of volunteering motivations in different contexts in digital volunteerism given the lack of nuanced understanding of this topic.

Some research in Human-Computer Interaction (HCI) attributes volunteer engagement to altruism — doing good for other individuals, community, or a cause (Cobb et al., 2014). Alternatively, some other research related to the volunteerism of enthusiasts like Open Source software developers attributes their participation to personal career related and social motives, or ideological motives related to supporting open-source movement (Hertel et al., 2003). Volunteers such as the ones in citizen science and other intellectually stimulating programs are known to be

engaged in volunteerism with respect to the use of cognitive surplus — productive use of free time for cognitively enriching activities (Wald et al., 2016).

Motivation is strongly linked to sustained engagement and wellbeing and has been used to achieve these through the design of technology (Peters et al., 2018). Consequently, motivation can be used to address engagement on an individual volunteer level as well as sustainability (of volunteer-involving organisations and causes) on a programme level. Within the volunteering context, Millette and Gagne 2008 have used frameworks such as the self-determination theory (a core framework used in my research and explained in the next chapter of this thesis) that encompass motivation to understand how to improve volunteer satisfaction and performance and reduce turnover rate as an understanding of volunteer engagement in face-to-face volunteering contexts (Millette & Gagné, 2008). Besides, design for sustained engagement also impacts the sustainability of programs or causes that the volunteers are associated with (Cho et al., 2018). Additionally, the importance of wellbeing as a favourable outcome is even more highlighted in volunteering endeavours, given that volunteering research and praxis strongly point towards health and wellbeing outcomes associated with face-to-face volunteering and other similar activities (Weinstein & Ryan, 2010).

Studying the affective and behavioural dimensions of digital volunteerism presents a relevant opportunity in HCI research to explore the socio-technical aspects of digital volunteerism, as these have not been explored systemically and in depth prior to the research presented in this thesis. Thus, in order to understand how to design for wellbeing and sustained engagement of digital volunteers, we need to explore the various aspects of motivation and other engagement factors associated with digital volunteerism. This gap is addressed through a series of studies in this thesis.

1.5 Research Aims

Through this research, I aim to investigate the factors associated with volunteer motivation and wellbeing that underlie the design of technology for fostering digital volunteerism. More specifically, the three research aims that I intend to explore in this thesis are:

1. To investigate the motivational aspects critical for enhancing digital volunteerism experiences (which is critical to their wellbeing).

2. To identify digital platform attributes linked to volunteer wellbeing.

3. To create guidelines that can be used for effectively supporting the engagement of volunteers in digital volunteering platforms.

Motivation and engagement of volunteers has been extensively studied in social and behavioural sciences (Please see Chapter 2 2.3.1). However, the focus of those studies is overwhelmingly on the face-to-face form of volunteering. This research will address that limitation and explore motivation and engagement in the digital sphere in a more holistic manner — how the digital environment changes the experiences of volunteers, what unique issues characterise digital volunteerism, and what the implications are for the design of technology for desirable outcomes in digital volunteerism.

1.6 Research Scope and Contribution

This research was guided by the broad, overarching research aim that I had set at the beginning of my research journey. However, it was also influenced by the active collaborations with the organisations, and the scope of the research was shaped by the needs and limitations of these organisations. Thus, the research design was shaped by the availability of resources, personnel, volunteers, the associated organisational protocols, as well as the stage of research inquiry. This meant that the research methods as well as the order of research stages adopted in each case study showed some variation based on the aforementioned factors. It is also relevant to mention here that the research on the last case study (Stepup for Dementia Research) was conducted just as the COVID-19 pandemic started. This, combined with the time constraints of completing my PhD candidacy, limited the opportunities to organise and conduct additional activities (such as workshops) which I had planned as part of the participatory research.

The research contribution in each case study is primarily *empirical*, where I provide research insights based on both qualitative and quantitative data. The methods included co-design workshops, interviews, surveys, experiments and user analytics.

Some of the research, such as the experimental study in the OSPIA case study, involved gathering data in the field, i.e. embedded within the routine activities of the organisation and its volunteers. This thesis also includes **theoretical** contributions, such as those in the final chapter where I present a theoretical *volunteer-centric design* framework for designing for digital volunteerism. The design of the framework is based around the argument that the design for any form of digital work (or work in general) considers the psycho-social, functional, and other aspects work and the worker and impacts worker engagement and wellbeing. Therefore, the design of digital volunteering work should be based around similar considerations. In this thesis, I propose that this *volunteer-centric design framework consider volunteers' motivations shaped by their volunteering and other experiences to bring about their engagement and wellbeing through their volunteer work*. Additionally, this research provides **methodological** contributions with regards to the use of methods for exploring and enhancing volunteer motivation, engagement, and wellbeing.

In the next section, I broadly outline the research design and methodology found in this thesis. In addition, I provide a brief overview of the collaborations, the research design and research methods used for each case study as well as the specific research questions associated with those case studies.

1.7 Research Methodology and Design

This research is the result of collaborations with three volunteer-involving organisations, each using a distinct digital platform to engage volunteers for achieving their organisational objectives. The project corresponding to each collaboration is a unique case study on digital volunteerism. Two out of the three case studies (ReachOut Australia and OSPIA) were based on ongoing collaborations of volunteer-using organisations with the research lab that I was affiliated with (the Wellbeing Technology Lab, formerly Positive Computing Lab headed by my former supervisor Prof. Rafael Calvo). However, one case study (StepUp for Dementia Research) was initiated after I started my PhD. These organisations were already using digital volunteers to achieve organisational objectives. However, they conveyed a need for design research to investigate various aspects of volunteer engagement.

The decision to add a third case study (with StepUp for Dementia Research) in my research arose because of the need to diversify the domains of digital volunteerism.

These would help establish common patterns of volunteer experience across diverse volunteer-using domains and contexts. In addition to StepUp for Dementia Research, I had also considered (and even initiated) collaboration with some other volunteer-involving organisations that used platforms to engage volunteers. The consideration for including those organisations was based on the relevant knowledge gaps found in my literature review. For example, related work showed a gap in research on corporate digital volunteerism initiatives and skills-based digital volunteering (see 2.5.1). As such, I approached organisations that could represent those domains and used volunteer-using platforms. However, their hesitancy to engage with my research aims and explicit focus on their business objectives rather than having mutually beneficial collaborations from this research made it difficult to collaborate, and the research plans fell through early on during our negotiations.

The three organisations that I engaged with for conducting my research are described below:

1. *ReachOut Australia* is a non-profit organisation with a focus on mental health, that engages volunteers on their website https://au.reachout.com/ to help distressed youth. My research on the design of a chat widget followed previous research (Before I started work on this project. Thus, I was not involved in that research.) that had investigated the needs of ReachOut's online volunteers to achieve better workflow and experiences.

2. *University of New South Wales (UNSW) Medicine*, is a higher education institution that involves volunteers on an online teleconferencing website called *Online Simulated Patient Interaction and Assessment (OSPIA)* https://ospia.med.unsw.edu.au/sp/uhome_sp to achieve educational objectives of medical students. My research focused on improving sustainability of the OSPIA model via focusing on the experiences of its volunteers.

3. *The University of Sydney Susan Wakil School of Nursing and Midwifery*, that uses a research platform called *StepUp for Dementia Research* https://www.stepupfordementiaresearch.org.au to facilitate volunteering in scientific research as needed by various researchers in dementia research projects. My research involved an exploration of issues that impact the wellbeing and engagement of volunteers.

Through examining the three cases, each representing unique causes - mental health, education, and scientific research - this research aims to to get a holistic

understanding of digital volunteerism. Given the scope of a PhD degree and the logistics of managing multiple projects, I limited the case studies to three. These case studies presented opportunities to investigate digital volunteerism in different domains - humanitarian cause domain in the the voluntary sector, medical education domain, and science-based research domain respectively. Thus, some findings of this research are specific to the Australian context as well as the domain, sector, and cause represented by each case study. However, the diversity of these case studies offered a chance to verify the commonalities in digital volunteerism which are presented in chapter 6 and 7 of this thesis.

Taking a human-centred design perspective that considers the physical, emotional, cognitive, and perceptual aspects of user experience in a social context, a participatory approach was used for most of the research conducted in this thesis (Giacomin, 2014). As such, I used co-design methodology in most of my studies which were likely to generate authentic and meaningful insights. Additionally, both qualitative research and quantitative research methods were used for the purpose of fulfilling the research aims and objectives.

Co-design is a creative methodology aligned with the participatory approach, which can inspire the design outcomes (Guerrini, 2011). It focuses on the collaboration among the users, designers, researchers, and other relevant stakeholders (Sanders & Stappers, 2008). This approach evolved from participatory design, which has roots in the Scandinavian labour movement that emphasised involving the workers in the design of their work environment, and is thus characterised by its socialist political leanings (Schuler & Namioka, 1993). The theory behind the participatory design approach is that the tacit knowledge of work tasks cannot completely be formalised or quantified but rather can surface through a flexible process of co-design and co-research within the work context (Spinuzzi, 2005). However, in addition to flexibility and collaboration as found in participatory design, co-design includes creativity in the design process. Depending on the discipline, context, design stage, and numerous other factors, the co-design approach can involve creative techniques such as brainstorming, story-boarding, affinity diagramming, mock-ups, role playing, and storytelling often embedded in workshop settings (Sanders et al., 2010; Steen et al., 2011). Such 'generative' activities generate information-rich qualitative data, which, until recently, were underutilised in the social and behavioural aspects of information technology (IT) research, given the earlier focus on quantifying data in technical fields (Dybå et al., 2011). Sanders 2000 proposed that using generative tools for co-design is *"a journey toward a future being made from the dreams of everyday people"*. Generative tools are effective for capturing in-depth insights

into what the user *does, says* and *makes* in order to envision a future (Sanders Elizabeth & Stappers, 2012). 'Do' techniques mainly involve observation methods to investigate participants' routine activities. 'Say' techniques include interviews and questionnaires while 'Make' techniques invite participants to perform creative activities that reveal connections and feelings as well as indicate desired situations and experiences. Making often requires designers to develop bespoke toolkits that are appropriate for the problem at hand, the context and participants involved. For example, Sanders & Stappers 2012 created a workbook probe followed by generative sessions where new parents created visual timelines to reflect on their childcare and relationship routines at home. Co-design, like other forms of participatory research, is also known to allow researchers and practitioners to extend research inquiry through quantitative methods based on experiences of the people, in order to design 'with' the people, rather than 'for' or 'on' the people (Reason, 1994).

Technology designers have applied the co-design approach in devising a wide range of products and services (Pilemalm, 2018). Studies have shown that participation of the users and other stakeholders in the design process results in the creation of products and services that are significantly more useful and valuable for the users as well as their participating organisations (Kristensson et al., 2004; Steen et al., 2011). With respect to technology design in a social context, specifically software and information systems, co-design has been successfully used to design for e-governance (Anthopoulos et al., 2007), education (Penuel et al., 2007), nonprofits (McPhail et al., 1998), and community engagement (Merkel et al., 2004), among many others.

My collaboration with the three organisations entailed active stakeholder management in addition to the core research work. All the three case studies presented in this thesis involved initial explorations of the organisations and the associated causes. This included meetings, reviews of relevant documentation, and where applicable, observations of the volunteer work. The methods are described in detail in the chapters associated with each case study. However, in the next few sub-sections I will give an overview of the research design and summarise the methods and questions for each case study. Figure 1.1 visually summarises the research design for each case study presented in this thesis.

	ReachOut Australia	OSPIA	StepUp for Dementia
Research/Design Objectives	**Improve the workflow of volunteers in an online platform that provides mental health support to youth**	**Investigate and improve the experiences of volunteers on a teleconferencing platform who provide support to medical students**	**Investigate the experiences of volunteers on a science-based research platform**
Summary of Research Design	- 2 co-design workshops - 2 one-on-one interviews	***Study 1:*** - 1 survey - 2 co-design workshops - 1 one-on-one interviews ***Study 2:*** - 1 Experimental study ***Study 3:*** - 4 co-design workshops	- 1 survey
Design Contribution	Designed a chat widget for improved workflow of volunteers	Created design guidelines for improving volunteer relatedness and implemented a design strategy for improving volunteer relatedness via gratitude	Outlined identity-based archetypes to explain meaning-making via volunteering. Created design guidelines to improve volunteering outcomes
Research Contribution	Improved service outcomes for a voluntary-sector organisation by investigating the motivations and wellbeing of volunteers and embedding those within the technology	-Explored volunteer motivation, experiences, and wellbeing to understand barriers to their engagement in a medical communication teaching program. -Tested design strategies for improving volunteer relatedness. -Examined and critically analysed the concept of relatedness for volunteers within their routine work.	Investigated volunteer motivation, experiences, and wellbeing. Critically analysed them through the concepts of identity and meaning-making to highlight strategies for engagement of science-based research volunteers

Considering Volunteer Motivation and Experiences to design for Volunteer Engagement and Wellbeing

⬇

Volunteer-Centric Design

Fig. 1.1: A basic structure of the research design conducted in each case study included in this thesis

1.7.1 Methods overview for Case Study 1- ReachOut Australia

ReachOut is an Australian non-profit organisation that works with and for the Australian youth for improving their mental health outcomes. Working with ReachOut was a unique opportunity for me, given how this organisation actively prioritises the wellbeing of its employees and volunteers. Wellbeing practices were thus embedded into their day-to-day work based on the organisational work culture and policies. The design objective focused on enhancing the digital volunteer workflow i.e. routine tasks in their line of volunteering within the organisational context. This fitted very well into my larger research aim of investigating motivation and wellbeing to enhance engagement.

The initial research on this project had already started a few months prior to my joining my then research lab. Given the project's theme that addressed design for motivation and wellbeing of digital volunteers, the project was assigned to me after the initial explorations and assessment of chat technology for improving the workflow of digital volunteers (which is described in detail in chapter 3). My involvement mainly focused on designing the features of the chat technology that addressed volunteer motivation and wellbeing. I achieved that by merging my own research aims with the organisational objectives of enhanced workflow for the volunteers.

As such the study consisted of an initial co-design workshop and two one-on-one interviews to explore the motivations, goals, and experiences of the volunteers. This was succeeded by a follow-up co-design workshop where the participants collaboratively assessed the designed high fidelity prototype.

The co-design workshops included using generative tools that were developed to systematically explore volunteer motivations and experiences and practices that supported wellbeing. The resultant data was analysed to generate and iterate design features for the digital chat system. This case study can be found in chapter 3 of this thesis. Figure 1.2 summarises the design brief of the project corresponding to this case study from a stakeholder point of view.

ReachOut Australia

Context	An Australian voluntary sector non-profit organisation that uses their digital services, specifically their website to aid distressed youth help-seekers. They use services of peer moderators, who are volunteers, to respond to these help seekers as well as manage content on mental health and wellbeing.
Design Problem	The moderators are overworked responding to thousands of requests and community posts on the website forums. The main organisational requirement is to reduce moderator load and optimise their routine in a way that shows consideration to the values of the organisation and the people involved.
Objectives	A chat widget was conceptualised in an earlier trial to solve this problem. This project's main objective is to explore the design of the chat widget to improve the workflow of volunteers in consideration of their values and motivations.
Team and Stakeholders	- Team at Wellbeing Technology Lab, School of Electrical Engineering, University of Sydney: Khushnood Z. Naqshbandi (Lead Design Researcher), Dr. Simon Hoermann (Co-lead), Dr. David Milne, Dr Dorian Peters, Prof. Rafael A. Calvo (Project PI) - ReachOut affiliates: Ben Davies, Sophie Potter (community managers) - 19 online volunteer moderators affiliated with ReachOut Australia
Deliverables	Reporting research insights in regular meetings with ReachOut affiliates, Peer-reviewed publications co-authored with organisational affiliates
Design Process	- Two one-on-one interviews with moderators, one exploratory workshop and one follow-up workshop with moderators and community managers - The process focused on uncovering volunteer motivations, collaborations, and wellbeing and embedding those in the design of the chat widget
Constraints and Expectations	The design process and outcomes should show consideration towards the voluntary sector- and organisation-specific ethos and resource constraints

Fig. 1.2: A design brief capturing the key information of the ReachOut case study from a project management perspective

1.7.2 Methods overview for Case Study 2- OSPIA

Medical communication (with prospective patients) is an important module of medical communication taught to students of medicine at university level. This entails teaching them the required communication skills, followed by practice and finally assessments. UNSW Medicine teaches its students these skills using a dedicated teleconferencing platform called OSPIA that was built specifically for this purpose. This platform engages volunteers who act as 'simulated patients', providing opportunities to the students to practice their communication skills.

However, the sole focus of the platform design was the medical students' educational objectives. This had led to neglect of volunteer engagement on the OSPIA platform. Besides, UNSW Medicine lacked any substantial information on the volunteers, resulting in a complete lack of knowledge of volunteer engagement. My research objectives for this case study were, thus, to investigate and improve the experiences of these volunteers.

The OSPIA case study included three research studies which represented the various phases of the design process. In the first research study, I used mixed-methods for user research. This included an online survey with both qualitative and quantitative questions, two co-design workshops and one individual interview.

Study two of this case study included an experiment to test a design intervention against a baseline design. The results of the first study were used here to design an engagement strategy that was tested 'in the wild' on the volunteers in their routine work.

Study 3 included further inquiry into the concept of volunteer relatedness that was found relevant in studies one and two of the research. Study 3 included four co-design workshops with the volunteers where the concept of relatedness was explored in-depth using generative co-design techniques. This case study can be found in chapter 4 of this thesis. Figure 1.3 summarises the design brief of the project corresponding to this case study from a stakeholder point of view.

OSPIA, UNSW MEDICINE

Context	The University of New South Wales School of Medicine runs a program called Volunteer Simulated Patient program which uses volunteers called simulated patients who help the medical students practice communication using mock scenarios in interview sessions. In addition to the university campus at UNSW, this program runs virtually on an online dedicated teleconferencing platform called *Online Simulated Patients Interaction and Assessment (OSPIA)*.
Design Problem	The design of the OSPIA has primarily focused on its main objective, i.e., education of the medical students. The engagement of the volunteer simulated patients (SPs) has not been considered, resulting in high attrition rates as reflected in the SP appointment logs.
Objectives	The objective of the design research enquiry is to get insights and strategies to improve the experiences of volunteers on the OSPIA platform.
Team and Stakeholders	- Team at Wellbeing Technology Lab, School of Electrical Engineering, University of Sydney: Khushnood Z. Naqshbandi (Lead Design Researcher), Chunfeng Liu (Lead OSPIA Engineer, Researcher) Kaiwang Hu, Dr Renee Lim (external collaborator), Prof. Rafael A. Calvo (Project PI in Phase 1 and Phase 2) - Team at Affective Interactions Lab, Design Lab, School of Architecture, Design, and Planning, University of Sydney: Khushnood Z. Naqshbandi (Lead Design Researcher), Ajit Pillai, Dr Naseem Ahmadpour (Project PI in Phase 3) - UNSW Medicine affiliates: Dr Silas Taylor (program director), Kiran Thwaites (manager) - Online and Campus volunteer simulated patients registered with UNSW Medicine, Australia
Deliverables	Reporting research insights in regular meetings with and reports/slide decks to UNSW Medicine affiliates, Peer-reviewed publications co-authored with organisational affiliates
Design Process	Three design research phases coincided with three studies that were conducted to achieve the required objectives: - Study 1 consisted of one survey sent to both online and campus SPs, two co-design workshops conducted with both online and campus SPs., and one one-on-one interview with an SP who had conducted both kinds of sessions. - Study 2 consisted of an experiment with pre-test post-test experimental set-up - Study 3 consisted of four co-design workshops conducted with both online and campus SPs.
Constraints and Expectations	The design process and strategies should be mindful of the educational objectives of the program as well as the resourcing constraints in terms of personnel and funding for operations. Also, the process should consider the overarching goal of creating sustainability for the Volunteer Simulated Patient program.

Fig. 1.3: A design brief capturing the key information of the OSPIA case study from a project management perspective

1.7.3 Methods overview for Case Study 3- StepUp for Dementia Research

StepUp for Dementia Research is an online science-based dementia research platform that matches scientific researchers (such as academics) to suitable volunteer participants for dementia research. These participants register voluntarily on the StepUp For Dementia Research website and set their participation preferences.

Unlike the preceding case studies, the research objectives were not very clear to me at the beginning in the StepUp for Dementia Research case study. This could be because the StepUp platform had not yet been launched (it was launched a few months after we began initial discussions in mid-2019). The clarity of objectives was established gradually based on a series of discussions with the program's director and program manager. The director was keen to understand the design needs to maintain the sustainability of the platform. When combined with my research aims, we formed the research objective of investigating the experiences of volunteers on the StepUp website as a science-based research platform. More specifically the objective was to understand volunteer motivation, needs, and wellbeing. Accordingly, this case study included an online survey study that explored these. The analysis of the resultant data revealed insights into volunteer identity, meaning-making, enablers and impediments, and various dimensions of wellbeing in science-based research volunteering. As has been mentioned in 1.6, I planned on additionally using participatory methods for this case study, but the plans were thwarted due to the uncertainty caused by the COVID-19 pandemic. This case study can be found in chapter 5 of this thesis. Figure 1.4 summarises the design brief of the project corresponding to this case study from a stakeholder point of view.

The three case studies are presented in chronological order based on the timing of when I began work on them. Each comprised a design research project in itself that was managed by me and also required a team that assisted me with several aspects of research. For instance, in the ReachOut and OSPIA case studies, I was assisted by engineers who helped implement some of the design insights. Similarly, each case study included researchers and collaborators who contributed to some aspects of research design and execution of plans. These researchers and collaborators were credited accordingly via co-authorship of the research papers resulting from the work, or a mention in the acknowledgements section of the publications (if their contributions were not directly associated with research).

StepUp for Dementia Research, Susan and Isaac Wakil School of Nursing and Midwifery, Faculty of Medicine and Health, University of Sydney

Context	An Australian online "matchmaking" platform that matches Dementia researchers with suitable and interested volunteer research participants. The platform is managed by the Susan and Isaac Wakil School of Nursing and Midwifery, Faculty of Medicine and Health, University of Sydney.
Design Problem	The program was still in its infancy and more information was required about the volunteer research participants in order to build engagement and inclusivity in the platform.
Objectives	Investigate the experiences, motivations, and wellbeing of volunteers on the platform.
Team and Stakeholders	- Team at Affective Interactions Lab, Design Lab, School of Architecture, Design, and Planning, University of Sydney: Khushnood Z. Naqshbandi (Lead Design Researcher), Dr Naseem Ahmadpour (Project PI) - Susan and Isaac Wakil School of Nursing and Midwifery affiliates: Prof Yun-Hee Jeon (Director), Dr Mirim Shin (Manager, Researcher) - Online volunteers registered with StepUp for Dementia Research
Deliverables	Reporting research insights in regular meetings with program affiliates, Peer-reviewed publication co-authored with organisational affiliates
Design Process	An online survey that consisted of qualitative and quantitative questions sent to all registered volunteers. The survey ran for more than six months to accommodate more responses as more people registered on the platform after its launch in late 2019.
Constraints and Expectations	The design process was constrained because of the COVID-19 pandemic which restricted face-to-face workshops and interviews which were planned for the next phase of design research. Also, the geographic scope of the project is limited to Australia as StepUp for Dementia Research platform only allows researchers affiliated with Australian research institutions.

Fig. 1.4: A design brief capturing the key information of the StepUp for Dementia Research case study from a project management perspective

As has been mentioned before, the objectives of the research associated with each case study were shaped by negotiations and discussions with our collaborators so that my work would result in mutually beneficial outcomes for the collaborators and myself (including my research teams). The main research aims of this thesis outlined earlier in section 1.5 guided these negotiations so that the outcomes aligned with those. Thus, while the research objectives and design in each case study showed some variation, they focused on the same overarching main research aims.

My interest in using the self-determination theory (SDT) for my research developed around the time I was analysing the data of the first case study, i.e., ReachOut Australia. At that time, I had the privilege of meeting and having a productive chat with Prof. Richard Ryan, the co-founder of SDT who, along with some other researchers in my lab had been working towards using SDT for designing technology for motivation and wellbeing. He further connected me to Prof. Marylène Gagné, who had been doing impactful work on exploring SDT in a face-to-face volunteerism context. Prof. Gagné suggested some useful SDT resources for my research on volunteer motivation and wellbeing. Thus, for the purpose of assessing volunteer motivation, I used SDT in the subsequent case studies in addition to using generative co-design techniques and other supporting methods.

1.7.4 Methods overview for Care-Focused Case Study Analysis

During my PhD, I came across some research papers and projects that combined digital volunteerism and care perspectives where care ethics were used for critiquing, analysing or understanding various aspects of volunteerism. I encountered these digital projects and publications while conducting literature reviews as well as while attending relevant conferences, workshops, and other networking events. After I completed work on my case studies, I examined how care ethics manifested in a digital volunteering context and consequently develop a framework of care in the design of digital volunteering platforms based on the three case studies I had completed.

Within the literature of interest, I selected seven HCI publications where care ethics were used in a volunteering context. A thorough reading of these publications helped me to isolate seven patterns with respect to the concepts, processes, experiences, and consequences that highlight care ethics in their corresponding projects. I labelled those patterns as conceptual categories and used them as a care-focused framework

for design of digital volunteerism. This framework was further used for content analysis of the findings from the three case studies presented in my thesis. The findings included the data presented in the thesis chapters, in addition to the other documentation such as meeting notes (with organisation personnel), observer notes, and reports associated with each case study. Consequently, this analysis helped me to derive further insights for a framework on the volunteer-centric design of digital volunteering systems. The process and outcomes are presented in chapter 6 of this thesis.

Figure 1.5 shows the research aims and objectives associated with this research which include the three case studies and care ethics focused analysis of the case studies, as well as study specific methods, participants and analysis for each of these modules. The findings from the three case studies and care ethics focused analysis were used to fulfil the research aims of this thesis presented earlier in section 1.5 of this chapter.

1.8 Thesis Structure

This document is a thesis with publication. It means that some chapters, such as the ones describing the case studies, have already been peer reviewed and published in journals or conference proceedings. In such cases, the papers appear in more or less the same format and content as the original publication. This is a typical format for thesis with publication at my institution. The thesis is organised into the following chapters:

In **Chapter 2**, I examine the historical background of volunteerism and its foundations of prosociality as found in other disciplines. I then provide the literature backing for why motivation and engagement of volunteers are relevant for my research, giving a perspective from other disciplines, followed by an HCI perspective. I then introduce and discuss SDT, a motivational framework used in my thesis, followed by a section on wellbeing of volunteers and how it is approached in this thesis. This is followed by an outlining of the research trends in digital volunteerism, which include the domains, the labour, and the platforms and technologies used in digital volunteerism. I also discuss technology design in volunteer-using organisations and the nature of work in digital volunteerism, and put forward a proposition in the form of the need for a volunteer-centric design for digital volunteerism in this chapter.

	ReachOut Australia	OSPIA	StepUp for Dementia	Care Ethics Analysis
Research/Design Objectives	Improve the workflow of volunteers in an online platform that provides mental health support to youth	Investigate and improve the experiences of volunteers on a teleconferencing platform who provide support to medical students	Investigate the experiences of volunteers on a science-based research platform	Develop a framework of care in the design of digital volunteering platforms
Contribution to Research Aim 1 To investigate the motivational aspects critical for enhancing digital volunteerism experiences	☑	☑	☑	
Contribution to Research Aim 2 To identify digital platform attributes linked to volunteer wellbeing	☑	☑	☑	
Contribution to Research Aim 3 To create guidelines that can be used for effectively supporting engagement of volunteers in digital volunteering platforms	☑	☑	☑	☑
Research Methods	2 co-design workshops, 2 interviews with 5 volunteers, 2 community managers. Analysed using thematic analysis (inductive approach).	Study 1: Online survey with 66 survey respondents, 2 co-design workshops with 11 participants, and 1 interview. Analysis included Summary statistics, correlation analysis, Thematic analysis (inductive approach). Study 2: Experiment with baseline and intervention phases with 30 participants. Analysis included significance testing, summary statistics, and goodness of fit test. Study 3: 4 co-design workshops (generative activities toolkit) with 9 participants. Analysed using Interpretative phenomenological analysis.	Online survey with 266 survey respondents. Analysed using thematic analysis (inductive approach).	Review of selected published work on care ethics and volunteerism in HCI, snowballing technique. Analysed using Top-down thematic analysis and reviewing the results and other case study observations.

Fig. 1.5: Research objectives, contribution to thesis research questions, and research methods for each of the three case studies and care ethics analysis module.

Chapter 3 comprises the ReachOut case study. The chapter starts by introducing the organisational context and the research problem. The chapter also includes the previous work on this project, and then describes the research that led to the design of a chat widget for moderators, the online volunteers on the ReachOut website who provide help to help-seeking youth on their forums. This chapter focuses on the design methods as well as the resultant prototype that was co-designed with the ReachOut community members. It also outlines the various motivational and experiential factors that aided the design process.

Chapter 4 describes the OSPIA platform and the motivation for this research, i.e. the long term sustainability of the Volunteer Simulated Patient program. It explains how the program has worked so far and then outlines and discusses the three research phases involved in this case study. This research led to findings on many volunteer experiences, specifically relatedness, the exploration of which led to some volunteer-centric design insights.

Chapter 5 describes the StepUp for Dementia Research case study. This case study consists of an online survey of volunteers of this platform that aimed to draw connections between motivation, wellbeing, and meaning in life through science-based research volunteering. With the aim of investigating wellbeing and motivation, it also delves into the question of what volunteering is and how volunteer motivation is impacted by issues of identity and meaning-making through volunteerism.

Chapter 6 presents the analyses of the findings and observations of the three case studies from a lens of Care Ethics with the aim of drawing implications for the design of digital volunteerism.

Chapter 7 provides a general discussion of the findings of my research, which provides a basis for the volunteer-centric design framework. I also reflect on the research process and revisit the research questions.

Chapter 8 is the concluding chapter of this thesis where I summarise the research contributions. I also outline the limitations and future directions for my research in this chapter.

Related Work

2

> "*Then why do you want to know?*"
> "*Because learning does not consist only of knowing what we must or we can do, but also of knowing what we could do and perhaps should not do.*"
>
> — **Umberto Eco**
> (The Name of the Rose)

In this chapter, I present the literature review for my research topic. Based on existing work, I synthesise knowledge by creating a narrative to support my research aims. The chapter sections are presented in a way that gradually contribute to the need for a volunteer-centric design for digital volunteerism.

2.1 Introduction

People have volunteered throughout history with the aim of providing social service and serving the sick, the needy and the suffering. Accordingly, organised and individual giving and helping behaviours that focus on common good are associated with virtue and historically, we can trace their roots to faith-based socially beneficial practices (*See, e.g.,* Alms, Zakat, Tzedakah, Sadaqah, Seva, Dāna) (O'Halloran, 2010). Etymologically speaking, the word volunteering is derived from the Latin word *voluntarius* meaning "one's free will" (Dictionary, 2022) . The earliest recorded usage of the term volunteering in the West was in the 1600s and was associated with military service, with its usage becoming more mainstream over time to denote other community-focused volitional activities (Internet Archive, 2010). In this chapter, I outline the theoretical grounding for the various aspects of volunteering within and outside HCI which go towards setting up the basis of my research.

2.2 Volunteerism and Prosociality

Volunteerism is a classic exemplar of prosocial behaviour (Piliavin & Charng, 1990). This makes it relevant to discuss prosociality in this chapter. Prosocial behaviour or prosociality may be defined as behaviour performed willingly with the intention to help or benefit the other (Eisenberg & Mussen, 1989). It is an umbrella term that covers many behaviours that range from intangible help such as day-to-day acts of kindness and volunteerism to giving tangible help in the form of charity and philanthropy, as well as interpersonal and community behaviours that entail cooperation and community engagement (Dovidio et al., 2006). These are also facilitated through several attitudes, emotions and affective states such as empathy, compassion, gratitude, forgiveness, awe, and nostalgia among others, many of which are encouraged on an individual and societal level (Bartlett & DeSteno, 2006; DeSteno, 2015; Leiberg et al., 2011; Piff et al., 2015; Stellar et al., 2017; Zhou et al., 2012). Similarly, personal experiences such as those of adversity (Lim & DeSteno, 2016), and interpersonal behaviours such as mimicry (van Baaren et al., 2004) have been found to increase prosocial behaviours.

The evolutionary roots of prosociality have been attributed to kin selection, that suggests prosocial behaviour towards others based on their kinship or similarity to the prosocial actor. Others suggest that prosociality is hardwired into our genes, i.e.,

some people are genetically predisposed towards being prosocial (*The Oxford Handbook of Prosocial Behavior*, 2015). Prosociality has been studied in many disciplines and contexts. It has been studied as forms of service and giving behaviour such as volunteerism, charity, and acts of caring among others in the social sciences(Dovidio et al., 2006). In the field of behavioural economics, it has been used to study human cooperation (*See, e.g.*, prisoner's dilemma (Komorita & Parks, 1999) and volunteer's dilemma (Diekmann, 1985)), social responsibility (Zimbardo, 2011) (*See, e.g.*, bystander effect and diffusion of responsibility), the efficient management of commons (Ostrom, 1990)(*also cf. Tragedy of the commons*), among others. It has been studied as both a behaviour and as a motivation in Psychology (Batson, 1987; Batson & Powell, 2003; A. Grant & Dutton, 2012).

On a social level, prosociality is normalised, regulated, and maintained by many governmental, legal, cultural, non-profit, faith and spirituality based systems (Dovidio et al., 2006). The impact of prosocial help between various groups is highly dependent on the status of the benefactor and the beneficiary within the social, economic and cultural hierarchy, i.e. structures that determine power relations (Nadler, 2016). In recent times, prosociality has manifested itself in many new ways, such as conscious consumerism, whistleblowing, clicktivism, among many others, reflecting the constant changes in the cultural, organisational, legal, technological and other changes in the society (Dovidio et al., 2006).

Many forms of prosociality are often associated with altruism, i.e. selfless prosociality to increase the welfare of the other (Batson & Powell, 2003) although it is known to be driven by various other psycho-social mechanisms (J. Wilson, 2000). Accordingly, in their book *Altruism and Prosocial Behaviour*, Batson and Powell 1987 outline the multiple motivations for volunteerism and other prosocial behaviours as egoist (focus on one's own welfare), collectivist (focus on a group's welfare) and principlist (focus on upholding a moral value). They further raise the possibility of using this classification of motivations to improve the occurrence of prosocial behaviours (Batson, 1987).

While it may not be within the scope of this thesis to study the intricacies of prosociality, it is pertinent to note that prosociality has been presented as a main or supporting topic in many works in HCI research. Many papers that I surveyed in this chapter used theories and frameworks that underlie prosociality to inform their design processes and decisions. For instance, socio-psychological mechanisms such as reciprocity that are known to induce prosociality have been used to improve desirable outcomes for online volunteering (Hsieh et al., 2013; Kuznetsov, 2006).

Batson's motivations of prosociality (Batson & Powell, 2003) have been used to understand the motivations of online volunteers (Rotman et al., 2012). The concept of commons has been used to understand the contribution and engagement of online volunteers in digital commons (Luther, 2012), not to mention understanding the work of volunteers in organisations that are prosocially oriented e.g., non-profits (Belani et al., 2011).

Therefore, keeping the prosocial nature of volunteering in mind, I discuss the literature on various aspects of volunteerism in the rest of the chapter. In the next section, I delve into the topic of volunteer motivation and why it is a core aspect of designing for digital volunteerism.

2.3 Motivation for Volunteerism

In section 1.4.1, I introduced and explained motivation for volunteerism and how it is important to deepen our understanding of that to design for sustained volunteer engagement and wellbeing for digital volunteerism. However, in order to achieve that, it is important to outline the prior related research to get relevant insights and frameworks for further investigations. In this section, I will first provide a perspective of how motivation and engagement for volunteerism have been approached in social sciences by giving a an overview of its epistemic associations with altruism and morality. I will then present comprehensive motivational theories that consider the multifaceted nature of volunteering motivation and the implication for design of technology. This will be followed by the relevant perspectives in the discipline of HCI and more broadly Design. I finally discuss SDT in this section, which is the main motivational framework used in my research and how it's multifaceted and comprehensive approach to motivation could allow design for volunteer engagement and wellbeing.

2.3.1 Perspective from Other Disciplines

The work of volunteers - the amateurs, the enthusiasts and the do-gooders - is highly romanticised in popular culture. While describing their passion, G.K. Chesterson uses the following words, "Such a man must love the toil of work more than any other man can love the rewards of it" (Chesterton, 1908). In academic literature,

the drive or passion of volunteers has been mostly interpreted and measured as their motivation and sustained engagement with their work or the cause (Clary & Snyder, 1999; Cnaan & Goldberg-Glen, 1991; Omoto & Snyder, 1995). As we will see in this section, literature shows that motivation for volunteering can be a complex phenomenon and can be used to examine their needs for engagement and provide valuable insights for design.

The motivation to volunteer has been frequently associated with altruism, even though it's not representative of the actual motivations to volunteer (Haski-Leventhal, 2009). For instance, Shwartz 1970 showed that volunteering motivation is driven by a cost-benefit analysis and enforced by moral obligations as dictated by the persisting social norms (Schwartz, 1970). So, while the need to help others could be a motivation for volunteering in most instances, it could also underlie notions of self-esteem, such as feeling useful and having a purpose (Anderson & Moore, 1978). Thus, in order to understand volunteering motivation, my literature now pivots to more comprehensive motivational frameworks that encompass these complexities and are used in the context of designing for volunteerism.

According to the Functional Motivation theory of volunteerism, an instance of volunteerism might serve different psychological functions for different volunteers and the same volunteer at different stages of their lives. It also outlines the Volunteer Functions Inventory (VFI) as a tool to assess the psychological function that volunteerism serves for the volunteer (Clary & Snyder, 1999). The six distinct functions as outlined in this theory are:

1. Values Volunteering to express or act on values that are deemed to be important by the volunteer.

2. Understanding Volunteering to learn about the world and use skills that might be going unused.

3. Enhancement Volunteering for self-development and psychological growth.

4. Career Volunteering to enhance career prospects or for professional growth.

5. Social Volunteering to enhance social relationships.

6. Protective Volunteering to reduce negative feelings like guilt, or as an escape from personal issues.

VFI has been used to generate design insights such as messaging to volunteers based on the VFI motivations (Clary et al., 1998). While this theory provides value by telling us why an individual might be motivated to volunteer and accordingly provide some insights into volunteer engagement, it does not tell us much about the 'quality' or the source of motivations regulation which can be a key towards designing for volunteer wellbeing and engagement. This point was the focus of investigation by Güntert and colleagues (2016) where they compared VFI with another theory, the self-determination theory (SDT), and found that fostering self-determination in volunteering tasks underlies volunteer engagement and wellbeing (Güntert et al., 2016). Indeed, SDT has been used by Millette and Gagné to design tasks successfully for volunteers in a face-to-face volunteering context (Millette & Gagné, 2008). SDT is explained in details further in 2.3.3 to explain its multifaceted approach that links motivation with engagement and wellbeing to lay the foundation for my research.

2.3.2 An HCI Perspective

In order to understand why people volunteer, Nov, Arazy, & Anderson (2011) developed a model of voluntary participation in social movements in citizen science portals and proposed four types of motivation: (i) collective motive which is linked to a volunteer's desire to help accomplish a project goal, (ii) norm-oriented motive, linked to volunteer's desire to fulfil social expectations, (iii) reward motives which focus on external intangible rewards such as reputation and relevant social interaction, and (iv) identification motives which focus on group identification and setting of norms for the volunteer. In a similar effort, Rotman et al. (2012) used Batson's motivations of prosociality to classify the motives of citizen science volunteers into four groups; (i) the egotistic motive opens one's minds to new knowledge, (ii) the collectivist motive is for the collective benefit that one would acquire from the collaboration, (iii) the altruistic motive is to help the scientists, and (iv) the principlist motive is the desire to make scientific knowledge accessible to public. Rotman and colleagues found that the volunteer motivations differed at different stages of volunteer participation, based on the progress of the project and their interaction with their peers and scientific community.

Other motivational factors and theories have been put forward to explain volunteer participation and engagement. The Social Learning theory, or Social Modelling (Zhu et al., 2012), has been used to explain prosocial behaviour in online volunteering groups, in which positive behaviour exhibited in an online space influences others

(Amichai-Hamburger, 2008). The idea is that learning is highly contingent upon the environment and an individual models their behaviour based on observation of others. Another learning theory related to situated contexts found in the literature is Legitimate Peripheral Participation (LPP) where members in a community of practice collaborate and learn tacit behaviours based on their roles. The GIMP open source community was used as a case study by Ye and Kishida 2003 where new members peripherally participated in small tasks at first and then gradually moved to bigger roles (Ye & Kishida, 2003).

Motivation of Reddit voluntary contributors were studied by Hsieh et al 2013 highlighting the phenomenon of generalised reciprocity. Generalised reciprocity is the phenomenon when a giver provides some service not expecting immediate or direct compensation, but expecting it at some other time and form, and not necessarily from the direct beneficiary. Aspects of prosociality and social identity of volunteers were also found relevant in determining volunteer motivations (Hsieh et al., 2013).

Volunteer recognition was found to be a factor in long-term retention, thus focusing on a specific segment of volunteers, i.e. returning volunteers (Wald et al., 2016). Volunteer recognition was also found to be important in physical volunteering organisations with an online presence (Kane & Klasnja, 2009) and volunteer social network doGooder (Morse et al., 2008).

Eveleigh et al.2014 suggested personal goal-setting mechanisms for low contributing volunteers who were not interested in the social aspects of volunteering as a way to give them autonomy but at the same time giving them a good reason to contribute from time to time (Eveleigh et al., 2014). Reeves et al. 2017 deemed setting goals as a very effective motivating factor for the volunteers. They found that some volunteer citizen science projects implemented goals in the form of (i) project-completeness goals that focus on the number of tasks completed, (e.g. Higgs Hunters using 3-day challenges), (ii) milestone-driven goals, which focus on a particular level of contribution (e.g. Moon Mappers running the Million Crater challenge) and (iii) community-based goals focusing on the community participation instead of any particular quantity or level of goals (N. Reeves et al., 2017). On a similar note, a goal-setting feature called "Collaboration of the Week" was used to mobilise volunteers' efforts in Wikiprojects (Zhu et al., 2012).

Reputation and concern for personal image were also found as positively reinforcing for contributions in some online volunteering communities. Building a positive

reputation was specifically found as an effective motivator for volunteers in Open Source Software (OSS) development communities who use volunteering as a way to build a professional image and developer skills (Nov, 2007).

Greenhill et al. talk about 'gamized' activities that use playful approaches like 'loltext' over volunteer tasks used in the online citizen science website, or Zooniverse to engage the users, thus, maintaining their intrinsic motivation (Greenhill et al., 2016). Loltext or lolspeak refers to an internet subculture where comic text descriptions on image macros, with often deliberately misspelt words, are created and shared widely over the Internet. Another factor that contributes to playfulness, task novelty, was mentioned as a way of motivating contributions (Jackson et al., 2016). Similarly, curiosity was mentioned to have a positive effect in engagement in crowdsourcing if used correctly, in this case, by using an incremental reveal of information as the volunteer progresses in the overall project goal (Law et al., 2016).

There is also plenty of precedence for using gamification for motivating contributions of online volunteers. For instance, Morales et al. 2017designed a gamified system, Zeall, for volunteers and their coordinators that took into consideration the social and other specific needs of the non-governmental organisations that used the services of volunteers. The authors designed this system with the hypothesis that rewarding good behaviour would strengthen the initial motives that most of the volunteers begin with, but which gradually diminishes once these motivations are fulfilled. In the system, rewards were given for any tasks performed, especially tasks performed within short timescales. Common gamification techniques like leaderboard rankings were used. The participation of volunteer coordinators was emphasised by rewarding them to incentivise leadership as well as letting them choose volunteers for extra rewards based on their community knowledge about the merit of the volunteers. Besides that, milestones and long-term achievements were also built into the system to encourage long-term participation. This was reinforced by community-building mechanisms such as the use of community specific jargon (Morales et al., 2017). To design for high performance with a few volunteer contributions, Preist et al. (2014) suggest that competitive gamification is better; while as to design for more contributions with average to low performance, they suggest normative gamification (Preist et al., 2014). In another study that compared competitive gamification with gamification focused on the volunteer's identity with respect to the cause, Moreno et al. found that identity related gamification was more important for motivation, and having different suitable identity based roles for volunteers within the gamified system was also useful (Moreno et al., 2015).

Tab. 2.1: Summarised literature review findings of motivational background in online
volunteering and voluntary contribution platforms

Motivational framework/theory	Author/s	Associated platform/s
Model of volunteer participation	Nov et al. 2011	Citizen science platforms
Batson's model of prosociaity	Rotman et al. 2012	Citizen science platforms
Social modelling	Zhu et al. 2012	Wikipedia
Reciprocity	Hsieh et al. 2013	Reddit
Prosociality	Hsieh et al. 2013	Reddit
Reputation	Nov 2007	Open Source communities
Recognition	Wlad et al. 2016	Citizen Science platforms
Goal setting	Zhu et al. 2012	Wikipedia
	Eveleigh et al 2013	Citizen Science platform
	Reeves et al 2017	Citizen Science platforms
Group/Social Identity	Zhu et al. 2012	Wikipedia
	Hsieh et al 2013	Reddit
Playfulness	Greenhill et al 2016	Zooniverse
Gamification	Morales et al 2017	Zeall
	Preist et al. 2014	Close the Door Apps
	Moreno et al 2015	Phone app prototype

Research Gap

Table 2.1 provides a brief overview of some of the prominent motivational frame-
works and associated platforms (online platforms, apps) for online volunteers de-
scribed above. These theories provide a good understanding of volunteer motiva-
tions, accompanied by insights for design. However, volunteer motivation is either
not considered or presented in a very simplistic manner which does not take their
experiences into account. For instance, Kapsammer et al (2017) present the design
of a digital volunteering iVolunteer, from a systems-perspective where the experi-
ences and motivations are barely considered (Kapsammer et al., 2017). Also, related
work where volunteer motivation is discussed from the lens of prosociality, identity,
and reciprocity, addresses volunteer engagement along the lines of mainly produc-
tivity and does not delve into how volunteer experiences and wellbeing (Hsieh
et al., 2013). Thus, the nuances and the holistic approach that links motivation,
engagement, and wellbeing are missing in the related works. In my research, my
aim is to investigate volunteer motivations and the experiences that shape those
motivations with a focus on their wellbeing and volunteering engagement in a digital
volunteering context. This would encompass the various contextual practices in
their day-to-day work that entail wellbeing, as well as determining various motiva-
tional, structural, and other psycho-social determinants of wellbeing. In the next
sub-section, I will describe SDT introduced earlier in the chapter. SDT provides a

holistic perspective on motivation and wellbeing of volunteers, and thus makes it relevant for designing for digital volunteering platforms.

2.3.3 The Self-Determination Theory: A Motivational Theory for Engagement and Wellbeing

Why SDT?

The Self-Determination Theory (SDT) ((Ryan & Deci, 2017)), one of the few prominent motivational theories, is underutilised in HCI research on online volunteers. To my knowledge based on the relevant literature on volunteerism, SDT has not yet been been used in HCI in a digital volunteering context. The advantage of using SDT is that it is a comprehensive theoretical framework that has been successfully applied to designing for people in many contexts and disciplines such as education (S. W. Park, 2013), sports (Allen & Shaw, 2009), games (Gee, 2012), organizational management (Tranfield et al., 2000), and health (Balaam et al., 2011) amongst many others. SDT can help explain why some technology designs successfully generate motivation and a sense of wellbeing while others do not. Peters, Calvo, & Ryan 2018 further explain the value of SDT to support HCI research on the impact of technology design for motivation, engagement and wellbeing. In a traditional face-to-face volunteering context, SDT has shown to be very useful for designing volunteer work by centring volunteer motivation and wellbeing (Güntert et al., 2016; Millette & Gagné, 2008). Thus, it makes it relevant to use in a digital volunteering context as presented in this thesis.

How Does SDT Work?

The Self-Determination Theory postulates that motivation associated with an activity is contingent upon the degree to which that activity satisfies the self-determining aspects of an individual's aspirations (Deci & Ryan, 2002; Ryan & Deci, 2017), and specifically three basic psychological needs: autonomy, competence and relatedness. Autonomy refers to the need for feeling a sense of agency and volition with regards to activities one performs. Competence is the need to feel mastery over the means to perform that activity. Relatedness is the need to feel meaningful connections to others through that activity. When those needs are satisfied through engaging

with an activity, one experiences a high degree of motivation to engage with that activity which results in wellbeing. SDT constructs can have a varying effect on motivation in different contexts including volunteering, and knowing how design should support the psychological needs can help to create better experiences for volunteers and enhance their wellbeing.

Another approach to motivation within the Self-Determination Theory is the extent of regulation or the identically named self-determination of motivation. Internally regulated motivation is called intrinsic motivation, which is the innate drive to engage in an activity notwithstanding its outcomes. We are intrinsically motivated to do things that we enjoy, without needing an external incentive. On the other hand, we may be motivated to perform an activity for the specific outcomes and external incentives attributed to it. Due to differences in the nature of those outcomes and incentives, Deci & Ryan 2002 differentiated among a range of externally regulated motivations in a sub-theory of SDT: The Organismic Integration theory. Accordingly, instead of a single construct, motivation is described as a spectrum ranging from amotivation to intrinsic motivation, with different types of extrinsic motivation in between, each based on relevance to the individual's self-determined values or source of regulation (Figure 2.1).
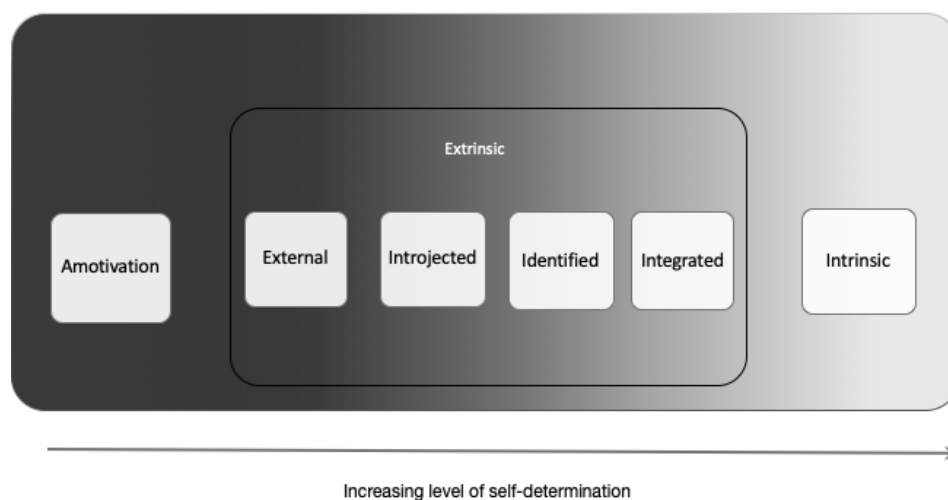
Fig. 2.1: Motivation spectrum showing various types of motivations in an increasing degree of self-determination and varying source of regulation.

The motivation spectrum, which is based on the level of self-determination or the source of activity self-regulation, has been used in the context of volunteering (Millette & Gagné, 2008). On one end of the spectrum is non-regulation, which

is when an individual is completely amotivated. This is then followed by extrinsic motivation which may entail (i) external regulation, e.g. compulsory volunteering in some schools or organisations; (ii) introjected regulation, which is partly internalised and is associated with issues of ego or self-esteem e.g. individuals who volunteer because they see themselves as good people; (iii) identified regulation, which is when a volunteering activity is seen to be related to a particular value, virtue or meaning that is valued by the volunteers, e.g. volunteering to help the needy because it is virtuous to help the needy, (iv) integrated motivation, which is when a volunteer self-identifies with the virtue, value or meaning that they assign to the volunteering activity, i.e. an external value is fully integrated with one's own values because of conviction. For instance, motivation for volunteering at a refugee camp may be integrated because a volunteer derives immense satisfaction from helping refugees, and accepting the hardships that it might entail as an essential part of the activity. Integrated motivation is the most self-determined type of external motivation. An individual's prosocial desire associated with doing good for others is a good representation of the virtue, value, or meaning in integrated and identified motivations (A. M. Grant, 2007). The other end of the spectrum, the intrinsic motivation, is intrinsically regulated. This spectrum has been used as a scale for gauging volunteer motivations and each type of regulation can be individually used to decide how the design of volunteer activities should be modified (Gagné & Deci, 2005).

In this thesis, I explore two unique applications of the theory in volunteering in the online environments. I used standard scales to assess (i) the three SDT constructs and (ii) the motivation based on the motivation spectrum of volunteers in two case studies – OSPIA and StepUp for Dementia.

2.4 Wellbeing of Digital Volunteers

There is an emerging interest in designing technology for psychological wellbeing and happiness, indicated by the popularity of wellbeing applications for mood tracking, mindfulness (K. A. Cochrane et al., 2021), meditation(K. Cochrane et al., 2020), and journaling (Tholander & Normark, 2020), with many promoting long-term wellbeing rather than immediate gratification (Calvo & Peters, 2014). Along those lines, I focus our attention towards volunteerism and wellbeing. Long-term volunteerism, specifically in a traditional face-to-face setting, is strongly associated with

psychological wellbeing and happiness Musick and Wilson, 2003. This is especially important because this impact on happiness is not subject to hedonic adaptation, making volunteerism a way forward for overcoming the 'hedonic treadmill', and building significant increments towards happiness (Binder & Freytag, 2013). It is therefore natural to ask how the wellbeing benefits of traditional volunteering can be transferred to digital environments.

Wellbeing in a given context is known to be strongly associated with motivation and engagement, with this knowledge guiding emerging relevant research in HCI (Peters et al., 2018). Certain aspects of improved engagement such as flow, enjoyment, and immersion among others are associated with enhanced motivation, and are also known to improve wellbeing (Calvo & Peters, 2014). HCI has also borrowed the understanding of wellbeing from other disciplines to design technology. Accordingly, wellbeing can be understood as (i) *hedonic*, based on experiences that result in momentary happiness, and, more specifically defined as "the presence of positive affect, the absence of negative affect, and a cognitive evaluation of life satisfaction"; and (ii) *eudaimonic*, that is concerned with the realisation of the human potential and integrates the individual with the social that results in a life of meaning and purpose (Gaggioli et al., 2017). The emergence of wellbeing-supportive design of technology has seen growth in our understanding of the various design aspects that contribute to hedonic and eudaimonic wellbeing (Mekler & Hornbæk, 2016; Seaborn, 2016). It is also supported by the use of psychological frameworks such as SDT that caters to both hedonic and eudaimonic aspects of wellbeing (Gaggioli et al., 2017; Peters, 2022; Ryan & Deci, 2017).

In a volunteering context, various predictors of hedonic and eudaimonic wellbeing are also associated with improved motivation to volunteer. For instance, role identity and social identity which are known to shape volunteer motivation and engagement are also linked to improved wellbeing (Gray & Stevenson, 2020; Hackel et al., 2017; Thoits, 2012). Based on this, I aim to seek insights for wellbeing for digital volunteers, especially since hardly any supporting literature exists on this topic. This would include investigating both hedonic wellbeing that covers the short-term, and eudaimonic wellbeing that covers the long-term aspects of wellbeing through the use of SDT in my research.

In addition to considering psychological factors on an individual and interpersonal level, it is also relevant to consider systemic and larger social factors for supporting wellbeing for volunteering work in HCI. The critical theory approach to volunteerism suggests that there is a divide between the experiences and impact of volunteerism in

the Global North versus South (Mirabella, 2020). Online volunteerism may lend itself to this divide by reinforcing existing social inequalities between the less and more technologically–equipped and technologically–abled populations (Ackermann & Manatschal, 2018; Piatak et al., 2019). The shift towards issues of social justice and awareness of disenfranchisement of marginalised groups of people via technology (Bardzell, 2010; Ogbonnaya-Ogburu et al., 2020) is therefore relevant for designing for wellbeing in volunteerism, especially if the volunteer work aims to fairly serve all beneficiaries and be inclusive of volunteers from diverse socio-economic and demographic backgrounds and varying abilities (Marková, 2018).

In my research, the focus is to investigate motivational, experiential, and other factors that contribute to volunteer engagement and wellbeing. Thus, I use theoretical frameworks such as SDT and methods such as co-design that support these goals. More importantly, in this research, I critically analyse the experiences of volunteers in order to investigate and design systems via a 'volunteer-centric design' approach (discussed more in the later sections of this chapter) which aims to contribute to these outcomes. Thus, while in the first case study, that of ReachOut Australia, presented in this thesis extensively uses only co-design methods to investigate design for motivation, engagement and wellbeing, the subsequent case studies of OSPIA and StepUp use standardised scales from SDT in addition to co-design to investigate the design for motivation engagement and wellbeing of digital volunteers.

2.5 Trends in Digital Volunteerism

In this section, I present trends in digital volunteerism as found in HCI and related literature. The aim is to give an overview of digital volunteerism in HCI to highlight the relevant knowledge that will be used in my research. It is to be noted that in this chapter and the rest of this thesis, I will abide by the definition of digital volunteerism established in the introduction chapter, i.e., a phenomenon where people perform voluntary activities using digital technology for common good and without any financial gain.

2.5.1 Trending Domains of Digital Volunteerism

In this subsection, I highlight the commonly occurring domains and contexts in which digital volunteerism is explored in HCI literature. Some of these domain categories are commonly referred to by the names found within the literature such as Citizen Science volunteering, Wiki and (FL)OSS volunteering, and Skills-based volunteering. For other domain categories, I refer to them by names that best describe the work of participating volunteers, such as science-based research volunteering, volunteering for knowledge and information sharing, and volunteering for humanitarian causes.

1. **Citizen science volunteering**- A huge chunk of the literature focused on volunteer participation is citizen science volunteering. Citizen science is an application of digital volunteering where amateurs add value to scientific research projects. Citizen scientists may contribute new data, collaborate with scientists to refine the data, co-create projects with the scientists, solicit scientific investigation from professional researchers, or commit to independent research with little to no recognition from relevant professional societies (Preece, 2016). Some of the prominent citizen science projects mentioned in the literature are Zooniverse, Galaxy Zoo, Foldit, Stardust@home, SETI@home, Eyewire, etc. Jennet et al. (Jennett et al., 2016) mentions three forms of citizen science volunteering on the basis of what they contribute: *(i) Volunteer computing*, where participants install software to lend the processing power to volunteer projects e.g. distributed computing using the Berkeley Open Infrastructure for Network Computing (BOINC) for projects like SETI@home, MilkyWay@home, Einstein@home, Folding@home, etc.; *(ii) Volunteer thinking*, where volunteers use their cognitive resources to solve problems e.g. Foldit, Eyewire, Galaxy Zoo, EteRNA, etc.; and *(iii) Participatory sensing*, where participants install software and use sensors like Wifi, bluetooth, or GPS in their devices that helps in data collection e.g. Oldweather.

2. **Science-based research volunteering**- Another application of digital volunteering in the scientific domain is individuals participating in research in science-based research volunteering. Science-based research volunteering is similar to citizen science volunteering in that it shares the focus on doing science. However, they differ primarily because of how they involve volunteers in scientific research. Science-based research involves volunteers as research participants while as citizen science involves them as amateur scientists. Unlike citizen science, science-based research volunteering has not received much

attention in HCI with only nascent research interest in volunteer science-based research platforms such as Volunteer Science (https://volunteerscience.com/).

3. **Wiki Volunteering**- Wiki creation and maintenance, specifically that of Wikipedia, is found in literature in abundance, with research on motivation (Kuznetsov, 2006), demographics (Collier & Bear, 2012), and culture (Morgan et al., 2012), among various other aspects of volunteer participation in Wikipedia and other similar platforms.

4. **FLOSS Volunteering**- Another similar domain of digital volunteering found in the literature is Free Libre and Open Source Software (FLOSS) volunteering where volunteers contribute to open source software development and management. Similar to the research on Wiki volunteering, research on volunteer motivation (Ye & Kishida, 2003), sustainability (Fang & Neufeld, 2009), and demographics (Powell et al., 2010) among others was commonly found in this form of digital volunteering as well.

5. **Volunteering for Knowledge and Information Sharing**- The Internet has facilitated sharing of information for public benefit. People volunteer information about their general experiences e.g. Yelp or Quora, or to help provide solutions to issues e.g. help forums (Jabr et al., 2014), or in programs used in public and private sectors (Easton & Wise, 2015), etc. Literature pointed to volunteering on platforms like Reddit and OpenStreetMap receiving some research attention (Brennan & Corbett, 2013; Jones & Weber, 2012).

6. **Volunteering for Humanitarian Causes**- Digital Volunteers are associated with various humanitarian causes in different ways. This was found in literature in the form of volunteering for organisations that provide help and advocacy, such as non-profits and voluntary sector organisations (Morse et al., 2008). This also encompasses digital civics and other forms of participatory engagement programs that allow people to volunteer in public service or community-based organisations (Seguin et al., 2022; St. Denis et al., 2014). Online platforms also allow individuals or groups of individuals to raise awareness about issues or help someone without being affiliated with organisations (Amichai-Hamburger, 2008). It was also found that volunteers self-organise around several causes (Cobb et al., 2014; Starbird, 2013; Starbird & Palen, 2011) or social change (Kavada, 2012; Passini, 2012). Causes ranged from crisis and disaster relief (Starbird & Palen, 2011), aiding the homeless (Morse et al., 2008), and political activism (Passini, 2012), among many others.

7. **Skills-based Volunteering** – Some emerging literature was found on skills-based online volunteering which is used in some instances to aid causes that may include conducting research, making websites, or virtual mentoring among other virtual tasks (Feng & Leong, 2017). This domain has a lot of potential for further research on digital volunteers in HCI. For example, there are many dedicated websites such as the United Nations' online volunteering platform (www.onlinevolunteering.org), or online volunteering marketplaces like Volunteermatch (https://www.volunteermatch.org/) and Vollie (https://www.vollie.com.au/), that allow volunteers to choose whether they want to volunteer 'virtually' i.e. purely via online means (as seen in Vollie) versus through geographic location based physical means (in the case of the Volunteermatch).

While some of the above mentioned instances represent volunteering causes that are geared towards care-focused and humanitarian objectives e.g. doGooder (Morse et al., 2008), some others are causes that have a quintessential intellectual appeal to hobbyists and enthusiasts such as citizen scientists (Tinati et al., 2015) and Open Source enthusiasts (Geiger et al., 2021). However, these are seen to overlap in many instances (Haworth et al., 2016; Ludwig et al., 2015).

This classification is not an exhaustive list of the domains of digital volunteerism; rather it reflects the research interest within the HCI community in the last two decades. Indeed, there are some current examples of domains of digital volunteerism which could do with some attention from HCI researchers. For instance, there is an emerging interest in the corporate sector on harnessing technology for corporate volunteerism, but the research is lacking in HCI and related literature. Indeed, some recently formed social enterprises in Australia such as Communiteer (https://communiteer.org/), Good Company (https://www.goodcompany.com.au/au), and others are taking note and integrating corporate volunteerism modules into their business models as a way of achieving social good as well as enhanced revenue generation. Additionally, the literature also mentions domains such as online content moderation which has generally focused on paid work, with interest in its volunteer counterpart still in its infancy (Kiene et al., 2019).

2.5.2 Organising Digital Volunteering Labour- Varieties and Genres

Different types of digital volunteering are found in literature based on how the digital volunteers' labour is organised. Microvolunteering is a good case in point. Microvolunteering is a phenomenon where volunteer work is divided into small 'microtasks' (Bernstein et al., 2013). Crowdsourced volunteer work is common in many microvolunteering projects (Bullard, 2016; Parker et al., 2014). Even though there are many instances of volunteering that clearly demand significant time and effort from volunteers in terms of the volunteering tasks, the literature does not point to a particular terminology for this phenomenon. For instance, United Nations Volunteers has a website (https://www.onlinevolunteering.org/en) where volunteers engage in tasks such as writing policies and proposals, graphic design, remote teaching, online advocacy and community outreach which are inherently time-consuming. Some of these tasks even require the volunteers to directly communicate with the beneficiaries of their work, such as online teaching and community outreach.

Related to the concept of volunteer labour are models of volunteer collaboration on digital platforms. Commons-based peer-production, a phenomenon where a large number of people work together over the internet to achieve a common goal, is an example best demonstrated in platforms such as Wikipedia (Luther et al., 2009). Communities such as those in Open Source use Legitimate Peripheral Participation (LPP) in their volunteering practice, which encourages tacit knowledge learning in situated contexts where new volunteers initially peripherally participate in small tasks then gradually move on to more consequential roles (Mugar et al., 2014).

Moreover, volunteering labour also varies according to how the overall projects are planned and organised based on the requirements of the projects and available resources (Amichai-Hamburger, 2008). For instance, some projects are planned, delivered and managed online for their entirety e.g. Wikipedia, where volunteers organise themselves into groups and organise various topics into Wikiprojects (Ung & Dalle, 2010). Other projects might have a mixed or a hybrid model where some physical or location-based aspects are embedded into the digital or vice-versa (Blythe & Monk, 2005). As mentioned previously, in some cases, digital volunteers are recruited by non-profits (Luo, 2012), virtual organisations (Greenhill et al., 2016), or physical organisations with a strong virtual presence (Høimyr et al., 2015). In other cases, volunteers informally organise themselves into groups based on a particular cause (Zhu et al., 2012). Another observation is that while in some of these instances volunteers work on a single project or organisation and at

different life-cycles of the projects, some may be engaged in more than one project or organisation, or on an ad-hoc basis subject to events, crises and other situations (Amichai-Hamburger, 2008; Kapsammer et al., 2017).

Initially in this thesis, labour of the volunteers was primarily associated with the structure of the tasks and the overall experience design given their work context. During the course of this research however, considerations arose about the quality and experience of volunteer work based on the way their labour was organised. For instance, in OSPIA case study, it was found that the experiences of volunteers were shaped by tasks that required more time and subsequently, more efforts of volunteers. In chapter 4 of this thesis, I term this phenomenon as "macro-volunteering", a foil to the more commonly known micro-volunteering. Other affective and experiential aspects associated with the labour of volunteers (such as emotional labour) are further explored in this thesis. Thus, this section is a step towards building an understanding of the organisation of labour of volunteers.

2.5.3 Platforms and Technologies for Digital Volunteering

Related work shows that there is diversity in digital volunteerism with respect to the kind of digital platforms used. Some projects were carried out through dedicated systems for volunteering objectives. An example is Volunteerscience, an online portal where scientists and researchers use volunteers as research subjects for behavioural experiments (https://volunteerscience.com/). United Nations has its own website dedicated specifically for volunteering tasks that can be achieved online (https://www.onlinevolunteering.org). Other digital volunteering projects are urgent, or do not have enough resources to build dedicated platforms, which is why they use already existing platforms. An example is volunteers using social media to organise relief and aid work during the 2013 Colorado floods. When asked about the use of social media for relief work, one of the volunteers responded, "Twitter is for delivering the news, Facebook is where we talk about the news, and the blog is where we provide the details." (St. Denis et al., 2014). Social networks were also found to play a huge role in recruiting volunteers through peer-recommended opportunities (Morse et al., 2008).

Another observation is that even though many digital volunteering projects have a dedicated online presence, they leverage social media as a means of public engagement in general or to enhance their visibility. Reuter et al. designed an application

to help disaster volunteers integrate the useful functionalities of various social media applications like Facebook, Twitter and Google Maps. Based on already existing data for social media use by volunteers, Facebook was observed to build community engagement, Twitter was ideal for rapid information dissemination, and Google Maps provided precise location services. The app could be accessed as a web version as well as embedded in Facebook, and was used to organise relief activities (Reuter et al., 2015).

Literature that focused on the use of smartphone and mobile technology for digital volunteering was also found, with projects encompassing digital civics (S. Park et al., 2017), the voluntary sector (Kane & Klasnja, 2009), citizen science (Preece, 2016) and others leveraging the advantages that come with improved mobility. Preece 2017 also notes the increasing use of mobile phones in some regions of the Global South, which could pave the way for improving inclusiveness in digital volunteering projects(Preece, 2017). The use of technology provides the additional benefit of functions aided by sensing devices(Preece, 2016) and other computing resources, such as in volunteer cloud computing (Shahri et al., 2014). Finally, the literature also showed a few attempts to utilise newer technologies such as blockchain for engaging volunteers (Kapsammer et al., 2017).

2.5.4 Volunteer-Involving Organisations and Design of Volunteering Technology

The design of any successful technology requires a deep understanding of the users and the nature of the users' work (Rogers et al., 2011). HCI has made huge strides towards designing digital technology for achieving organisational objectives for workers, including volunteers associated with volunteer-involving organisations (VIOs). Digital volunteering forms an important counterpart to physical volunteering in many volunteer–involving organisations (VIOs) and is often used to improve overall efficiency of engaging volunteers (due to increased accessibility), as well as the delivered services (Amichai-Hamburger, 2008). Thus, it makes sense for these organisations to invest in improving the design of their digital products in order to enhance volunteer experience and engagement. Despite this, the design of digital volunteering solutions is predominantly focused on objectives and values of volunteer-involving organisations primarily found in the voluntary sector (Brudney, 2016).

Unlike the research on the design of technology in private and for-profit sectors that has made significant advancements in the last few decades, the research on technology in the voluntary sector remains inadequate, with some initiatives undertaken, but which remain largely disparate (McPhail et al., 1998; Morse et al., 2008; Schummer & Haake, 2010). This could be attributed to the lack of capital for investing in organisational technology in the voluntary sector, which makes this sector rely heavily on private donations and grants from the governments in nations in the Global North. Subsequently, funding and resource constraints centre the design of volunteering technology mostly on organisational objectives and sustainability (Balser, 2008) rather then using a volunteer-centric perspective. Moreover, voluntary-sector organisations often "appropriate" the technology that is used for organisational work in the for-profit sector as many routine tasks performed in the voluntary-sector organisations are similar to those in for-profit organisations. Naturally, one could assume that technology used in the latter can be successfully adapted for the former, for both paid workers and volunteers. For instance, an integrated customer chat service like Intercom (www.intercom.com) can be used both by a bank employee and by a volunteer working for the Red Cross. Thus, most systems are designed for the for-profit sector and nonprofits and voluntary sector generally follow suit (Balser, 2008; Saidel & Cour, 2003). This is despite research pointing to the fact that the work motivations, demographics and many other social characteristics of the volunteers and workers in the voluntary sector differ from those of the workers in the for-profit sector (Leete, 2000).

Consequently, there seems to be very little research on designing technology to centre volunteer work and experiences rather than take an organisation-centric approach. For instance, Kapsammer et al 2017 conceptualise the system architecture of iVolunteer, a digital Volunteer Management System (VMS) that uses open volunteering marketplace, intelligent recommender systems, and brokering and gamification mechanisms to centralise volunteer engagement and separate it from the influence of VIOs (Kapsammer et al., 2017). However, the conceptualisation does not go beyond system, and does not involve any perspectives of the volunteers themselves. Thus, more work is required to make it applicable to more contexts and for it to be more human-centered, or more specifically, volunteer-centered.

As a result of this inadequate attention to volunteer-centric design for technology, many experiences that we know are valued by face-to-face/ in-person volunteers, do not always translate well into digital volunteering platforms (Liu et al., 2016). This is because the experiential aspects of design which could be highlighted by uncovering volunteers' values and motivations, and more specifically how those

impact wellbeing is yet an unexplored area in HCI. This makes it important to gain a perspective of technology design that centres the volunteers with respect to their motivations, values, wellbeing and other factors that shape their volunteering. Thus, it is precisely the gap in volunteer-centric design that motivates my research presented in this thesis.

2.5.5 Digital Volunteerism as Digital Work: Towards a Volunteer-Centric Design

HCI has seen a meteoric rise in the interest in work, workers, the future of work and other related concepts in recent years, with the emergence of many new forms of work supported via technology. The establishment of a distinct discipline of Computer Supported Cooperative Work (CSCW) highlights the significance of technology for work in our day-to-day lives. Some recent examples of work in HCI and CSCW range from platforms used for professional work in corporations to informal work in paid gigs supported by apps such as Uber and online platforms like Amazon Mechanical Turk. These are all instances of work in the paid economy as opposed to the unpaid economy represented by volunteers – the amateurs, enthusiasts, and do-gooders.

Research provides evidence on what improves worker experiences focusing on worker productivity and performance (Choe et al., 2015; Drury & Farhoomand, 1999; Franssila et al., 2014). There is also evidence that the design of the work environment among other social and psychological factors impacts worker experiences, influencing not only their performance and productivity, but also their wellbeing. For instance, the sense of being connected to others has been linked to improved wellbeing at the workplace (Cockshaw et al., 2014; Mérida-López et al., 2019). This in turn, improves worker loyalty and enthusiasm, thus impacting the larger work sustainability (Sirota & Klein, 2013). Unsurprisingly, worker wellness and wellbeing have become important areas of organisational research as well as HCI research. Recent research in HCI emphasizes the need for a more holistic 'worker-centric design', an approach to design for supporting workers' interests beyond the workplace context in order to build a better and more sustainable future of work (Fox et al., 2020).

Volunteer work is similar to other forms of work in many ways. As has been pointed out in the previous section, the similarity could be the nature of the work itself. For

instance, online content moderation is known to recruit paid workers as well as volunteers (Kiene et al., 2019). The similarities between paid and volunteer work also extend to some experiential aspects of work. For instance, both volunteers and paid workers share concerns about work quality (Baruch et al., 2016; Y.-H. Kim et al., 2019), scheduling (Bernstein et al., 2013; Uhde et al., 2020), and the larger impact of their work (Dur & Glazer, 2008; Voida et al., 2015). The difference between the two is seemingly the monetary gain from paid work, but more importantly,the underlying motivational factors and values associated with the work for volunteering (Cnaan et al., 1996). The focus on motivation and volunteer experiences can determine the success of these designed systems that go beyond the issue of monetary compensation for work. To highlight this point, I compare the design of Wikipedia, the free online encyclopedia, which engages volunteer communities for knowledge maintenance, to that of the online Encyclopedia Britannica, which uses eminent professionals for knowledge maintenance. Wikipedia has not only become much more widely used than Britannica in the recent years, it has also been hailed for its open access model that provides a free source of reference for the general public, thus democratising both knowledge management and consumption. This drives home the fact that a design that considers nuanced aspects of engagement that include human motivation, wellbeing, as well as other important socio-technical factors in design can bring about phenomenal successes by improving engagement and productivity. It is thus, important to avoid simplistic framings of volunteering that go beyond paid v/s unpaid labour and explore drivers of volunteer motivation, wellbeing, and other related factors to maintain good volunteer experiences in digital volunteering platforms (Millette & Gagné, 2008). Using design methods and techniques can be useful for researching these factors by enabling the volunteers to reflect on their perceived values and experiences.

These related works suggest that volunteers' experience, just like that of paid workers, is shaped by several psychological and social factors that extend beyond their immediate volunteer work. The 'worker-centric' approach in HCI (Fox et al., 2020), thus provides a relevant analogous framing for designing for digital volunteers. When these factors are addressed in designed systems via a 'volunteer-centric' approach, they contribute to happiness and flourishing in the volunteer work.

Thus, while the concept of centring the volunteers in the design of volunteer-using platforms is not a unique one, I present a framing in this thesis that justifies this concept. Further, I focus on the experiential aspects of design that are highlighted through volunteer motivation and wellbeing. This is a significant aspect of thinking

behind a volunteer-centric approach towards designing for long-term volunteer engagement.

2.5.6 Care and Digital Volunteerism

Care is comprised of *caring attitudes* where one 'cares about' something or someone (Collins, 2015)(pp 49–64), and *caring actions* where one 'cares for' something or someone (Collins, 2015)(pp 65–81). We could 'care about' an issue, a thing, a person or a collection of these. Human emotions and reactions to those emotions such as sympathy, empathy and compassion are associated with caring attitudes (Hedge & Mackenzie, 2012). 'Caring for' entails tending to a matter or subject of care, nurturing it or maintaining it (Collins, 2015)(pp 65–81). Volunteerism and other forms of prosociality encompass many attitudes and actions of care. Care ethics, a theory of morality based on attitudes and actions of care, provide a feminist–focused perspective of morality that focuses on "receptivity, relatedness, and responsiveness" as a way of promoting the wellbeing of care–providers and care–receivers in a given context (Gilligan, 1988; Nel, 1984).

Recent HCI literature demonstrated the relevance of care ethics to volunteerism, centring volunteers and others within a volunteering context as care–providers. Care ethics in the context of digital volunteerism is discussed in detail in chapter 6. In this subsection, I provide a brief survey of HCI literature where care ethics has been used to understand and analyse design for volunteerism.

Rossitto et al. 2021 contribute to our understanding of the various configurations of care practices in volunteer–involving initiatives via two relevant case studies, as well as how technology can facilitate or hinder these practices. They introduce the concept of "anti–designs", defined as the socio–technical exploration that does not take into account the different configurations of care in work practices to highlight issues of care in designing for volunteer–led initiatives. Rossitto and colleagues talk about the care–related issues that these volunteers have for the beneficiaries visible in the design for community and volunteer–led initiatives. They also mention how the configurations of caring go against corporate and capitalistic narratives that are found in the design of many socio–technical systems (Rossitto et al., 2021).

In their research on maker culture involving volunteer participation, Vyas 2019 associated the social aspects of care to the wellbeing of makers. The care was

exhibited via doing good by making crafts for others (family, others in need), thus fulfilling their altruistic needs in the making and thereby enhancing their own and their beneficiaries' wellbeing. The author found that prosocial identity is core to makers even as compared to their interest–based maker identity. (Vyas, 2019).

Howard and Irani (2019) examine the ethics, values, care and politics in HCI research associated with qualitative research participants who are deeply invested in knowledge production systems such as Wikipedia, a volunteer–using platform. They present a reflective narrative of these research subjects, with a focus on their accountability, representation and emotional labour. Their paper described care as a feminist ethic and linked it to those who are often neglected. They specify system affordances (or lack thereof) contributing to the gender imbalance that skews against participation of women on Wikipedia. The authors also noted that ethics are not universal, but situated, and the meaning of 'social good' may vary based on a multitude of factors such as location, culture, politics, etc. (Howard & Irani, 2019).

Kruger et al (2021) reflected on care practices in a volunteer–driven community initiative aimed at serving refugees and migrants in Germany, and how such practices contributed to sustainability of design results in a socio–technical project. The authors then linked it to how they could support the larger social sustainability and the agenda of social justice. The initial aim of this research was to co–design technology with volunteer–using organisations. However, it evolved into understanding various factors that impacted sustainability of such projects after handover. The research made a point as to how volunteer–driven repair and maintenance is important to the ethic of care in socio–technical research projects(Krüger et al., 2021).

Thus, we find that relevant HCI literature points to Care Ethics as a way of understanding the care–focused aspects of design in volunteering. These highlight the interconnectedness of care–focused design and wellbeing, and detail the socio–technical characteristics of digital volunteering. In chapter 6, I have used Care Ethics for providing further insights into the volunteer-centric design for digital volunteerism by using it as a lens to analyse the three case studies presented in this thesis.

2.6 Summary and Research Opportunities Emerging from Related Work

In this chapter, I first introduced volunteerism by providing a concise historical perspective. I then briefly outlined the literature on volunteerism and prosociality to build an epistemological foundation of volunteerism.

I then focused on volunteer motivation — the various motivational theories and factors that have been used to support engagement of volunteers — and then narrowed it down to specifically those that give insights towards designing for digital volunteerism. I also provided a perspective on wellbeing of digital volunteers — how it is missing in HCI research, what constitutes volunteer wellbeing, and how to embed it in my research investigations. I outlined the self-determination theory as a way of assessing volunteer motivation, engagement and wellbeing, discussing how and why it was used in my research.

Next, I presented the trends in digital volunteerism, showing the oft-researched domains and how volunteer labour is organised, followed by the various platforms and technologies that are used for digital volunteerism.

Related work shows that the engagement and motivation of volunteers has been studied in different digital domains and contexts such as citizen science, FLOSS, and digital civics, among others. Many of the studies tend to show certain overlaps in terms of recommendations and strategies of design to enhance motivation and engagement of volunteers. However, digital volunteerism usually does not appear as the core research theme. These recommendations and strategies are focused on specific projects or may extend to the broader application areas and domains (such as citizen science, disaster informatics and others). Hence, the resultant design perspectives do not provide holistic insights into the larger phenomenon of digital volunteerism, thus making these endeavours seem completely disparate from one another despite their underlying conceptual similarity. This makes it relevant to study these from the common lens of digital volunteerism. Additionally, the focus on volunteer wellbeing is not observed in the literature. This makes it important to have a wellbeing-focused perspective of design.

Further, since all the case studies in this thesis involve volunteer-using organisations (VIOs), I outlined the relevant literature in that context and built a narrative of

why it is important to design technology that centres around volunteer motivation, engagement, and wellbeing. This narrative was further supported in the section where I outlined the worker-centric design of technology that addressed the various factors that build wellbeing and sustainability in work. I used the worker-centric design paradigm to build an analogy with the volunteer-centric design approach of technology introduced in this thesis, which centres the volunteers' motivations and experiences — both within and outside their work context – which contribute to their engagement and flourishing in digital volunteering work.

Finally, I introduced care ethics in relation to volunteerism. I provided relevant literature and showed how it can be used as a way of analysing the various aspects of digital volunteerism design, thus providing valuable insights towards the volunteer-centric design in this thesis.

Thus, in the related work research presented in this thesis, I surveyed the existing literature to contribute to our current understanding of digital volunteerism and its design. In the subsequent research presented in this thesis, I extend that knowledge, specifically with a focus on motivation and wellbeing of volunteers and by introducing the concept of volunteer-centric design.

ReachOut: Providing Help to Helpers through the Design of a Human-Centred Chat System

> *"When thou art strong and well thyself, bear gratefully the burdens of the weak. If thou cherish the tree of kindness, thou wilt assuredly eat of the fruits of a good name."*
>
> — **Saadi Shirazi**
> (The Bustan of Saadi)

Preamble:

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This chapter addresses the three research aims outlined in this thesis - **Research Aim 1**: To investigate the motivational aspects critical for enhancing digital volunteerism experiences, **Research Aim 2**: To identify digital platform attributes linked to volunteer wellbeing, and **Research Aim 3**: To create guidelines that can be used for effectively supporting engagement of volunteers in digital volunteering platforms. This is achieved by exploring the experiences and motivations of volunteers on an online platform. The research was performed to fulfil the objective of improving the workflow of volunteers that provides peer-support to youth with respect to their mental health and wellbeing. The research in this investigation focused specifically on the design of a chat tool, a rudimentary version of which was conceptualised and tested during a trial completed prior to this study. The process explored the motivations and experiences of these volunteers, which led to the development of specific features of the chat tool that were tailored to the nature of their work and

organisation, as well as the sector-specific ethos. Several research methods were used, including two one-on-one interviews, one main co-design workshop and a follow-up co-design workshop to asses the design features of a high fidelity prototype of a chat widget. The methods, motivational themes, and ensuing design solutions that were implemented are discussed in detail with the aim of encouraging co-design of technology for voluntary-sector organisations.

3.1 Introduction

Research has shown that the voluntary sector differs from the for-profit sector in terms of work motivation and demographics of its workers (Leete, 2000). A defining characteristic of the voluntary sector, also known as the third sector, civic sector, joint sector, or social sector, is its heavy use of volunteerism. It is worth pointing out that this sector uses the service of volunteers abundantly; individuals who are not usually driven by explicit material considerations (Bussell & Forbes, 2002). The importance of customising technology to the voluntary context and its people has been recognised as the key to the success of these organisations (Balser, 2008). Moreover, technology changes work processes, tasks, job satisfaction, workload, and power relationships in the voluntary sector (Saidel & Cour, 2003). This makes it essential to emphasise the importance of creating a bridge between the voluntary sector and human–computer interaction (HCI) research so that the latter better addresses the need for designing technology for this sector. In this chapter, I address this need by investigating the design of technology for a voluntary sector organisation, with a specific focus on the online volunteers and others within their community.

3.2 ReachOut Australia

The study was conducted in collaboration with ReachOut Australia, a voluntary-sector organisation dedicated to providing online mental health and general well-being support to Australians aged 14–25 years. Their aims are early intervention, prevention and information (Metcalf & Blake, 2014; ReachOut, 2015). Accordingly, the volunteers do not offer online counselling or psychotherapy, but the outcomes of their peer support for the distressed youth are no less important. The service provides either immediate relief to the young person or helps them recognise the need for clinical help. At the time this research was conducted, most online peer-to-peer support in Australia occurred via the ReachOut forum, where trained volunteer peers communicate asynchronously online with help-seeking youth and offer empathetic understanding, personal encouragement, and careful, tailored referral to the appropriate resources.

3.3 Background

3.3.1 Digital peer-support service for youth mental health

Providing mental health support to young people is challenging due to the stigma and the debilitating nature of mental illness and the common hesitancy to seek help (Gulliver et al., 2010). Indeed, in the Australian 2010 census, only 29% of young people (aged 16–34) in Australia with mental health problems reported using any support services, compared to 40% in older age groups (Australian Bureau of Statistics, 2010). Several studies conducted in other countries representing a wide range of healthcare practices consistently show a similar trend (Clement et al., 2015; Gulliver et al., 2010). This makes an online, specifically online chat, service a useful, instantaneous, and cost- and time-effective way of delivering appropriate help while simultaneously maintaining the privacy of the help seeker ((Dowling & Rickwood, 2013; Hoermann et al., 2017; Reyes-Portillo et al., 2014). Peer-support technologies for the provision of mental health services take a step back and, instead of dealing with problems after they become aggravated, they deal with early signs of mental distress and, thus, are proactive rather than reactive. Peer support is an important aspect of a holistic solution to youth mental health support (Fo & O'Donnell, 1974; McGorry, 2007). Instead of relying completely on the clinicians and professional therapists, the peer-support model utilises trained peers who motivate and gently nudge the mentally distressed youth towards the right mental health and well-being choices. These peers are not professional mental health workers but, in most cases, volunteers who take an active interest in the cause that they associate with (Davidson et al., 2006).

3.3.2 Previous Research and Chat Trial

In order to gather evidence regarding end-user interest in the live chat option, a real-time peer-to-peer chat-based support system was introduced at ReachOut for the first time during a trial that was a precursor to this study (Milne et al., 2016). This trial introduced a simple version of a text-based chat service to the ReachOut website and had pre- and post-chat surveys for 84 visitors and the ReachOut moderators. Milne et al. reported that of the 84 visitors, 21 were deemed as trolls and 18 were out of the eligible age bracket during the pre-chat survey. Of the 45 remaining,

only 29 gave their informed consent. Both the visitors and the moderators rated the trial quite positively —26 out of 29 (90%) chats were rated by the participating moderators as worthwhile, while 18 out of the 29 (62%) visitors who finished the post-chat survey thought the same. Ten out of the 29 participating visitors did not finish the post-chat survey, and one visitor did not think it was worthwhile, because he wanted help with homework. Of the visitors who completed the survey, the ones that had reported sad or anxious moods at the start reported feeling better after the chat. The helpful text links shared by the moderators in the chat resulted in a good click rate of 73%. However, analysis showed that a considerable amount of the moderators' time—even on chat conversations with a visitor who moderators deemed worthwhile—was spent idle, waiting for the visitor to respond (56%), looking for relevant resources (13%), assessing eligibility screening (14%), and so on (Milne et al., 2016). This meant that, at any given time, the moderators could have handled more visitors or made better use of their time and efforts through other services. The busiest hour on ReachOut forum in the year 2015 involved almost 800 visitors, indicating that the moderators were often engaging multiple help seekers simultaneously. Given the limited number of moderators working actively in the forum at any given time, introducing certain kinds of automation could potentially help facilitate the chat moderation process. However, it was not clear from this trial what the moderators would consider appropriate and useful, or what system or service would be in line with theirs and the organisation's values. Moreover, the researchers recognised the possibility that other solutions for making ReachOut's online peer-to-peer service more efficient and easy might not have been considered because of the limited nature of the trial.

While the behaviour of visitors to the ReachOut site has been studied extensively (e.g., (Burns et al., 2007; Collin et al., 2011), the behaviour of moderators has not attracted much attention. Consequently, further research is needed to examine the moderators' perspectives and explicitly explore these questions. Based on the prior meetings with ReachOut personnel, a few challenges for engaging with the moderators were known prior to the study. For example, they require great flexibility in deciding how much personal time they can spend on moderating. They are geographically dispersed across Australia and within multiple time zones, thus potentially interfering with communication with one another. More importantly, the community managers, who are paid employees of the organisation, felt that it was essential to make sure that the moderators were well supported throughout the emotionally demanding task of providing synchronous chat support to vulnerable youth. Additionally, the dynamic between the moderators and their community managers represented an important aspect to be studied. These community managers are responsible for overseeing the

moderator recruitment, training, and monitoring, and they serve as the moderators' regular point of contact with the organisation, and thus form an essential component for the moderator engagement. The importance of involving community managers for designing volunteer tasks and engagement with an organisation is backed by ample evidence in peer-reviewed literature for both traditional and online forms of volunteering (Alfes & Langner, 2017; Eveleigh et al., 2014; Shin & Kleiner, 2003). Thus, it seemed worthwhile to continue the study in order to propose solutions supported by further research.

3.3.3 Current Research: Humanising the Chat System

This research would require a dynamic approach that allowed the researchers to explore redesign of the chat system while considering the multiple social, personal and organisational factors that could impact effectiveness of the system and the engagement of the moderators. Consequently, the research team chose a co-design approach. The goals of the research were (a) understanding moderators' expectations and motivations, (b) determining moderators' current aptitude in using software systems as part of their work, (c) understanding moderators' perceptions of the integration of automation in the chat system, and (d) exploring the dynamics between the moderators and community managers. The proposed ReachOut online chat forum was intended to be workable for the users of the system. These users comprise two main categories: *(i) visitors*, young people going through tough times and seeking help on ReachOut Australia online platform, and *(ii) moderators*, the online volunteers who are trained by ReachOut to offer peer support to distressed youth (K. Naqshbandi et al., 2016). The moderators are young adults, aged 16–25 and Australian residents, who are recruited and trained by ReachOut to moderate its online discussion forum. These moderators are supervised by and report to professional senior community managers within ReachOut, individuals who have specialised qualifications and experience. At the time of the study, ReachOut had 19 moderators dispersed across Australia who, collectively, had moderated more than 35,000 forum posts from approximately 4,000 visitors within the years 2014–2015 (ReachOut, 2015). These moderators have a good understanding of online technology and feel confident enough to use it for their volunteer work. They generally have some vocational or other volunteer experience or tertiary-level educational qualification in mental health, community affairs, social work, or working with young people. The moderators are categorised as junior or senior moderators based on the regularity and length of their moderation activities. In other words, moderators

possessing less than a year of regular experience are junior moderators while those with longer service are senior moderators.

3.4 Method

This study used a co-design approach that involved the researcher-designers[1] (Authors 1-4, 7), and participants from ReachOut (the community managers, Authors 5 & 6), and the moderators. The researcher-designers proposed activities with the intention of involving all these parties during the design process, while the community managers and moderators were involved in the design activities organised by the researcher-designers. Additionally, all design decisions were made by the researcher-designers in consultation with these participants. In their planning, the researcher-designers understood the importance of choosing methods that would be most effective toward achieving our shared research goals. This study comprised three stages: an initial workshop with some participatory activities, interviews with individual participants, and a final follow-up workshop with participatory activities. All the interview and workshop sessions were audio recorded for subsequent analyses. For coding practices, we used the general inductive approach (Thomas, 2006). We carried out this study in accordance with the recommendations of University of Sydney ethics conventions. The protocol was approved by the University of Sydney Ethics Committee (Project No. 2016/06). All subjects signed written informed consent agreements in accordance with the National Statement on Ethical Conduct in Human Research (2007).

3.4.1 Study Design

To facilitate design considerations, each workshop involved a general focus group discussion around the motivations, goals, and experiences of the moderators, followed by several individual and group activities designed to gather specific system-design requirements. The first workshop session introduced the concept of a peer-to-peer chat system by demonstrating a series of low-fidelity prototypes in order to elicit

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[1]The research team consisted of technology researchers who contributed to the design of the chat system by providing various skills related to interaction design, software development and user research. Thus, the members of the research team for the ReachOut study will be hereby referred to as researcher-designers.

responses and critiques from the moderators. The subsequent online individual interviews complemented the information gained from the first workshop session. Finally, in the second workshop session, we demonstrated a functional chat system to confirm that the design elements were in line with the needs of the moderators and context of the chats. We conducted several chat simulations in which moderators, community managers, and researcher-designers role-played the moderator–visitor chat sessions, based on the visitor personas extracted from the ReachOut forum, in order to test the proposed concept (Workshop 1) and system (Workshop 2). The workshops were conducted within the ReachOut headquarters. This location is the usual work facility of the ReachOut community managers. The moderators joined remotely from different parts of the country via Skype. The participant information sheet, consent sheet, workshop materials and artifacts with remote participants were exchanged via email.

Participants

Our collaborators within ReachOut Australia recruited a representative sample of volunteer moderators; all recruited moderators and community managers agreed to voluntary participation. The participating community managers had several years of experience dealing with the moderators in ReachOut. The moderators who participated in the workshops had been actively moderating the online forum for at least a year and were therefore senior moderators. The moderators who participated in the interviews (Stage 2) had less than a year of moderating experience, and thus were junior moderators. During the course of discussions with all of the participating moderators, we found that most of them were either studying or had recently completed a tertiary-level program in Psychology and were interested in using this experience as a means to advance their future career prospects. The community managers were professionals in their line of work and had many years of experience in community work especially related to managing youth mental health. The ReachOut participants (for all the workshops and the interviews) comprised one male and four female moderators and one male and one female community manager. The moderators were aged in their early 20s; the community managers were in their early- to mid-30s. The researcher-designers initiated and facilitated the discussions and activities in these workshops as well as the interviews. During the focus group and interview discussions, the researcher-designers encouraged the ReachOut participants to elaborate, elucidate, or reiterate their discussion points so that the researcher-designers could understand the lived experiences of the

moderators and community managers. Other, more hands-on activities engaged the researcher-designers and ReachOut participants performing similar or balancing roles. The recommended participant group size—tiny (2-4) to small (6-8), as recommended by Muller and Kuhn (1993)—was reached for both workshops to match their participatory design goals.

Initial Workshop

The initial workshop was conducted with focus group discussions interspersed with creative participatory activities that were designed to elicit responses and reveal underlying motives of the intended end users. These activities included (a) brainstorming, (b) affinity diagramming, (c) sketching, and (d) role-playing in the online chats. This workshop involved four ReachOut participants—two community managers employed full-time by ReachOut and two experienced moderators (who participated remotely via Skype), and four researcher-designers. The workshop lasted for two hours. Activity worksheets were emailed to the remote participants, who shared them back through email after the activity sessions. The session began with an informal introduction and ice-breaking session for the first few minutes. We followed it with a semi-structured discussion of the moderators' motivations and experiences of volunteering with ReachOut. The discussion was cued in the form of open-ended questions drawn from some of the areas of research interest (see end of section Chat Trial), such as "What do you do as a moderator?," "Why do you work as a moderator?," and "What kind of forum activities are you doing?" The discussions flowed organically most of the time, but were controlled using discussion cues by the researcher-designers if the participants deviated too far from the topic or if the process became prolonged. The initial discussion was followed by a simulated chat with a moderator using an off-the-shelf chat tool in which one of the researcher-designers adopted the persona of a potential visitor (e.g., a young person seeking information on drug abuse). The moderators worked together to maintain the conversation while openly discussing the visitor's likely motivations and needs and the rationale behind each dialogue move. The session then moved on to brainstorming and affinity diagramming that involved structuring ideas using Post-it Notes. The ReachOut participants were asked to think about and discuss situations that would be concerning in an online chat conversation and, conversely, to envision an ideal conversation. They also were asked to describe a situation or visitor that would be difficult to deal with and, conversely, a situation or visitor for which they could imagine the conversation going particularly smoothly. The

responses were jotted onto Post-it Notes as separate points and gradually structured by all the participants into four topics: concerns, ideal, difficult, and straightforward (see left portion of Figure 3.1). Participants then were asked to sketch a "support kit" of useful resources for the chat system. The goal was to generate additional creative insights into the moderation work based on the understanding of the moderators (see right portion of Figure 3.1).
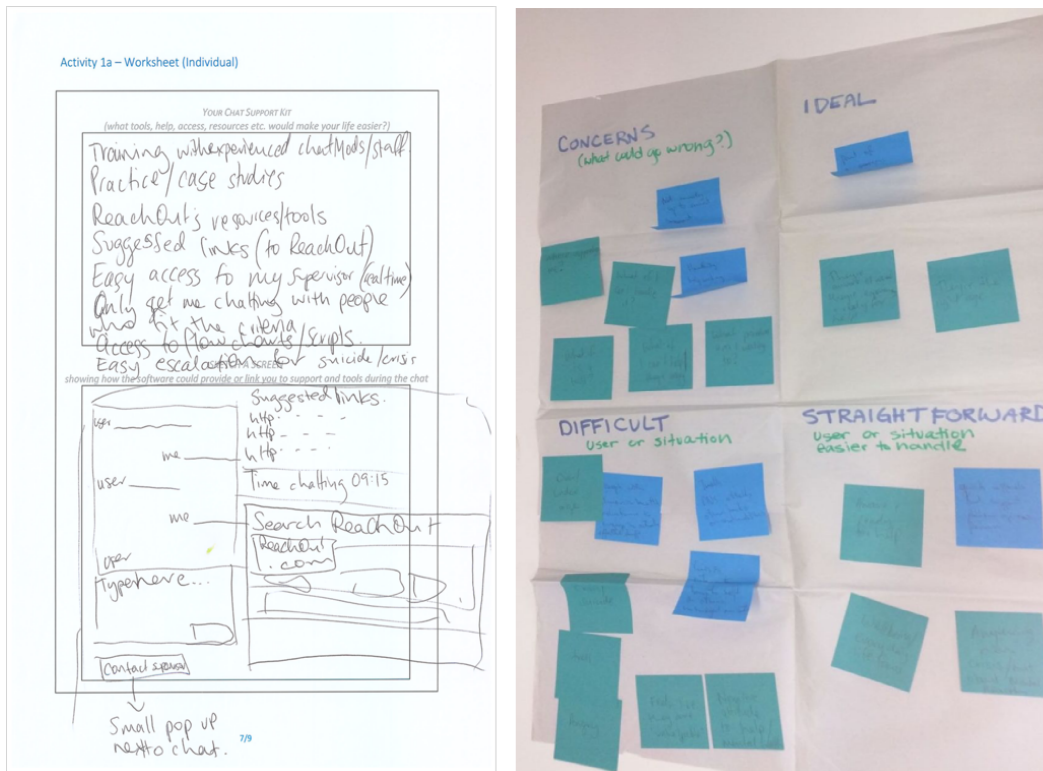
Fig. 3.1: Sketching (left) and affinity diagramming (right) activities in which ReachOut moderators, community managers, and researcher-designers participated during Workshop 1.

Two additional simulated chats were conducted via the same protocol described previously. In the first chat, we used the persona of a concerned youth worried about her friend's drug abuse (see Figure 3.2), in the second, of a severely depressed visitor at risk of harm.

Although the primary objective of the workshop was the design of the chat tool, the researcher-designers kept open minds toward other possible digital solutions during the discussions and creative activities. In particular, they avoided presenting any leading questions or cues.
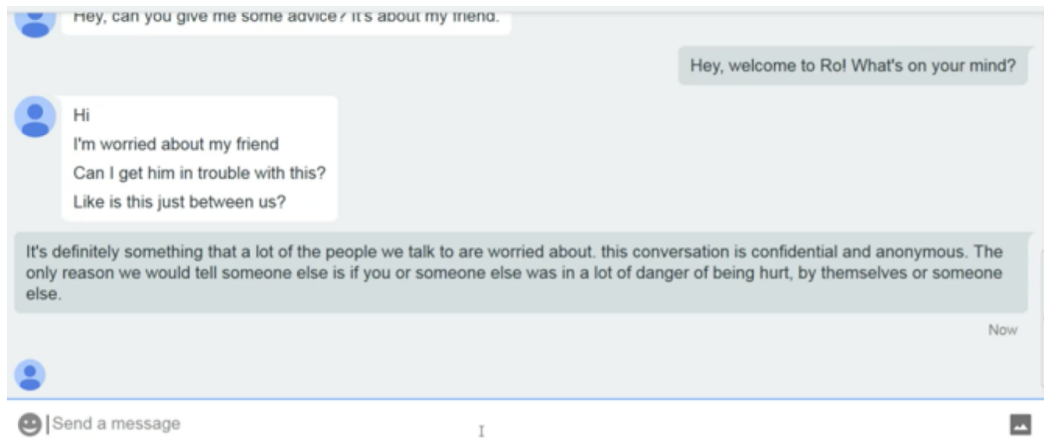
Fig. 3.2: Screenshot of the simulated chat during Workshop 1, where ReachOut moderators and researcher-designers role-played visitor–moderator interactions.

Individual Interviews

Individual interviews were conducted with two moderators, each with less than a year of volunteer experience at ReachOut. These interviews were conducted remotely via Skype, each with one researcher-designer and one moderator. The discussions lasted less than an hour—55 minutes and 45 minutes for Interviewees 1 and 2, respectively. The interviews were semi-structured. Although the researcher-designers provided discussion prompts related to a series of topics of interest, the moderators were encouraged to add to the discussion wherever relevant and were asked probing questions whenever needed. The questions were similar to the ones asked in the focus groups from Workshop 1. Each interview began with a discussion of the participant's motivations for volunteering and his/her experiences. It then moved to simulated chat sessions in which a researcher-designer adopted the persona of a potential visitor and communicated exclusively via the text-based features of Skype. The participant was encouraged to respond via text while explaining his/her thought process via audio. Later in the interview sessions, the moderators were asked open-ended questions to discuss concerning, difficult, straightforward, and ideal situations and visitors.

Follow-up Workshop

A second workshop was conducted with three participants—one community manager and two moderators (one moderator and the community manager also participated

in the first workshop). The purpose of this workshop focused more specifically on the design and features of the potential chat system. The discussion questions were the same as the first workshop to provide a quick recapitulation of earlier points but were time-controlled in order to provide more time for the prototype discussion. The discussions also revisited the topic points—concerning, difficult, straightforward, and ideal situation/visitors—although this time the points were structured categories based on the previous workshop findings. This workshop repeated the simulated chats as the previous workshop but, instead of using an off-the-shelf tool, the participants used a working prototype of the system we will describe in later sections of this paper. Also, rather than researcher-designers alone adopting the visitor personas, the participants themselves alternated between the visitor and moderator roles using personas that were assigned to them by the researcher-designers. After a firsthand experience with the high-fidelity prototype, the moderators and community managers then discussed the various features of the prototype, as well as its perceived usefulness and whether anything could be improved. For instance, one of the moderators used the term "sticky note" to describe how an ideal tool would help him compartmentalise his thoughts while moderating. The researcher-designers used this and other insights from this workshop to further refine the prototype. The Workshop 2 lasted for two hours. Table 3.1 consolidates some of the information gained from the workshops and interviews.

Tab. 3.1: Research design summarising the research in each case study included in this thesis

Method	RO Participants	Researcher-designers	Duration	Activities
Workshop 1 (W1)	2 moderators, 2 managers	4	2 hours	Semi-structured conversations, Brainstorming, Affinity diag., Sketching, Role playing
1-on-1 Interviews	2 moderators	1	1- 55min, 2- 45min	Semi-structured conversations, Role playing
Workshop 2 (W2)	2 moderators (1 from W1), 1 manager (common with W1)	3 (2 from W1)	2 hours	Semi-structured conversations, Brainstorming, Sketching, Role-playing

3.5 Analysis

The primary method of collecting data was through audio recording. One of the researcher-designers present during all events transcribed the audio data from the interviews and focus groups/workshops. Transcripts from these were analyzed using the general inductive approach (Thomas, 2006). This approach uses inductive analysis, where the readings of the raw qualitative data are used to derive themes or concepts. The goal is to avoid any structured constraints influenced by predetermined objectives. Two researcher-designers (myself and another researcher) closely read the texts of the transcripts, independently analyzing the transcripts. During the readings of the transcripts, each researcher-designer identified specific themes, with the aim of capturing the primary messages that the participants conveyed. Consideration was given to the following while outlining the themes: frequency (how often the concept was mentioned), intensity (strength of the comment), specificity (detail of the response), and participant perception of the importance of the concept (Krueger, 1997). An example of a prominent theme is "Building rapport with the visitors." Some examples of quotes that indicated building rapport with the visitors were *"Trying to ask a lot of questions to get them talking to build up that rapport"* (Moderator 3), and *"A good chat is when you are really engaging with the user. You form a connection with them based on what they have said to you"* (Moderator 4). During the course of combining the two independent sets of themes, the researcher-designers noticed that many themes expressed similar ideas. For instance, the theme "Following community guidelines" represented comments of this nature, *"So, the user is in a highly emotive state; they might be prone to say things that are inappropriate or just in the heat of the moment. And if that is the case, you are unable to offer them full support. You have to outline what the guidelines are and inform them of that."* (Community Manager 1) Meanwhile, the theme "Getting help if required" included comments such as, *"This is the point where someone else should come in and support the chat."* (Community Manager 1). Because of the similarity in suggesting the same outcome for the moderator, these related comments were combined into a new theme, called "Providing support and guidance to the moderator." On the other hand, the theme "Promote use of the forum" contained only one coded comment, from Moderator 2, *"You're also heaps welcome to come and have a chat to us on the forums if you need anything else. We're here for you. forums.reachout.com"* and was thus discarded. The process of coding, identifying, and combining themes was repeated a total of three times, when agreement between the coders was achieved. We discuss the resultant themes in the results section.

3.6 Results

In this section, I describe the themes that emerged during qualitative analysis. We categorised the themes into (a) those that relate to participants' current skills and experience and whether they feel equipped to provide real-time chat support; (b) those that relate to why they would be motivated to volunteer; and (c) the specific details of what the service should try to do and how.

3.6.1 Confidence and Concerns

Participants were generally optimistic and confident about potentially assisting help-seekers via real-time chat. In many ways, they saw it as a natural extension of their existing duties moderating the ReachOut forum. They felt confident that their previous experiences had given them knowledge of and access to a large amount of useful information to share. This included reference materials hosted on ReachOut.com and elsewhere, past conversations posted in the forum, and external services (e.g., HeadSpace, Kids Helpline) for referrals to visitors when appropriate. They considered themselves as just one component in the overall holistic framework for treating these troubled youths. *"But then there is the community outside as well: family members, parents and other supports, other specialists, crisis services. We are often the beginning of a much bigger, longer journey with a lot more sort of variation, a lot more types of support. We are part of the journey and we push it along in the right direction."* (Moderator 4) As peers, they saw themselves as uniquely well equipped to offer support with empathy and encouragement. *"The support that peers can give to each other: That is quite separate and different and unique to the support [you can get] from self-help or professionals"* (Moderator 2). However, the participants also expressed concern that the chat service would be more likely to place them outside of their areas of expertise. In the forum, they have a great deal of control over which topics and users they engage. However, in a chat service, they might be assigned to a visitor for whom they have limited capacity to relate to, and conversations might quickly traverse into areas of which they have little knowledge or experience.

3.6.2 Motivations for Participating

When asked about their motivations for volunteering at ReachOut forum, some moderators mentioned motivations related to the greater good, such as making a difference to peoples' lives and contributing positively to society. The respondents stated that they perceived ReachOut as a safe place in which they could make meaningful contributions by facilitating healthy discussions around the various issues that affect young people. These involve *"... building capacities in our community of young people around understanding, recognising, and supporting"* (Community Manager 2). They also appreciated being part of the online community of peers: *"Yeah, I really enjoy working for ReachOut. It feels like home"* (Moderator 3). In addition, several participants saw ReachOut as a stepping-stone toward a career in a related field. Disciplines such as Psychology and community work came up quite often when discussing their motivation: *"I come from a Psychology background. I was looking to get experience within the field of Psychology in order to help me to progress further in my career".* (Moderator 1).

3.6.3 Goals and Priorities for the Service

Participants had some very specific feedback about how the chat service should be conducted. We provide these details in the following subsections.

Build Rapport with Visitors

One of the most prominent themes to emerge during the analysis was the need to build a strong rapport with each visitor. This was seen as particularly important during the early phases of a chat conversation, to help visitors feel at ease: *"We don't want to just straight jump into it [the problem] either. Like, this is our first interaction with this person, so how are we going to make them welcome?"* (Community manager 1). Participants predicted that some visitors would have difficulty opening up. Additionally, in some cases, the cause of distress would be ambiguous, and visitors would need help navigating through their emotions, such as *"... Someone who is not really self-aware and unable to tell what's going on but obviously is really struggling. So, the challenge is to ask the right type of questions and build the type of rapport"* (Moderator 3).

Uphold Visitor Autonomy

Participants felt strongly averse to prescribing direct solutions to visitors. Instead, they felt the best approach was to empower visitors to formulate their own plans and strategies: *"[Our job is to] help someone make some decision on what they should do next, rather than offer up solutions exactly ourselves".* (Moderator 4). This autonomy-supportive approach was demonstrated during the simulated chats. The participants were careful to avoid prescriptive statements and wary of jumping to a solution too quickly: *"I am careful to not give direct advice, I guess we are not exactly trained to directly counsel our users. So, [I] don't want to exactly tell what the person what to do."* (Moderator 2). When it felt appropriate during the interaction, moderators would share resources that they felt might be relevant and useful but would generally offer multiple options and avoid making any decisions on the visitor's behalf. *"We have a bunch of resources on our site, so if it's cool, I can give you a few links, but we can also keep chatting too!"* (Moderator 1). *"Which ones do you want to pick? How do you want to take them?"* (Moderator 3). A community manager explained that this focus on autonomy is a core guideline for the organisation, which aims to follow a strengths-based approach to working with young people. *"This is where I am using a strengths-based model to get them to think about ways to help themselves".* (Community manager 1).

Preserve Anonymity and Maintain Boundaries

ReachOut's existing peer-support services are provided anonymously as part of their commitment to providing a safe place for young people to share their private struggles. New users are warned not to enter any identifying information when they create their public profiles, and to not reveal their own (or anyone else's) identity when posting messages on the forum. One of the moderators' core responsibilities is to locate any identifying information on the forum, redact it, and remind users about this policy. Participants were keen for the chat service to remain anonymous also, given that it would have the same goal of providing a safe place for a young help-seeker to open up. The preference for anonymity extended not only to the visitors' identities, but also to their own. The participants acknowledged that the need for anonymity could have a negative impact on their capacity to build rapport or conduct follow-ups with visitors. A good compromise would be to adopt existing forum user-names and profiles so that visitors would have at least some knowledge

with whom they were talking. This would also facilitate making contact via the forum after the chat.

Follow-up with Visitors about Post-chat Outcomes

Given the focus on building empathy and rapport during each chat, participants felt it would be natural and desirable to continue checking with them [visitors] from time to time after each chat. *"Follow up questions. Ask them how they are doing, or how their appointment with the psychologist went. Making it a bit more personal for them is a good thing"* (Moderator 1). They were also keen to know if visitors would follow through with the advice and suggestions they were given. This was seen as valuable information for refining their approach to future conversations, as well as for gaining some validation and positive feedback that these conversations would have a meaningful impact. It would likely be an important component for maintaining long-term motivation and engagement. However, participants also recognised that visitors would be difficult to contact for follow-ups if the service were entirely anonymous. They also felt that it would be important to respect visitors' autonomy and ensure that they had a say in whether any follow-up contact would be made and what form it would take. One simple solution they proposed was to end each chat with an invitation to join the forum and continue the conversation there: "We're on the forum all the time so come visit" (Moderator 3).

Respect Moderators' Time and Effort

The participants expressed concern that some conversations or portions of conversations would be a poor use of their time. For example, *"Someone pops up and says 'I wanna chat. How are you guys?' and it's got literally nothing to do with anything and it doesn't go anywhere."* (Moderator 2). Some specific situations that they considered likely to occur were:

- Visitors outside of the target demographic (i.e., Australians aged 14–25) who they would not be well equipped to help.

- Visitors who intentionally waste time to provoke a reaction (i.e., trolls)

- Visitors who prolong a conversation after it has run its natural course.

- Visitors who do not have anything specific to discuss.

One way to counter these potential situations was to set the right expectations at the start of the conversation: *". . . setting the expectations at the beginning so that users do not expect that moderators have infinite time"* (Moderator 4). They also thought it would be useful to have a predefined set of guidelines that could be consulted and cited when visitors engage in undesirable behaviour. *"It seems to be like an inappropriate use of the ReachOut service. So, [I] need to inform this user of that and outline the guidelines".* (Moderator 3). A similar document already exists for ReachOut's existing forum and acts as a reference for how users are expected to treat each other. These community guidelines are frequently consulted and cited when dealing with undesirable behaviour in the forum and was characterised as mutually beneficial for all involved parties. In addition to that, some participants suggested that they would feel more effective in their work if the system could screen out ineligible visitors, trolls, and those without specific needs.

Provide Guidance and Support for the Moderator

Participants expressed some concern that they have only limited training and will likely encounter situations for which they are not equipped to manage. The moderators would themselves require help on occasion. They recognised that the proposed chat service would be more problematic than the existing forum, where they can choose which posts and users to interact with and can take more time to conduct research and formulate responses. One reason they might feel out of their depth would be if they encountered a specific circumstance or domain for which they had little training or personal experience to draw from, as Moderator 5 indicated. *"If someone is in a novel situation that, for whatever reason, you feel not equipped with the proper knowledge about services or other information to provide to the user, then you feel unsure what to do. In such an instance, you want to be able to refer to someone else to get your own sort of assistance."* (Moderator 5) Distinct from this was the concern that some chats would put them out of their depth simply due to the intensity of the situation. *"Maybe the person is in a really difficult situation; maybe you don't feel equipped to support them in the best way. I guess you need some form of support for the person running the chat as well"* (Moderator 3). One possible avenue of support that the participants mentioned was to have a reference guide that provided specific steps to follow in various situations. The participants explained that they made frequent use of an existing handbook when moderating the forum. Perhaps this

could be adapted for the chat service. *"In a particular area, I would feel less equipped to help someone, but that's what the youth moderator handbook is [for]. I followed the directions in there to approaching those kinds of requests"* (Moderator 4). However, the moderators also recognised that, due to the time constraints imposed by the real-time chat service, this handbook would need to be concise and easy to draw from and/or thoroughly internalised through training and experience. *"Yeah, quick links, kind of like if they are talking about anxiety, depression or whatever, have useful, professional kind of services that you might want to add".* (Moderator 4). Another avenue mentioned was to provide direct access to a supervisor (i.e., the community manager), who would be able to quickly offer guidance and advice, or even take over particularly difficult or risky situations. *"So, they might say something like, 'It's OK. It won't matter soon.' It might be as simple as that. And that is the point where it's probably good for me [the community manager] to get involved to help you guys with the risk assessment kind of thing."* (Community manager 1) Participants also thought it would be useful to be able to offer advice and support for each other, regardless of any seniority. Because they are likely to have different areas of expertise, they could share the workload and stress of having to rapidly compose responses and identify relevant resources.

Find the Right Person for Each Visitor

Participants were concerned that they might not be equipped to help all participants equally. They felt it would be important to assign each visitor to the person best equipped to help them and suggested this could be achieved by allowing moderators (or their supervisor) to specify their level of expertise and the types of conversations that would best suit their expertise. *". . . Being able to assign topics based on skill levels, like 'This person is really new, but they're OK with basic advice from referrals. But they're not OK with crisis and tough time stuff'"* (Community manager 1). The visitor might then be able to choose a specific moderator or be assigned automatically to someone after entering some information about his/her reason for chatting. This information about expertise and topic preference would also be useful for letting moderators know who to contact if they find themselves out of their depth later on in a conversation.

3.7 Discussion and Design of the System

Since conducting the workshops, we have designed, developed, and temporarily launched an initial version of a chat system customized specifically to ReachOut's needs. We discuss here the features of this system and how these features reflect the resultant themes and insights drawn from the discussion and activity data. The design features and other aspects of design that were built into the system aided the moderators in their day-to-day work and also promote their wellbeing. Based on initial meetings with the ReachOut community managers, there were some concerns raised around how synchronous form of communication may overwhelm the moderators. The design addresses that concern by using automation in features such as Interactive guides, that reduces the moderator cognitive load. More importantly, the design fosters the community aspect of volunteering by allowing the volunteer moderators and community managers to directly and indirectly assist one another during the synchronous chats in a communal fashion.

From the perspective of the visitor, this system differs little from other automated chatbots used in e–commerce and on other Web sites. As shown in Figure 3.3, it is a small widget that appears on bottom right corner of the ReachOut Web site[2]. The widget will follow the visitor as he/she browses the site, allowing him/her to maintain a conversation and chat about the material encountered. Figure 4 provides an overview of the system from the perspective of the moderator. The interface is divided horizontally into three main areas: a main menu on the left, the content of the current conversation in the middle, and secondary information or features related to the current conversation on the right. The main menu provides information about the number of visitors waiting to chat and a button to begin chatting with the visitor who has been waiting the longest. Below this are links to the dashboard (with statistics on how many people are on the ReachOut Web site, how many people are currently chatting, etc.), the team page (a place for moderators to chat with each other and know which other moderator is currently online), and a history page (providing an overview of the past conversations of the moderator). The panel to the right in Figure 3.4 shows the visitor info, which includes some basic details about the visitor, the pages he/she has visited recently on ReachOut, and a list of URLs that have been shared in the conversation so far. A filled-in circle beside a link indicates that the visitor has clicked it, while those with an empty circle remain unvisited. The remainder of this section will describe the key features of the chat system in more detail.

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[2]The screenshot was taken from au.reachout.com when the chat widget was rolled out temporarily.
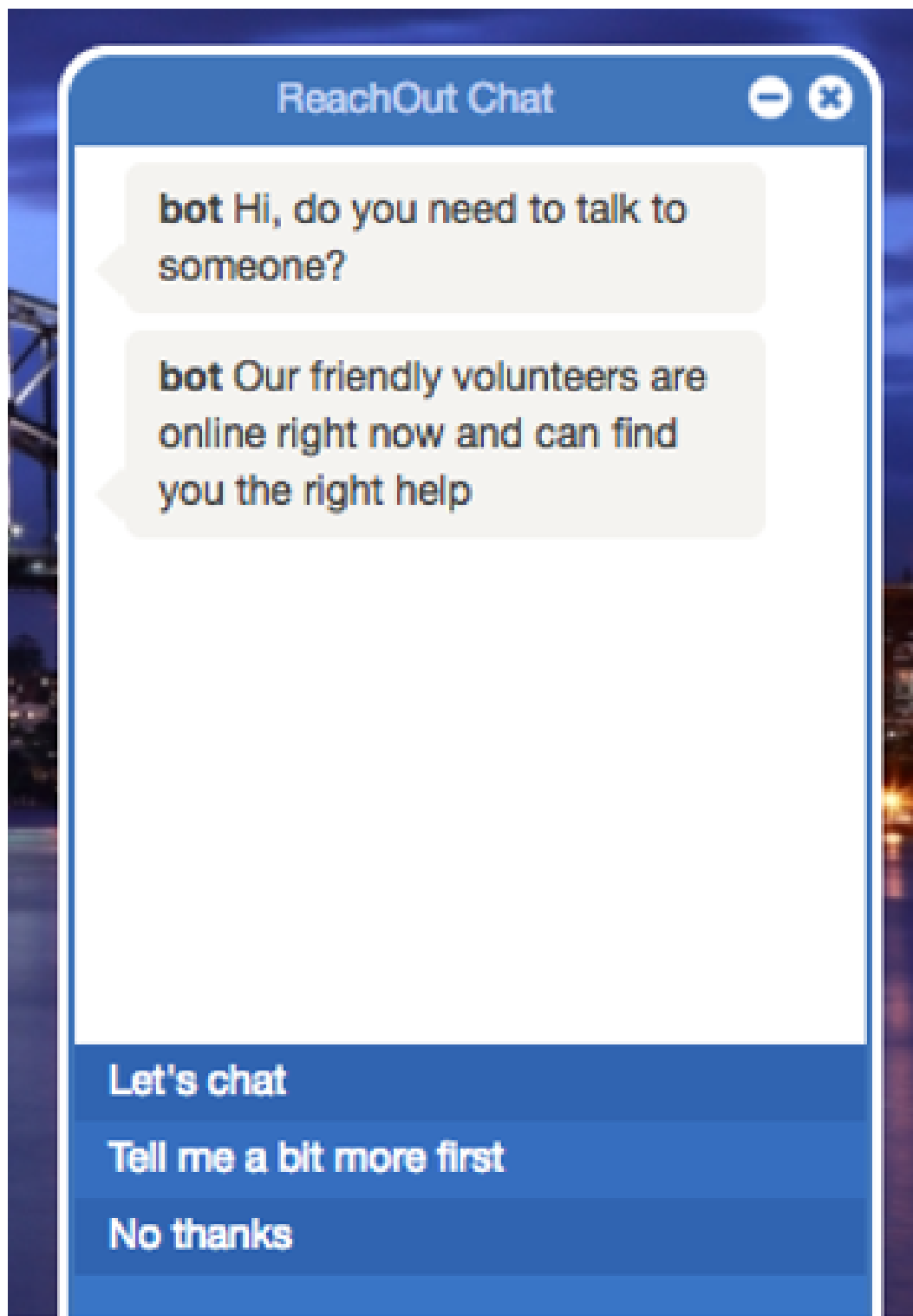
Fig. 3.3: The ReachOut chat system from the perspective of the visitor.
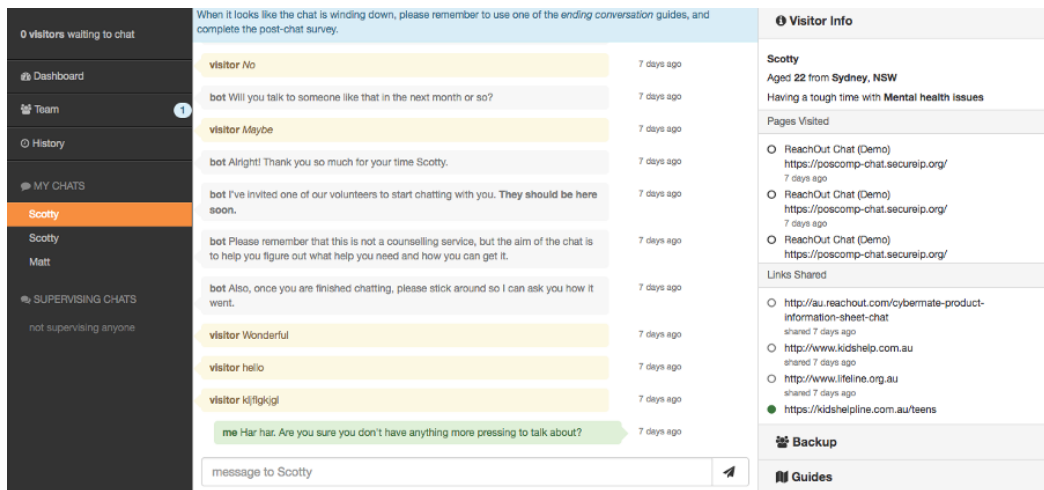
Fig. 3.4: The ReachOut chat system from the perspective of the moderator, here at the start of a chat.

3.7.1 A Bot to Conduct Surveys and Automate Screening

We implemented a scripted bot that all visitors initially chat with before they can talk to a moderator. This bot, as shown in Figure 3, begins by welcoming the visitor and offering an explanation about the purpose of the service and with whom they would be chatting. It goes on to ask screening questions (about age and location) and gently refers ineligible visitors on to alternative services (Figure 3.5).

After obtaining informed consent, the system presents a short survey. Much of this survey is a requirement of our research protocol, but it is also used to give the moderator a head start on who the visitor is and what he/she intends to talk about (see the top right of Figure 4). In the future, this feature also could be used to help assign the conversation to the most appropriately skilled moderator. At the end of the survey, the bot explains that someone will be along soon, and all moderators receive a notification that someone is waiting to chat. After the moderator concludes the conversation, the bot returns to ask a short follow-up survey (Figure 3.6)[3].

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[3]The screenshot was taken from au.reachout.com when the chat widget was rolled out temporarily. The names in the chats do not represent real people, but the substance of the chats present a tone similar to real conversations.
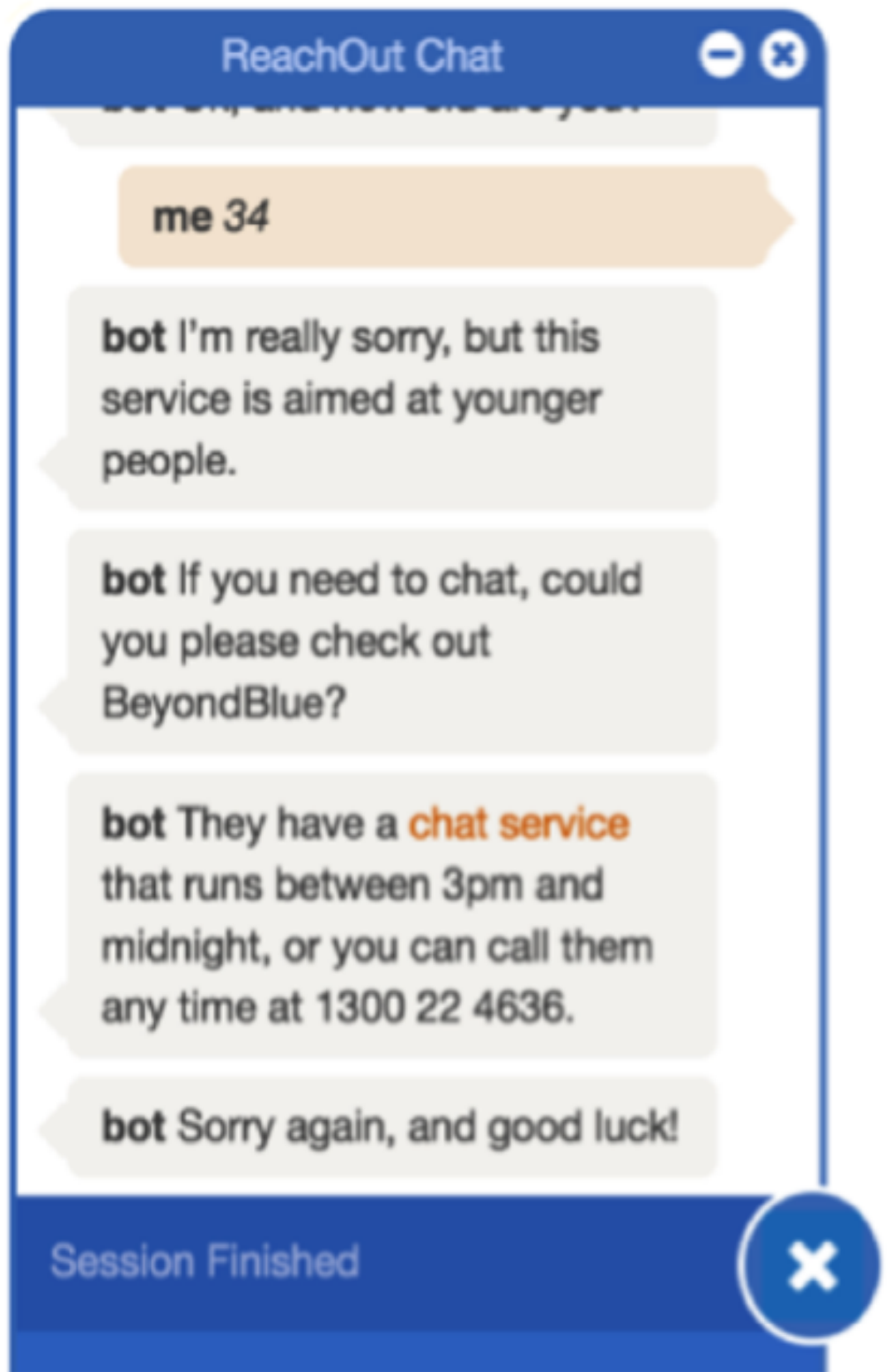
Fig. 3.5: An automated bot screening out an ineligible visitor in the ReachOut chat.
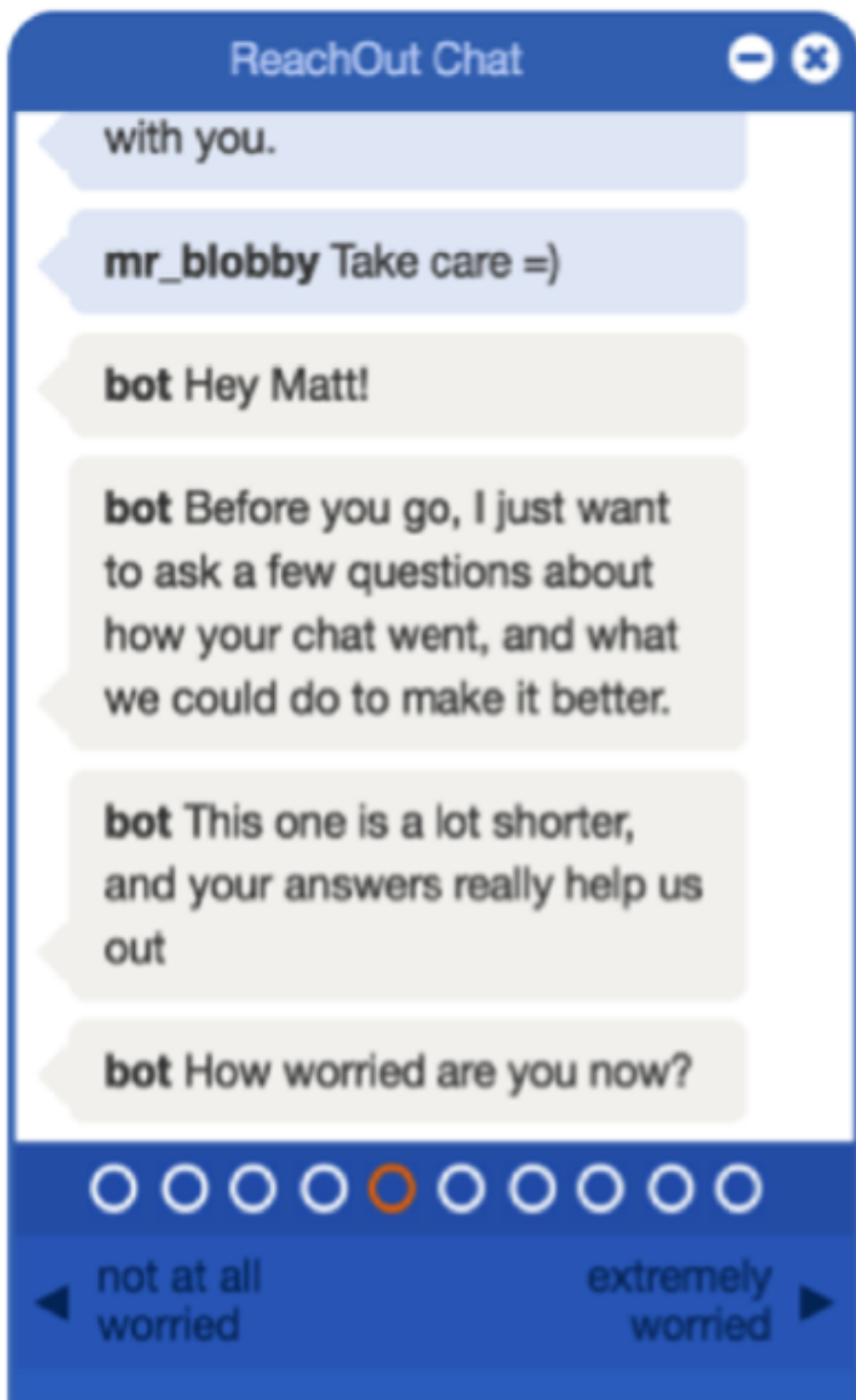
Fig. 3.6: Automated bot following up with a visitor once the visitor–moderator chat is over
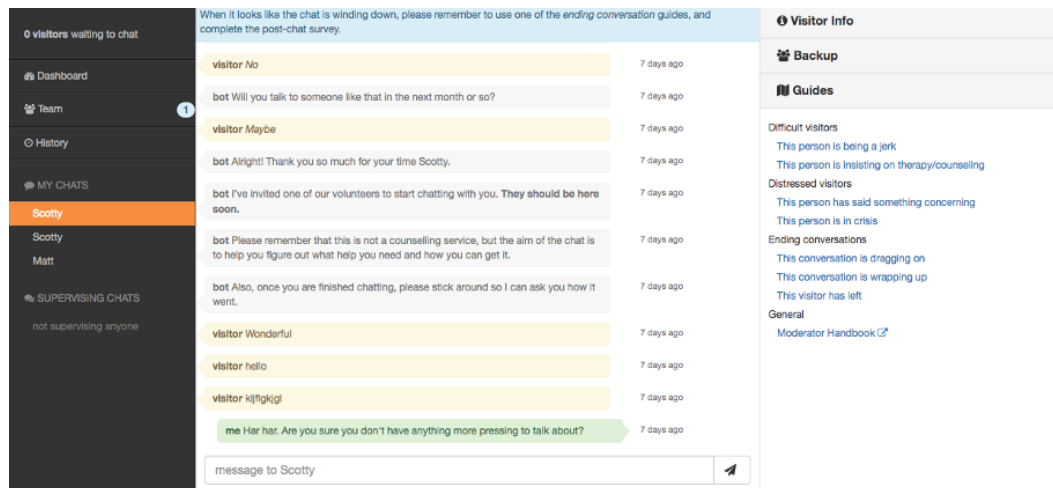
Fig. 3.7: Interactive guides to help moderators during difficult or repetitive situations in the ReachOut chat system.

3.7.2 A Lightweight User Identification System

To identify the moderators for follow-up purposes, the system retains the usernames already established on the ReachOut forum and uses the existing forum accounts to authenticate. In this way, visitors who are forum regulars would be able to recognise with whom they were talking, and new visitors would be able to locate the moderator on the forum if they wanted to know more. The bot that conducts follow-up surveys also invites visitors to contact the moderator via the forum if they would like to have a follow-up conversation. To identify visitors who use the chat, we chose not to require any login or authentication out of concern that it would add an unnecessary roadblock to adoption and could dilute the message that this is a safe and anonymous place to chat. Instead, the bot that initiates the conversation asks the visitor to provide a first name or nickname. This gives both the bot and the moderator something to refer to visitors by and begin building rapport.

3.7.3 Interactive Guides for Difficult or Repetitive Situations

The right side of Figure 3.7 shows the range of interactive guides available to the moderators. Each guide was designed for a specific situation that is likely to be particularly difficult to resolve or expected to occur often and for which it would be desirable for moderators to behave consistently while expending as little effort as possible (e.g., encountering a troll).

Each page of each guide concisely describes a goal for the moderator (i.e., a dialogue move), and a series of suggestions of what to say to accomplish this goal. For example, the guide for "This conversation is dragging on" first asks the moderator to explain gently that the conversation is running over time (Figure 3.8a). The moderator then offers the forum as an alternative venue to continue the conversation (Figure 3.8b). Finally, the moderator encourages the visitor to sign up for the ReachOut forum if he/she is not already a member (Figure 3.8c). Each suggested message can be edited freely before it is sent to the visitor so the moderator maintains full control of the conversation. The content and tone of each guide was developed through close consultation with ReachOut's community managers.

3.7.4 A System for Moderators to Assist Each Other

To allow moderators to assist each other, we developed the backup features shown in Figure 3.9. When a moderator determines that he/she requires backup, an alert is displayed to everyone who is currently online. Moderators who respond to this alert are shown a page containing the full conversation with the visitor on the left and a secondary conversation between the moderators on the right. Only the original moderator is able to respond directly to the visitor via the conversation on the left, but others can offer advice and suggestions via the conversation on the right. Additionally, a community manager can view all conversations that are currently occurring and can monitor an individual conversation via the interface shown in Figure 9, even if a moderator has not yet asked for backup. As shown at the top of this figure, a supervisor holds the opportunity to "jump in" and contribute directly to the conversation with the visitor if deemed necessary.

3.8 Conclusion

In this paper, we have described the co-design of a real-time peer-to-peer chat support system that provides support to distressed young people and focuses mainly on the dynamics and interactions between volunteers and their managers within the context of a voluntary-sector organisation. During the discussions and co-design activities of the workshops and interviews, the volunteers described their goals, motivations, and experiences. This indicated that the volunteers' motivations link to their values and life experiences. For instance, the values of providing mental
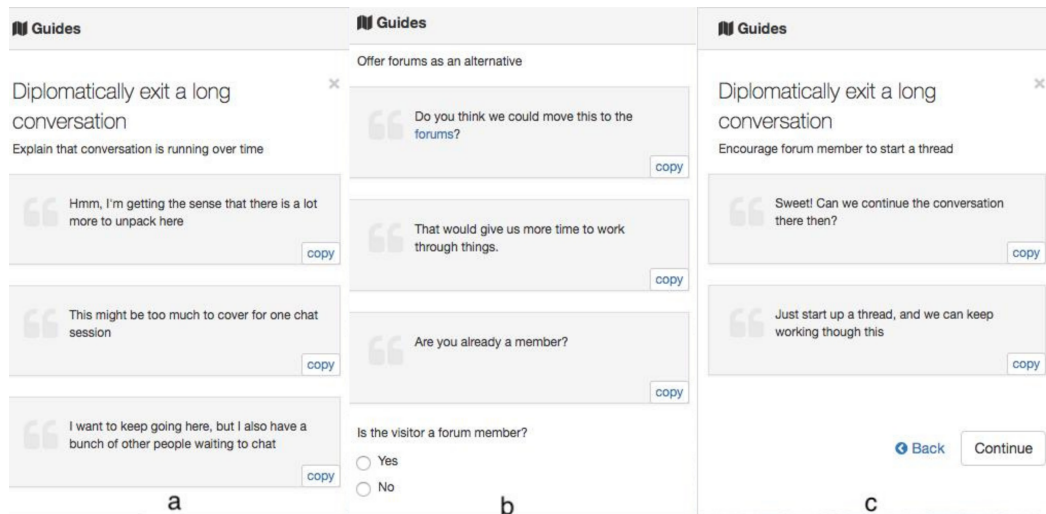
Fig. 3.8: An interactive guide in the ReachOut chat system to help the moderators end conversations that have run over time.
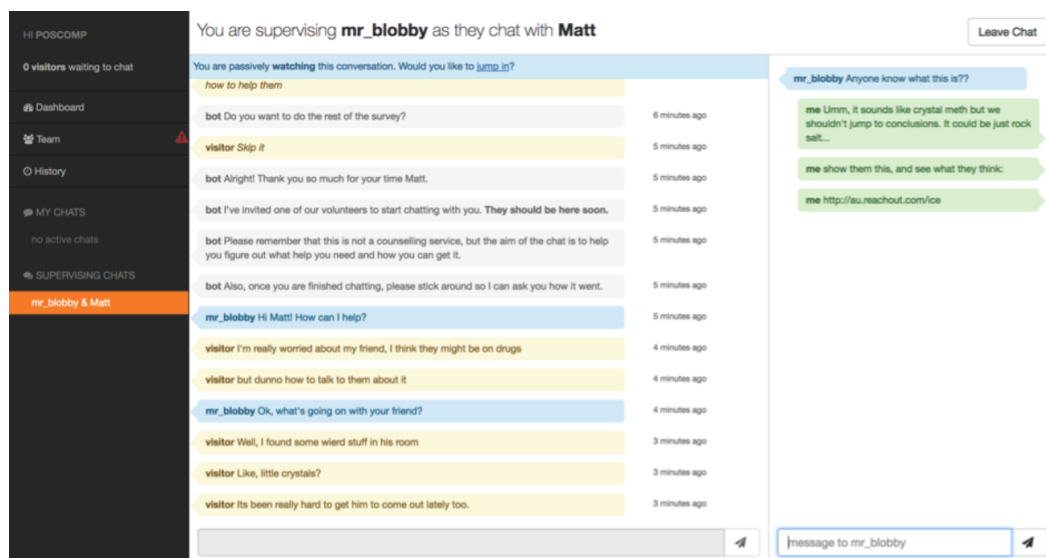
Fig. 3.9: A community manager supervising a moderator–visitor chat conversation in real-time in the ReachOut chat system.

health service to aid their professional growth as well as to provide help to those who need it was highlighted the self-oriented as well as other-oriented facets of volunteering motivation. The system design reflected volunteer engagement and wellbeing based on their expectations of volunteering in this context. For instance, the design supported their desire for maintaining their anonymity in the chat to maintain their own privacy, screening of participants to respect the volunteers' time, among many other engagement and wellbeing-supportive aspects of design. The themes that were identified served as guidelines that allowed researchers to synthesise several design features for the chat system. With its focus on volunteer motivation, wellbeing, and engagement, and how that impact the design of a digital volunteering platform, this case study, thus, contributes to all the three research aims outlined in section 1.5 of this thesis.

One limitation of our research is that it has focused exclusively on one side of the conversation: We investigated the needs of the volunteers who provide the service, but not the young help-seekers who will use it. Our rationale for this focus is that the volunteers will interact with the service most often, and consequently, its success depends significantly on fostering their sustained engagement. Another reason for this focus is that we expected volunteers' needs from the system to be complex and nuanced. Thus our research process, in conjunction with the preceding trial, has demonstrated the many opportunities for the system to support and augment the volunteer moderator. In contrast, we expect the help-seeker's needs to be satisfied primarily by the conversation itself rather than the system through which it is conducted. Arguably, from their perspective, the system should remain as simple and familiar as possible; this was a specific aim in the initial design. In future, we hope to use the system described here to recruit young help-seekers into our research to understand better their needs and to address their side of the conversation.

3.8.1 Implications for Research, Application or Policy

Technology initiatives are, by and large, inefficient in the voluntary sector, and even the sector workers admit to that (Mogus & Levihn-Coon, 2018). This is exacerbated by the fact that modern-day technology gives more power to the common people to initiate and engage in many community-building undertakings that traditionally would have been led by the voluntary-sector organisations. For instance, online advocacy platforms like Avaaz.org or Change.org have given much power to people to initiate and engage in advocacy on their own terms, thus removing the need for

external advocacy usually led by voluntary sector organisations. In order to stay relevant, the funding-constrained sector has to look for efficient and meaningful ways to design technology that would lead to engaged technology usage by the voluntary-sector workers and their end users. The co-design approach, as illustrated in this study, allows researchers to capture the true essence of the work within a voluntary-sector organisation by conducting design research with the volunteers and their managers, whose professional dynamics and interactions guide the design of a needed technology. In our research, the resultant product of this approach was a highly tailored online chat system that kept in mind the socio-technical character of this sector and its distinctive culture, where volunteerism is regarded quite highly. Co-designing technology initiatives for the voluntary sector can help envision better ways to set accountability and adapt the service standards to meet the aspirations of the benefactors, volunteers, and other groups of people working closely with the sector. Specifically, using the co-design approach can help in capacity building for newer, voluntary-sector-appropriate digital paradigms such as online volunteering, digital charity, and online fundraising that can be used to fulfill organisational objectives.

OSPIA: Improving Relatedness and Motivation of Medical Tele-Volunteers

4

> 🙶 *"Those who are happiest are those who do the most for others."*

— **Booker T. Washington**
(Up from Slavery)

Preamble:

This chapter is derived from the following articles published in:

- The International Journal of Human-Computer Interaction published on April 9, 2020, copyright Taylor & Francis, and available online:https://doi.org/10.1080/10447318.2020.1746061

- The Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1-6) and available online: https://doi.org/10.1145/3411763.3451665

- The Design Research Society (DRS 2020) International conference, held online on https://orcid.org/0000-0002-2646-2372

This chapter addresses the three research aims outlined in this thesis - **Research Aim 1**: To investigate the motivational aspects critical for enhancing digital volunteerism experiences, **Research Aim 2**: To identify digital platform attributes linked to volunteer wellbeing, and **Research Aim 3**: To create guidelines that can be used for effectively supporting engagement of volunteers in digital volunteering platforms. I achieve this by investigating the experiences of both online and face-to-face volunteers in a volunteer-using program in the medical education domain. The main research objective of this case study is, therefore, to investigate and improve the

experiences of volunteers on a teleconferencing platform who provide support to medical students. This chapter includes three studies:

- The first study consisted of a survey (n = 66 volunteers), two workshops and one interview (n = 12 volunteers) in which we explored volunteer demographics, motivations, psychological needs, and experiences. Findings suggested relatedness can be an important indicator of volunteer motivations.

- The second study is experimental where I test two design strategies based on volunteer acknowledgement and expression of gratitude embedded in the routine work of the online volunteers. In total, n = 30 online volunteers completed 196 sessions. I used survey and system data to assess the impact of gratitude on perceived volunteer relatedness, motivation, and behaviour. The results showed that the expression of gratitude significantly affected the volunteer's experience of relatedness which then correlated with immediate volunteering behaviour.

- The third study further explores volunteer relatedness in routine volunteer work. Through four co-design workshops with n=9 participants, I identified seven perceptions of volunteers regarding their relatedness experiences.

In this chapter, I will describe the research on the case study that was conducted in collaboration with UNSW Medicine at the University of New South Wales with respect to their Volunteer Simulated Patient programme. This programme is an essential component of teaching medical communication to undergraduate medical students, and thus fulfills the objectives related to their education. I will start by describing OSPIA and how it works followed by the background to set the stage for the various motivations for this research.

4.1 Online Simulated Patient Interaction and Assessment (OSPIA)

The "Online Simulated Patient Interaction and Assessment" (OSPIA) learning system is an online platform for communication skills training. It allows the undergraduate first and second year medical students to conduct practice interviews with simulated patients i.e. volunteers who play the role of patients (Barrows, 1993). The ultimate goal of this tool is to aid medical students to become better at having caring, respectful and effective conversations with their future patients. Multi-modal feedback and assessments are included on the online platform and aid student learning. Many similar training programmes use professional actors in face to face settings, an approach that is expensive and not scalable with large cohorts. OSPIA facilitates such training through volunteers to lower the cost. On the OSPIA platform, volunteers – referred to as Simulated Patients or SPs – enact the role of patients. SPs are recruited through online volunteering marketplaces such as Seek volunteer (https://www.volunteer.com.au/) and Govolunteer (https://govolunteer.com.au/).

Before conducting any sessions, the SPs register to log into the OSPIA website from their internet-connected device (excluding tablets and smart phones) and undergo a compulsory training session (using videos and text documents). This is a labour-intensive task which may take up to hours and includes watching training videos, reading material (e.g. how to use scenario scripts), and assessing the student performance after each interview session. Once ready to engage with the students, the SP receives the scenario which includes the symptoms and medical history of a simulated patient. For example, an SP may play the role of an easily distracted patient who is vague in descriptions of their symptoms. The SP then logs into OSPIA to access a calendar where they can create appointments. The SP then adapts

these behaviours based on how comfortable the student makes them feel during the session. The SP may edit their appointments at any time. The status of a booked appointment changes to completed when both the student and SP participate in a booked appointment. On every Monday following a completed OSPIA session, the SP receives an automated generic email acknowledging and thanking them for their contribution within the past week. During each OSPIA session, the student and SP interact directly via video-conference (Figure 4.1). During the session, the SP can use OSPIA features to provide informal feedback on the student performance in real-time as the interview progresses. The SP then formally assesses the student performance using a standardised form and qualitative feedback. A survey also captures their volunteering experience. The student then views the result of the assessment and submits a reflection on their own performance. OSPIA is the online module of the
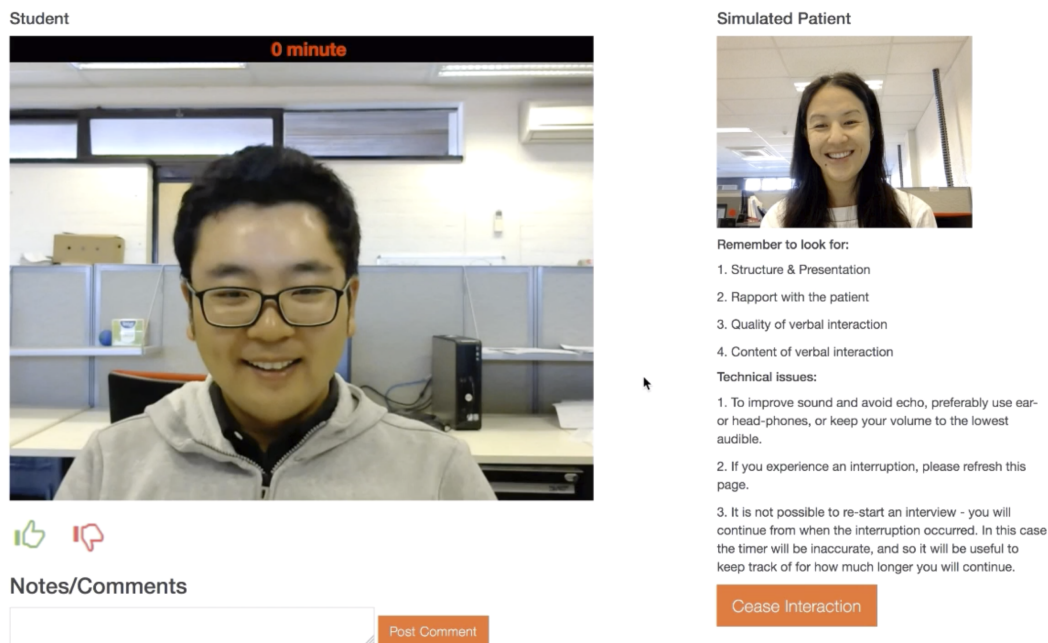
Fig. 4.1: OSPIA interview interface from the perspective of the simulated patient

Volunteer Simulated Patient programme at UNSW Medicine. There is a physical, face-to-face counterpart to the online OSPIA volunteering programme. This takes place simultaneously in the university campus where the volunteers perform their SPs roles in person. Some of the SPs participate in both the online (online SPs) and campus programmes (campus SPs).

4.2 Background

4.2.1 Comparing Online and Physical Volunteering Experiences

Volunteering in online contexts (Feng & Leong, 2017; K. Naqshbandi et al., 2019) and physical contexts (Marta et al., 2006; Peterson, 2004) have been studied separately, but never compared in the same context to distinguish between the attributed experience and motivation, particularly in relation to the design of the online platforms. In this multi-study chapter, I address this gap in research and explore the experiences of volunteers in a program which includes both online and physical modules with similar objectives and volunteer tasks. I use this unique opportunity of parallel online and physical volunteering modules in the same programme to capture the similarity and differences between the experiences and motivations of the online and campus SPs to generate relevant design recommendations for OSPIA.

4.2.2 Building Motivation for Macro-tasks

Research on using motivation to influence design in online volunteering is dominated by those linked to micro-volunteering, particularly online citizen science platforms, where individuals contribute to scientific research through classification, identification, observation, categorisation or curating of data (Jennett et al., 2016; Rotman et al., 2012) in domains such as Astronomy, History, Biology, and Medicine, (N. Reeves et al., 2017). HCI research often examines the design of citizen science platforms to improve volunteering outcomes. For instance, Iacovides et al. (2013) identified game elements and communication features that improve volunteer contributions. In this research, I address the research gap on volunteer motivations and experiences on macro-volunteering platforms by studying online 'macro-tasks' that require substantial time and effort commitments by volunteers.

4.2.3 Sustainability in the OSPIA model

Like many other volunteer-involving programmes, volunteer SPs play a vital role in the sustainability of OSPIA in the long-term. Prior to the research conducted in this chapter, there was minimal research on the OSPIA volunteers and hardly any

strategies to engage them. This was primarily because OSPIA was conceptualised as a medical education tool, so volunteer engagement had not been considered until online volunteer retention became an issue. As a result, the collaborators expressed a need to investigate this matter. Thus, understanding motivation and engagement of the OSPIA volunteers was needed to ensure the ongoing OSPIA sessions and build sustainability into the OSPIA model.

With these in mind, I conducted an initial study to examine volunteer experiences, motivations and how their psychological needs were fulfilled as they engaged with students in online and physical modules of an educational volunteering programme for teaching medical communication skills. This first study was exploratory and examined the nature and determinants of volunteer experiences and motivation in both physical and online environments. Based on the findings in the first study, I manipulated the design of the online platform and included a design feature that allowed students to express their gratitude towards the volunteers in personalized messages. I then tested the impact of this design feature on volunteer motivation and behaviour. The third study involved probing these volunteers further regarding their perceptions of relatedness to get an in-depth understanding of how to build for successful engagement of volunteers on online volunteering platforms. I describe these studies in the following sections.

4.3 Study 1: Studying SP Motivations, Psychological Needs and Experiences

4.3.1 Methods

The initial exploration for this case study included meetings with key stakeholders such as the program manager and reviews of existing information such as SP registration data and participation logs. It also included observations of face-to-face sessions between SPs and medical students at UNSW Medicine and the first author (KZN) registering as an online SP and performing some sessions to get an overview of the online SP experience. This helped set ground for further empirical research.

A mixed methods study was designed to explore the background, motivations and experiences of SPs. This study commenced with a survey sent out to both online

and campus SPs to collect quantitative and qualitative information about their demographics, volunteering experiences, volunteering motivations and fulfillment of their psychological needs relevant to the volunteering programme. This was followed by a qualitative study – two workshops and one interview – in order to collect in-depth data. The study was approved by the Human Research Committee at the University of New South Wales (ref HC16048). All participants gave written informed consent.

Online survey

The link to an online survey was sent via email to all SPs registered in the online and face-to-face campus programmes. At the time the survey was sent, there were 195 registered SPs (107 online SPs and 88 campus SPs) of which 13 SPs volunteered both online and in campus. The survey included questions about the SP mode of attendance (online, campus, both), demographics (age group, gender, occupation), and open-ended questions about their reasons for volunteering ('I volunteer as a campus/an online SP because__'). Participants also rated (7- point Likert scale, ranging from strongly disagree to strongly agree) statements that measured their motivations as described in the motivation spectrum in section 2: amotivation, external, introjected, identified, prosocial and intrinsic. For each type of motivation, a question was taken from the scale of volunteer motivation (Millette & Gagné, 2008) in addition to a question from Grant's prosocial motivation scale (A. M. Grant, 2008). Additionally, I included the Technology-based Experience of Need Satisfaction – Interface questionnaire (TENS-Interface) (Peters et al., 2018). This was employed to capture the sense of autonomy, competence and relatedness attributed to using the online platform or being involved in the face-to-face campus programme. SPs who chose both modes of attendance (campus and online) were asked to fill the TENS-Interface questionnaire for each mode of attendance separately. Participants were then asked if they would like to participate in a follow-up study (workshop or interview).

Workshops and interview

Following the survey, two workshops were organised. The first workshop involved seven campus SPs and lasted for 1 hour and 47 minutes. Given the participants in this workshop were campus SPs, an examination room at UNSW Medicine was

arranged as the venue in order for it to be practically conducive and routine for them as possible. The second workshop was with four participants (three online SPs and one SP who had participated in both face-to-face campus and online programs) and lasted 1 hour and 42 minutes. In the second workshop, one of the participants, who had recently given birth and could not travel because of her caring responsibility, joined remotely via Skype. A workshop venue at the University of Sydney was arranged for these participants in this workshop as they were online SPs (except for one, who had done both online and campus sessions) and agreed to come to this venue. Both these workshops were facilitated by an HCI researcher (Thesis author) who was assisted by another researcher who helped with notes-taking and logistics. Lastly, one SP, who had participated in both forms of volunteering, was interviewed in a one-on-one face-to-face session by the researcher (44 minutes duration) separately at a cafe that was convenient for her to travel to and because of her unavailability during the workshops.

The workshops began with an introductory exercise where the researcher and the participants introduced themselves.The objectives of the workshops and the interview were to gain an understanding of volunteers' experiences, motivations, and expectations. As such, the workshop discussion was semi-structured with prompts related to the following topics:

- Perceptions of the Volunteer Simulated Patient (VSP) Program and the OSPIA platform,

- Motivations for volunteering,

- Volunteering history and experiences (whether they volunteered elsewhere)

- Experiences and expectations from campus/online volunteering in VSP Program (good/bad experiences, expectations)

The workshop conversations were interspersed with an affinity diagramming activity (Tomitsch et al., 2018) in order to summarise and cluster information generated during the discussions (see Figure 4.2).
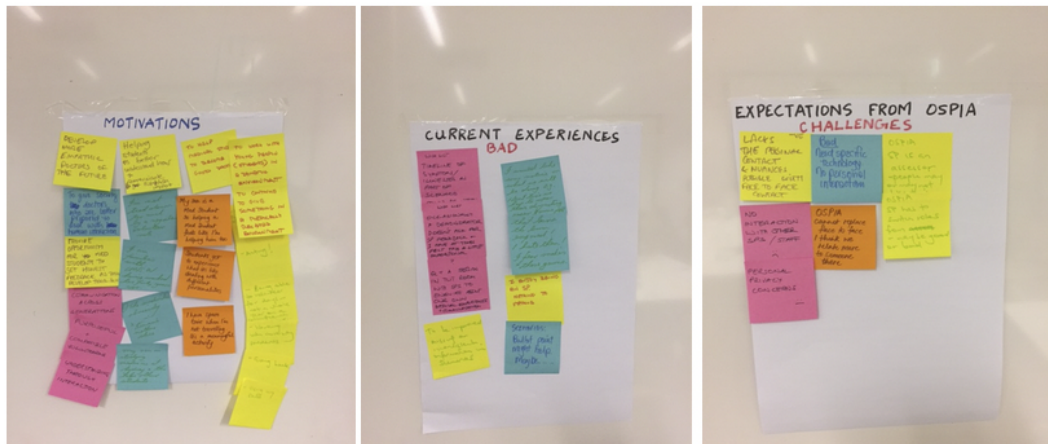
Fig. 4.2: Artefacts from affinity diagramming with simulated patients in workshop 1

4.3.2 Results

For the quantitative questions from the survey, several summary outcomes and analyses are reported. Responses to open-ended survey questions are combined with findings of the two workshops and the interview and analysed thematically. For all quantitative analysis, the data analysis toolkit in Microsoft Excel (version 15.33) and SPSS (version 24) were used. For qualitative analysis, Nvivo (version 11.4) was used.

Online Survey

Demographics. In total, n=66 SPs submitted completed surveys: n=34 campus SPs, n=24 online SPs, and n=8 both SPs. Thus, the campus SPs were slightly more responsive to the survey request (response rate= 52%). Overall, n=46 out of those 66 were female. Female participants formed the consistent majority in all modes of attendance mentioned above. The table in Figure 4.3 summarises the gender distribution across all attendance modes.

The average age of the respondents was 57 (SD=18.29), median 63. Many were retired (n=31), some others were employed (n=15), students (n=7), self-employed (n=5), and the rest were unemployed, homemaker, unable to work and other (Figure 4.4).

Attendance/Gender	Female	Male	Total
Online	18	6	24
Campus	22	12	34
Both	6	2	8
Total	46	20	n=66

Fig. 4.3: Figure showing the attendance mode and gender distributions of participants in online survey

Employment status (n=66)	
Retired	31
Employed	15
Students	7
Self-employed	5
Unemployed	3
Homemaker	2
Unable to work	1

Fig. 4.4: Figure showing the employment status distribution of participants in online survey

Self-reported ethnicity revealed n=46 respondents reporting as Australian (unspecified ethnicity), n=13 reported being Anglo-Australian, Caucasian, or of a European background, and the remaining seven participants were Chinese, Indian, Australian Aboriginal and Indo-Fijian.

Experience of need satisfaction. To compare the experience of need satisfaction in the online and campus SPs, I conducted a Mann-Whitney test. The test indicated a significant difference in the experience of autonomy between campus (Mdn=7) and online (Mdn=5.5) participants U = 407, p = 0.0004, r = 0.55. The test revealed no significant difference in the experience of competence between campus (Mdn=6) and online (Mdn=6) participants U = 607, p = 0.13, r = 0.23. Additionally, the test indicated a significant difference in the experience of relatedness between campus (Mdn=5) and online (Mdn=2) participants U = 379, p = 0.0006, r = 0.56. **Motivation.** For all the six items on the motivation spectrum, a set of Mann-Whitney tests were conducted. There was a significant difference in identified motivation between campus (Mdn=7) and online (Mdn=6) participants U = 435.5, p = 0.01, r = -0.17. There was a significant difference in intrinsic motivation between campus (Mdn=7) and online (Mdn=6) participants U = 404.5, p = 0.02, r = -0.38. The results did not reveal any other significant differences in the other items on the motivation spectrum. The results of the tests and other descriptive analysis of SDT constructs (three basic psychological needs) and motivation spectrum of campus and online SPs are provided in Figure 4.5.

Additionally, Spearman correlations were calculated to identify the relationship between the six types of motivation and three constructs of SDT in online and campus SPs separately. The results are summarised in Figures 4.6 and 4.7.

Correlations between the SDT and motivation variables exhibit some similarities in the campus and online SP tables (see Table 5 and Table 6 respectively); however, there are a few differences. There is a strong correlation between competence and autonomy in both campus SPs (r(14)=0.731, p <0.001) and online SPs (r(37)=0.453, p= 0.005). There is a significant correlation between competence and prosocial motivation (r(34)=0.354, p =0.040), and competence and intrinsic motivations in campus SPs (r(34)=0.369, p= 0.032) but not in online SPs. There is also a significant correlation between autonomy and relatedness in campus SPs (r(38)=0.343, p= 0.035), but not in online SPs. A significant correlation exists between relatedness and intrinsic motivation in campus SPs (r(31)=0.381, p= 0.035) but not online SPs. A significant correlation also exists between autonomy and intrinsic motivation in online (r(34)=0.365, p= 0.034) but not in campus SPs. A significant correlation

		Mode of attendance	Mean	SD	Median	p-value	U
SDT constructs	Autonomy	Campus	6.26	1.11	7	0.0004*	407
		Online	5.21	1.35	5.5		
	Competence	Campus	6	0.95	6	0.131	607
		Online	5.41	1.43	6		
	Relatedness	Campus	4.54	1.7	5	0.0006*	379
		Online	2.97	1.87	2		
Motivation	Amotivation	Campus	1	0	1	0.246	697
		Online	1.3	0.94	1		
	Ext-social	Campus	4.4	2.16	4.5	0.242	592
		Online	3.86	2.29	4		
	Introjected	Campus	1.95	1.65	1	0.262	613.5
		Online	2.41	1.9	1		
	Identified	Campus	6.34	1.31	7	0.011*	435.5
		Online	5.74	1.29	6		
	Prosocial	Campus	6.71	1.08	7	0.114	448.5
		Online	6.44	1.04	7		
	Intrinsic	Campus	6.59	1.06	7	0.022*	404.5
		Online	6	1.1	6		

*Significant p-values (2-tailed)

Fig. 4.5: Results comparing basic descriptive statistics and Mann-Whitney values of SDT constructs and motivation of online and campus SPs

Campus SPs	Competence	Autonomy	Relatedness	Amotivation	Ext-social	Introjected	Identified	Prosocial	Intrinsic
Competence	1								
Autonomy	.731**	1							
Relatedness	.279	.343*	1						
Amotivation	-.194	-.288	-.269	1					
Ext-social	.243	.130	.122	.060	1				
Introjected	-.010	-.207	-.287	.266	.332*	1			
Identified	.198	.217	.308*	-.423**	.282	.043	1		
Prosocial	.354*	-.157	.316	.063	.228	.239	.614**	1	
Intrinsic	.369*	.288	.381*	-.153	.162	.072	.433*	.534**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Fig. 4.6: Correlations for Need satisfaction and Motivations of the Campus SPs

Online SPs	Competence	Autonomy	Relatedness	Amotivation	Ext-social	Introjected	Identified	Prosocial	Intrinsic
Competence	1								
Autonomy	.453**	1							
Relatedness	.323	.263	1						
Amotivation	-.039	-.359*	-.094	1					
Ext-social	-.119	.040	.202	-.218	1				
Introjected	-.232	.022	.068	-.009	.644**	1			
Identified	.106	.272	-.089	-.463**	.109	.038	1		
Prosocial	.199	.340	.200	-.302	.185	-.155	.432*	1	
Intrinsic	-.136	.365*	.018	-.363*	.188	.193	.660**	.571**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Fig. 4.7: Correlations for Need satisfaction and Motivations of the Online SPs

exists between relatedness and intrinsic motivation in campus SPs (r(34)=0.369, p= 0.032) but not in online SPs. There is a significant negative correlation between intrinsic motivation and amotivation in online SPs (r(35)=0.363, p<0.32), but not in campus SPs. There is also a strong significant correlation between external social and introjected motivations in online SPs (r(37)=0.644, p<0.0001), and campus SPs (r(37)=0.332, p=0.045). A strong significant correlation exists between identified motivation and prosocial motivation in campus SPs (r(34)=0.614, p<0.0001) and online SPs (r(34)=0.432, p=0.01). A significant correlation exists between identified motivation and intrinsic in campus SPs (r(34)=0.433, p=0.01)) and online SPs (r(35)=0.660, p<0.0001). Finally, there is a significant correlation between prosocial and intrinsic motivation in campus SPs (r(33)=0.534, p=0.001) and in online SPs (r(34)=0.571, p<0.0001).

Qualitative analysis of workshop, interview and survey data

Thematic analysis was performed by the first author on the transcripts produced from the workshop and interview discussions, using Nvivo (version 11.4). A grounded theory approach was used to guide the analysis (Charmaz, 2014; Strauss & Corbin, 1994). Similarly, the qualitative data from the survey and workshop activities were thematically analysed and integrated with the rest. A final set of five categories for the themes were identified, and the details are as follows.

1. Perception of technology for doctor-patient consultations - Most respondents said that technology cannot replace the feeling of a "real" physical consultation, but that it is good for cases where the patient is unable to attend a physical consultation. *I think things like doing online or Skyping doctors [...] is good for people who can't get into the office, but I don't think it's going to replace completely the actual benefit of sitting in the same room as your doctor.* [CampusSP3]

2. Volunteering motives - A number of motivations and reasons for joining this volunteering program were discussed by workshop and interview respondents, as follows.

   Familiar vocational background – Many participants mentioned having a vocational or employment background in either medicine or tertiary education: *I used to be a health professional and I felt I didn't get much instruction to communicate with real people... and I just believe that it's a good thing to do.* [CampusSP4]

   To fill up free time – *It helps me utilise my free time at the same time help the future physicians get accustomed to simulated real-life situations.* [SurveySP7] and *We have free time on our hands, so that's why we volunteer.* [CampusSP7]

   Prosocial Motivation –The first of such motives in relation to personal experiences with medical professionals. Participants felt that the communication training given to medical students is insufficient: *Happy to help however I can. I was a practising physio many years ago and I always felt we were not trained at all in interpersonal skills. I hope my contribution to the doctors of tomorrow can assist them in their long journey!!* [SurveySP5] Additionally, the prosocial motive was linked to wanting to give back to the society: *For me it's just giving back, I volunteered most of my life anyway.* [OnlineSP3]

   Personal growth and fulfilment - Reasons such as self-development were mentioned: *I think I've probably learned much greater tolerance and a much greater gratitude for my own emotional development [. . .] this is about learning personal development.* [CampusSP6]

   Social interactions – Some campus SPs cited the social interaction in the sessions as their motivations: *I'm a peoples' person. I enjoy that interaction [sic].* [SurveySP8]

   Vocation and skill development - SPs mentioned volunteering to gain career skills: *Learning some new skills of my own. . . .* [SurveySP62] and *It is also a way of using my experience as a genuine patient in the hospital system and my years of experience as a teacher.* [SurveySP34]

3. Volunteering history – A total of five out of the 12 participants (in the workshops and interview combined) had regularly volunteered in the past or were engaged in other types of volunteering. Two survey participants also wrote about their volunteering history: *I used to volunteer as a dentist in various countries... And then, I've worked with sex workers... So yes, a variety*. [OnlineSP3].

4. Online/campus volunteering Experience –All the workshop participants mentioned their experiences with other individuals involved in the programme, such as the volunteer manager who was the main point of contact within the organisation that ran both online (OSPIA) and campus sessions. The campus participants expressed a strong bond with the volunteer manager, possibly due to the regularity of interaction with her. *She is very responsive, very quick. Even though she only works certain days she makes that very clear in her communication 'sorry I'm not here' or you get a bounce-back saying she's not here, but then when she is it's very, very, very responsive and any tech issues that I've had have been acted on so quickly, it's like 'Wow!'.* [BothSP1]

   Location convenience was specifically mentioned by online volunteers, as it enabled volunteering virtually from anywhere such as rural or remote areas, and by anyone including those with mobility issues. Others suggested that they can get more work done through the online platform, *More students can undertake simulated consultations than would be possible face to face*. [SurveySP24]

5. Positive and negative aspects of online volunteering via the OSPIA platform– A number of positive and negative aspects of the online volunteering experience emerged during the analysis. These were based on how the OSPIA platform has fostered volunteer engagement. Aspects of the volunteering experience that were deemed positive included:
   Time convenience with regards to scheduling sessions- *I can fit small chunks of volunteering in and around a busy schedule*. [SurveySP3]
   Easy to use appointment booking system- *I found the calendar easy to use. I just log in to appointment, organise the times, date and wait for someone to contact me and say: look, we're booking that time spot*. [BothSP2]
   Enjoying an activity with modest performance demands- *I enjoy its acting but not seriously*. [SurveySP21]

   The negative aspects mentioned by the participants included:
   Lack of access to the right digital devices- This was suggested by the campus SPs as the reason for their disinterest in using the OSPIA online platform. *It*

would be better if it could be conducted using an iPad. [CampusSP3]

Lack of technical knowledge-, particularly at times of technical disruption and system glitch. *There was a slight glitch when I logged on for my first interaction - the camera and speaker weren't working, and I had to refresh the page to get things to work.* [SurveySP9].

Lack of social intimacy- SPs, particularly the ones that had done both forms of volunteering, suggested that the online experience lacked an element of social intimacy. *I think I'm just used to the classic interaction that happens face to face. It strikes me as quite an intimate thing between clinician and patient. So, I agree with the idea that it feels quite distant, but the trade-off is one of convenience.* [OnlineSP2]

Difficulty in rapport building- with students was mentioned by SPs who had performed both forms of volunteering. *They're [the students] only online with us for such a short time. They're not going to build a rapport... They are just, quick, and we're not even doing 15 minutes, sometimes it's less than that.* [BothSP2]

Lack of engagement- Lack of uptake of booked appointments was mentioned by two SPs who found it dissatisfying when the appointments remained unacknowledged: *When there are services being provided and no one takes you up on that . . . I was sitting there going, 'I can act as a volunteer patient for you'.* [OnlineSP2]

Difficulty in performing tasks- Difficulty in performing assessment was mentioned by almost all online and campus SPs who expressed a lack of confidence in performing student assessments and understanding the assessment rubric. *For me, it would be useful to have a class on what an F or P- is so that I can be confident that we are all on the same page.* [OnlineSP3]

Inability to communicate- Inability to cancel appointments or contact someone in case of last-minute change was a communication issue mentioned by participants: *I had two students last night and I had a problem, I don't know, we had a bit of a power business in our house and I could not get to do [appointments with] them, and the sad thing is that we can't contact them to say, 'Can't do it', but I've booked in over four for the next week.* [BothSP2]

4.3.3 Discussion

The first study generated a range of initial insights into the SP experiences and motivations and resulted in several themes that characterised those. Many of

these findings can be discussed in light of the psychological need satisfaction and motivation theory. The survey results indicate that the average ratings for two of the three basic psychological needs – autonomy and relatedness – are higher in campus SPs compared to online SPs. The difference is specifically pronounced in relatedness. Some of the SPs' reflections in open-ended comments and workshops can explain those differences. For instance, relatedness was expressed by an SP as "an intimate thing between clinician and patient" and how it felt "distant" [(OnlineSP2] in OSPIA. Similarly, lack of relatedness was also expressed as being unable to build a rapport by some online SPs. In relation to the need for autonomy, SPs discussed the importance of flexibility in where and when they performed their volunteering activities. OSPIA already provides a good amount of autonomy to online users. For instance, a remotely located participant who was a new parent in addition to being a recently arrived immigrant remarked that OSPIA presents a very convenient volunteering opportunity for her because it allows her to set her own time and requires no travel. Another SP who volunteered in both online and campus modules found OSPIA suiting her better when she was caring for her elderly mother. Other SPs remarked OSPIA is convenient for people with mobility issues. Therefore, OSPIA embodies an important characteristic of digital volunteering– inclusion of marginalised demographics, who cannot participate in traditional forms of volunteering due to geographical, physical, or other barriers. The appointment booking system also provides scheduling flexibility to the SPs who can select convenient times. However, the SPs expressed disappointment in the lack of uptake of appointments from students, which could reduce their motivation if occurring frequently. In terms of autonomy constraints, one campus participant mentioned she does not use OSPIA because she does not have access to the correct device. As such, supporting autonomy may mean facilitating the use of a range of technologies and devices. This is a functional requirement that can enhance the experience and frequency of use in online volunteering platforms. In terms of competence, I found mastery in performing certain tasks such as assessing the students was, to certain extent, a barrier to volunteers' performance and experience in both online and campus modes. This may explain why there is no significant difference between ratings of competence in campus and online SPs. Addressing performance competency should improve the general experience for both groups. Another area for addressing competence is supporting volunteers to master the use of technology. Participants, particularly elderly campus SPs or elderly SPs who had performed both forms of volunteering, expressed a lack of technical know-how and hesitated to discuss technical issues for fear of embarrassment.

In terms of relatedness, both groups of SPs noted satisfaction with the volunteer manager important to their experience. The volunteer manager is the main point of contact for all SPs, particularly for the campus SPs, who characterized her role as a facilitator. Existing literature also suggests that effective volunteer managers are important for engaging volunteers (Alfes & Langner, 2017; Shin & Kleiner, 2003). This could be reflected in online platforms as well. Another relatedness area that was discussed by the participants was the barriers for building rapport and connections with the students through the online platform. There was a stark difference in experiences between campus and online volunteering experiences in this respect. Despite the conveniences and flexibilities of the remote online access, the experience seemed to lack a strong social aspect that strongly characterises traditional forms of volunteering. A design strategy to improve the online experience should therefore support interpersonal bonding between SPs and students.

In terms of the motivation spectrum, I found a better motivation outcome in the campus SPs' experience – higher identified and intrinsic motivations as compared to online SPs. Comments from campus SPs as well as online SPs highlighted a desire to help future doctors as well as giving back to the community. Therefore, high scores were observed for prosocial motivation in both groups, the highest for any form of motivation. Further, the correlation between relatedness and intrinsic motivation, which is significant in campus SPs but not in online SPs, indicates that relatedness in the campus experience might be a mediating factor for improving volunteer motivation. As a result, we find that campus SPs are more motivated to engage with the program and their sense of relatedness plays a significant role in supporting their motivation. It is not unreasonable to assume that improving the sense of relatedness in online SPs could improve their motivation. My next study explores this assumption.

It is relevant to note the similarities between the themes presented in this study (see theme 'Perception of technology for doctor-patient consultations' for instance) and existing Computer Supported Cooperative Work (CSCW) and HCI knowledge in healthcare (Fitzpatrick & Ellingsen, 2013) including tele-medicine (Kaplan & Fitzpatrick, 1997) and tele-health (Andersen et al., 2011) where medical professionals, patients and others in a medical setting collaborate with one another. While OSPIA is a digital platform that facilitates inter-personal communication in the context of medical training, the research presented in this paper is different in many ways to the above-mentioned studies. For instance, the knowledge and power dynamics between a volunteer- simulated patient and a medical student on OSPIA are different to that of a doctor and a patient on most tele-medicine platforms. A relevant example to

illustrate this is that in the OSPIA platform, the SP formally assesses the student. In a real online medical consultation, however, a patient is usually dependent on the doctor in terms of their medical expertise and knowledge. Additionally, the volunteer motivation for using the OSPIA platform are very different from those of the real patients on tele-medicine platforms. Therefore, there are substantial differences in design considerations and strategies for those platforms, which motivated the research presented in this paper. This study may be limited in terms of participant recruitment. There is a possibility that participants who are already engaged with this program are more likely to respond to a related survey. Thus, there could be a response bias in the survey data.

4.3.4 Recommendations for the next study

The default design of the OSPIA experience for the SPs means they receive automated emails once a week that acknowledge their work in the preceding week. The email is not personalised, and includes a generic 'thank you' statement that is repeated every week and for every SP. The design of OSPIA as a medical education platform has focused on what the SP gives to the student, and not how the student can provide value to the SP. A reciprocal gesture within the student-SP relationship could improve the interpersonal relatedness (Algoe et al., 2008) and, therefore, online engagement. This is explored in study 2.

4.4 Study 2: Studying SP Motivations, Psychological Needs and Experiences

Study 2 examines a design strategy for OSPIA to improve relatedness between medical students and SPs, with a focus on reciprocity in the relationship. Relatedness emerged as an important concern and motivator for online volunteers in the first study. Additionally, relatedness is associated with many volunteer wellbeing outcomes (discussed in the next section). This presents an additional incentive for designing for relatedness in online volunteering platforms. Finally, I note that although there is some work on engagement strategies for improving the social engagement aspect for online volunteers (Preist et al., 2014), opportunities to foster genuine interpersonal connections remain under-explored. In this study, I collect

and convey students' gratitude to SPs as a way of reciprocating the altruistic actions of the SPs and therefore improving their relatedness. The following section reviews literature on relatedness in volunteer wellbeing, and the impact of gratitude on relatedness and motivation to help others.

4.4.1 Background

Relatedness in volunteer wellbeing

Volunteering improves several physical and psychological wellbeing outcomes (Ayalon, 2008; Musick & Wilson, 2003). In a study on the volunteering factors that improve wellbeing, Creaven and colleagues found that volunteers' psychological health outcomes (such as decreased depressive symptoms) are improved due to social contact and social support in traditional volunteering (Creaven et al., 2018). Therefore, the experience of digital volunteering should provide social connectedness outcomes comparable to traditional physical experience.

Gratitude to improve relatedness and prosocial behaviour

Gratitude, often considered a virtue, has been the focus of many religions, as well as ancient and modern philosophy. Eminent gratitude researchers have labelled gratitude as an emotion, a virtue, a moral sentiment, a motive, a coping response, a skill, and an attitude (Emmons & Crumpler, 2000). Gratitude may be defined as an acknowledgement that we have received something of value from others, thus reciprocating their benevolence towards us (Emmons & Mishra, 2011). Existing research suggests that there is a link between the reciprocal experiences that involve gratitude and improved social bonding (Emmons & Mishra, 2011; Gordon et al., 2012). Gratitude is also strongly linked to prosocial behaviour such as charitable donations and a 'pay it forward' attitude (Shiraki & Igarashi, 2018). Prosocial behaviour is action(s) taken by individuals that benefits or helps others (Eisenberg & Mussen, 1989). Volunteering is a typical prosocial behaviour (Piliavin & Charng, 1990) and therefore digital design strategies for online volunteerism could improve volunteer engagement in prosocial behaviour by means of gratitude, thus supporting the social bonds. Many online systems use automated expressions of gratitude to volunteers (e.g. 'Thank you for your participation', 'Thanks for your time').

However, these static expressions are shown to be ineffective in improving repeated contribution in returning volunteers (Cheshire & Antin, 2008). In a study on improving prosocial behaviour, Grant & Gino (2010) showed that personal gratitude messages by the beneficiary can effectively motivate more volunteer contribution as it improves the feeling of social worth in them, i.e. 'being connected to others and being valued'. Here, we find a strong conceptual link to relatedness.

Inspired by the norm of reciprocity (Gouldner, 1960), which postulates that people feel an innate obligation to return others' favours, I changed the design of the OSPIA platform and encouraged the beneficiary students in this research to generate personal messages of gratitude to the volunteers. This is a unique intervention, as to date, I have not seen similar evidence that compares the generic automated acknowledgement messages with personal gratitude messages in the context of online volunteering. The cue was presented to the students after their session when they normally receive a feedback survey. Upon receiving the cue, the student would write a message to the SP with whom they had just performed the interview session. This personal message from the student would then be sent to the SP in their weekly acknowledgement email. As a result, I expected the relationship to be reframed as a beneficiary-benefactor relationship instead of a student-SP relationship. I hypothesise that the messages of gratitude improve the experience of relatedness, enhancing the SP's intention and consequently motivation to book more appointments both immediately and in the long term.

4.4.2 Methods

This study provided a design intervention on the OSPIA platform to the online SPs and follows a pre-test/post-test experimental design with a baseline phase and intervention phase. The study commenced in the beginning of the first semester in March 2018 and was approved by the ethics committee at The University of New South Wales. All participating gave informed online consent at the beginning of the first OSPIA session in the study. The hypotheses and measures tested in the study are listed in 4.8 and details of each phase are discussed next.

Hypotheses/Measures	Associated tasks
H1. Student expression of gratitude impacts SP's sense of relatedness	Two 7-point Likert scale questions in the survey (strongly disagree to strongly agree): -This week, I experienced a warm feeling for the student/s with whom I did the OSPIA session/s. -This week, I felt a sense of connection with the OSPIA community.
H2. Student expression of gratitude impacts SP's intention to book more appointments	One 7-point Likert scale question in the survey (strongly disagree to strongly agree): - I intend to do more OSPIA sessions during this semester.
H3. Student expression of gratitude impacts SP's immediate behaviour of clicking for booking more appointments	Clicking on the survey prompt (see Figure 5) -OK -Cancel
H4. Student expression of gratitude impacts SP number of appointments booked	Total number of completed appointments per SP, calculated at the end of each phase
H5. The message from the student beneficiary is perceived as gratitude.	One 7-point Likert scale question in the survey (strongly disagree to strongly agree): -The student's message expresses gratitude and thanks.

Fig. 4.8: Hypotheses tested in study 2 along with the associated tasks

Baseline phase

In the baseline phase, all participating SPs received an automated email every Monday that followed the appointment week. Only one email was sent to acknowledge any number of sessions that were performed by the SP in the preceding week. The email contained a generic short message acknowledging their contribution and a link to a short survey (4.9).

OSPIA: Thanks for your participation last week ⊃

OSPIA Administrator
to me ▾

Dear ⬤

Thank you very much for participating in OSPIA appointments last week. Feedback from students tells us that they value the opportunity to interact with you, and the feedback and assessment you give.

Your feedback is very valuable to us. Please click on the following button to take a short 1-2 minute survey to help us improve your experience.

Take the survey

With best wishes.

OSPIA team

Fig. 4.9: Weekly acknowledgement e-mail received by the sp in the baseline phase

When the SP clicked on the survey link for the first time, it led to a participant information and informed consent page. If the SP agreed to participate, they were redirected to the survey page. The survey consisted of the following measures: (i) the sense of relatedness of the SPs, measured using two items from the Basic Psychological Need Satisfaction and Frustration Scale – Diary Version (Chen et al., 2015; van der Kaap-Deeder et al., 2017) , (ii) a scale to capture SP's intention to book more appointments. A comments section was also provided for optional commenting by SPs. After the SP submitted the survey, a prompt appeared asking if the SP wanted to book more appointments (4.10). There were two click options for that prompt – 'OK', which would lead to the OSPIA session booking page, and 'Cancel', which would close the window. This measure captured the analytics for the immediate appointment behaviour of the SPs, which was one of the volunteering outputs. The other volunteering output and the final measure was the total number of appointments completed by each participating SP in the duration of this phase. All scales and hypothesis are presented in 4.8.
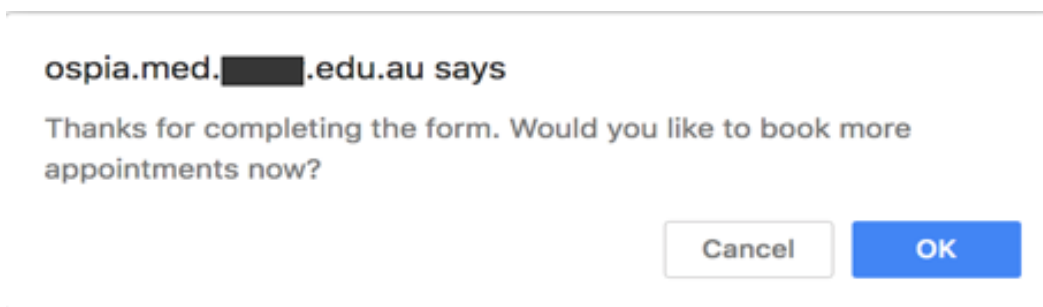
Fig. 4.10: Prompt to book more appointments

Intervention phase

The intervention phase followed the baseline phase. The students using the OSPIA platform normally complete a compulsory post-session questionnaire in order to fulfil the requirements related to student assessment. Within that questionnaire, a comment box was added with the following request:

> The simulated patients are volunteers that help medical students like you to practice their medical communication skills. This is a selfless task that is performed without any financial or material reimbursement for them. Take a few moments to think about this, and write a short personal message to the simulated patient from this OSPIA session (1-2 sentences, or at least a few words) to convey how you feel about them helping you with this session. This is optional but would be greatly beneficial to you as a way of self-reflection and to understand how others' contributions are a part of your success.

While the request does not explicitly mention gratitude or appreciation, I theorised that prompting the students to 'return the favour' would be readily accepted by the student, which according to Norm of Reciprocity would encourage the student to acknowledge the volunteer SP's altruistic deed. This activity was optional in order to get organic responses instead of forced ones. I hypothesised that these organic acknowledgements of their altruistic efforts would create a sense of relatedness for the SPs (H1). It should be noted that this part of the study was piloted in the baseline phase in order to see how students responded to the request, but the student messages were not shown to the SPs during that phase. I continuously moderated the messages to check their quality as well as frequency during the pilot testing. The positive responses and high frequency of messages from the students provided the assurance that I could commence the intervention phase. The behaviour and

responses of the students were guided by the code of conduct within the OSPIA platform as well as the general code of conduct within the university and there were no cases of the students violating those codes. In the intervention phase, the messages that the students wrote for the SPs were included in the weekly emails, with each message corresponding to a specific OSPIA session. The participating SPs received the email every Monday as per usual. The email in this phase had a slightly different subject line and body to inform the SPs about the change in the content of the survey that was linked to in the email (4.11). In each email, I

Fig. 4.11: Weekly acknowledgment e-mail received by the SP in the intervention phase

included one or more messages, depending on how many OSPIA sessions the SP had completed during the preceding week, and from one or more students who chose to respond to the request for a personal message for the SP. All the measures in the intervention phase were the same as that of the baseline phase, with one addition. The intervention phase survey contained an additional 'gratefulness check' question for each message, asking SPs to rate (on a 7-point Likert scale, from strongly disagree to strongly agree) the extent to which they perceived the student's message as grateful (The student's message expresses gratitude and thanks). In case an SP received multiple personal messages for multiple sessions, they received one email containing all the messages, where each message was followed by a gratefulness check question. The timeline and chronology of the events in the intervention phase are depicted in (4.12).
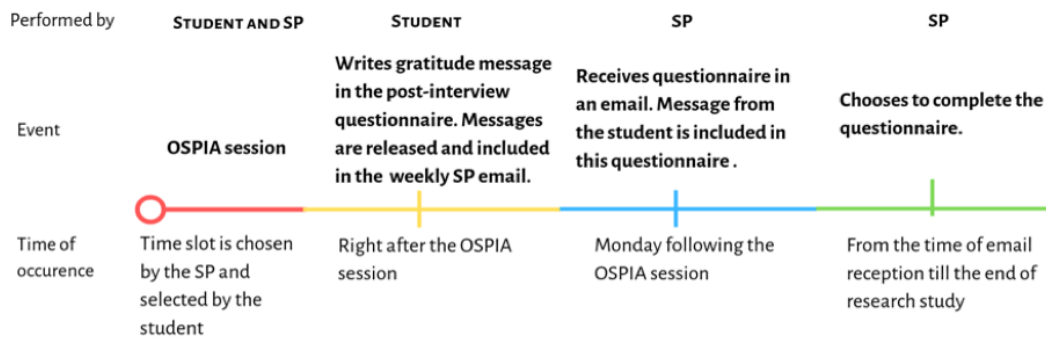
Fig. 4.12: Chronology of intervention phase events

4.4.3 Analysis and Results

A total of 407 OSPIA appointments were booked by n=40 unique SPs within the first semester, out of which 196 appointments were completed by n=30 unique SPs. The weekly survey was completed a total of 51 times by n=17 unique SPs. The baseline phase ran for eight weeks. A total of 262 appointments were booked and 115 appointments were completed (44%). There were 21 survey submissions during the baseline phase. The intervention phase ran for another eight weeks during which 145 OSPIA appointments were booked and 81 appointments were completed (56%). There were 30 survey submissions from the intervention phase. The appointments data pattern also showed that a few number of SPs booked and completed many of the appointments as compared to other SPs who completed only a few appointments in the duration of this study. For instance, one SP booked 23 appointments and another SP booked 22 appointments (combined from both phases) during the course of this study. Section 4.13 summarises the overall information about the number of appointments and survey responses by all SPs.

The measures from booked and completed appointments and survey submissions were used for testing my hypotheses. For the relatedness and intention ratings, I used Mann-Whitney tests to test significance differences. For the measure of immediate appointments booking, a chi-square test was used to assess the relation between the two options of the prompt. For the number of appointments, I compared the rates of completion for participants in each phase and used a t-test for capturing differences between the number of appointments. For the gratitude messages, the frequency of the messages written by all the students during the intervention phase was captured and the average score was calculated based on the SP ratings. It should be noted that most of the SP participants in the two phases were different, with only five SPs participating in both phases (16.7% of the total SPs who completed

Appointments booked	Baseline	262
	Intervention	145
Appointments completed	Baseline	115
	Intervention	81
Survey submissions	Baseline	21
	Intervention	30

Fig. 4.13: Number of appointments booked, number of appointments completed, number of survey submissions by the SPs in the baseline and intervention phases

the appointments in that semester). Thus, the groups corresponding to the two phases will be treated as two independent samples for testing significance. It was assumed that there might be a link between the beneficiary gratitude, relatedness, the intention to volunteer, the immediate volunteering behaviour in the form of booking appointments, and the long-term volunteering output. Thus, the analysis also includes computing correlations of the measures for determining the associations between these measures.

Expression of gratitude impacts relatedness: I calculated the medians for relatedness measure in each of the two phases, based on the average rating for the two relatedness items in each SP's survey submission. A Mann-Whitney test indicated a significant difference in the experience of relatedness between baseline (Mdn=5.5) and intervention (Mdn=7) participants $U = 117.5$, $p = 0.0006$, $r = 0.68$. Thus, my first hypothesis (H1) was confirmed.

Expression of gratitude impacts intention to book more appointments

A Mann-Whitney test revealed no significant difference in participants' intentions between baseline (Mdn=7) and intervention (Mdn=7) $U = 251.5$, $p = 0.22$, $r = 0.22$. Thus, my second hypothesis (H2) was not confirmed.

Expression of gratitude impacts behaviour for booking immediate appointments

A chi-square test was performed to compare the clicking behaviour of SPs in the baseline (57.14%) and intervention phase (63.33%) and no significant difference was found; $\chi2(1) = 0.04, p = 0.8$. Thus, my third hypothesis (H3) was not confirmed.

Expression of gratitude impacts the number of appointments

This measure was linked to the booked appointments and completed appointments data for each SP based on system logs. For this measure, initially, the overall number of booked and completed appointments were compared in the two phases. As shown in table 7, there were 155 completed appointments out of 262 booked appointments in the baseline phase. Similarly, there were 81 completed appointments out of 145 booked appointments in the intervention phase. An independent two-sample t-test for unequal variances was performed to compare the differences between the total number of completed appointments by each SP during the baseline phase (m=5.22, SD=7.8) and the intervention phase (m=6.14, SD=6.1), but the result was not significant; t(33)= 1.69, and p=0.34. The fourth hypothesis (H4) is, therefore, not confirmed. In order to further examine the appointment behaviour, Pearson correlation was performed to understand the relationship between the appointments booked per each individual SP and the appointments they completed during the baseline phase. This resulted in a significant strong positive correlation (r(257)=0.63, p < 0.0001). The appointments booked per SP and appointments completed per SP during the intervention phase also revealed a significant strong positive correlation (r(257)=0.91, p < 0.0001). Thus, the strength of the correlation between booked and completed appointments seems to have increased in the intervention phase. This can indicate that the gratitude intervention has positively impacted the SP's motivation to complete the appointments.

Reciprocation of gratitude messages

The request to submit messages of gratitude generated a high number of outputs from the students during both the baseline and intervention phases. However, I only showed the messages to SPs in the intervention phase. Out of 81 completed

appointments during the intervention phase, 80 students submitted personal messages; a response rate of 98%. The SPs' perception of gratitude in these messages seemed to be favourable, M = 6.88, SD= 0.44 (on a 7-point Likert scale). These messages ranged from simple statements appreciating the SP's effort to messages giving specific details of the session. None of the messages presented a negative tone and often referred to the SPs by their first names or mentioning session specific details, thus making them more personal for the SPs. Some examples of students' messages to SPs are as follows:

"Thank you so much for investing your time in this. I really appreciated how you helped calm my nerves in the beginning. I only hope to do the same for my patients in the future".

"Hi [SP name]! Thank you so much for being willing to do this for all of us. Really appreciate the time and effort given, it must be pretty painful and boring to repeat the same history 2011408275 times to all of us students who repeatedly ask the same questions all the time!"

"Thank you for taking the time! I definitely got a lot out of it (e.g. I should definitely have gotten those other symptoms at the start, and not have had to make you interject them at the end)".

"Hello [SP name]! Thank you so much for taking your time out and getting involved in this session, I really appreciate it from the bottom of my heart. Medicine students need constant support from you all and you all have been doing a remarkable job in that, thanks a lot again!"

In order to determine if there was a positive association between measures of gratitude, relatedness, intention to book and immediate appointment behaviour during the intervention phase, I performed a correlation analysis. Results of a bivariate Spearman correlation indicated a significant positive correlation between relatedness and intention measures ($r(29) = 0.440$, $p = 0.007$), a significant positive correlation between intention to do more appointments and immediate appointment behaviour ($r(29)=0.420$, $p=0.01$), and significant strong correlation between relatedness and immediate appointment behaviour ($r(29)=0.643$, $p<0.0001$). A summary of the correlation matrix is presented in 4.14.

	Gratitude	Relatedness	Intention	Immediate_appointment_behaviour
Gratitude	1			
Relatedness	.127	1		
Intention	.106	.440*	1	
Immediate_appointment_behaviour	.074	.643**	.420*	1

*. Correlation is significant at the 0.05 level (1-tailed).
**. Correlation is significant at the 0.01 level (1-tailed).

Fig. 4.14: Correlation summary for survey response variables of study 2 intervention phase

4.4.4 Discussion

Based on the findings in the two studies presented in this paper, I identify two main contributions relevant to volunteer motivation on online platforms (such as OSPIA). These discuss motivation in relation to (i) the psychological needs perspective and (ii) practical enablers and barriers.

Volunteer motivation and participation: A basic psychological needs perspective

The results from my second study indicated a significant difference between SPs' experience of relatedness in the two phases (baseline and intervention), and a significant correlation between relatedness and intention to book future appointments. This implies that the expression of gratitude by the student beneficiary may have been responsible for the increased sense of relatedness in SP volunteers. This also has implications for volunteering behaviour as I found a strong correlation between the SP sense of relatedness and their immediate volunteering behaviour in the intervention phase. Observing that the immediate appointment behaviour correlated with SPs' intention for booking appointments, we can assume that a perception of gratitude may have motivated the SPs to immediately plan for their future volunteering. However, the mean results for these measures as well as the overall appointments for the two phases did not demonstrate a significant difference. One possible explanation could be that there was a difference in total appointments booked in the two phases due to different timings of the conditions, which could have weakened the outcome. Another equally valid explanation is that the second study focused only

on the relatedness aspect of the SPs' volunteering experience. Findings suggested that the OSPIA volunteers also wanted improvements in their online experience to particularly address their needs for autonomy, for instance through more flexibility in supported devices (iPads, smartphones), time, and cancelling appointments at the last minute (without disrupting the student's learning). These, when not supported, inhibit volunteer motivation for booking (more) future appointments. Supporting scheduling flexibility in system design can foster volunteers' autonomy, and has been previously discussed in other cases of online volunteering (Eveleigh et al., 2014; Kane & Klasnja, 2009). For example, the mobile application 'Be My Eyes', enables volunteers help visually impaired individuals to perform tasks that require proper vision (https://www.bemyeyes.com/). The app allows the volunteers to accept the calls of the visually impaired, however one volunteer's unavailability would not render the visually impaired person helpless, and instead, the call is redirected to another volunteer. Issues pertaining to the sense of competence, especially in terms of SP assessment of students were frequently mentioned. For instance, comments in the first study revealed that the labour-intensive assessment task affects volunteer motivation for engagement. Research has also shown that the perceived labour-intensiveness of the online task impacts the volunteer motivation for performing further work (Eveleigh et al., 2014; Kane & Klasnja, 2009). An example to illustrate the points about autonomy and competence for volunteers is Wikipedia, which provides a wide range of contribution options. Volunteers can do as much as edit a single spelling of a word or write a complete article depending on their availability and expertise. In comparison, a task that takes anywhere between 25-60 minutes of uninterrupted work (minimum and maximum reported duration of an OSPIA session) requires a much higher degree of availability and can impact the volunteers' perceived autonomy and competence. SPs would have to keep that under consideration before making appointments, and therefore the issue impacts their volunteering behaviour. One way of resolving some of those issues on the OSPIA platform can be changes to the volunteer's training module (e.g., through gamification strategies) to better engage them with the time-consuming assessment components.

The second study focused on using personal gratitude messages by the student beneficiary for improving the volunteering relatedness and experiences of SPs. The outcome from the study suggests that improving volunteer relatedness alone may not be enough to improve their overall motivation to volunteer. I wanted to close the gap between the experience of online volunteers and campus volunteers. The latter group scored higher on intrinsic motivation and their experience of relatedness correlated with both autonomy and competence. Therefore, it is reasonable to

assume that any attempt to improve online volunteers' motivations must consider creating a harmony between how those basic psychological needs are fulfilled.

Volunteer motivation and participation: Practical enablers and barriers

In my research workshops with the online SPs, one of the volunteers who was a new parent mentioned her online volunteering participation was highly dependent upon her infant's schedule, while another participant noted that her schedule was mostly divided between her job and caring for an ageing mother. Thus, there is a possibility that the SP volunteers' appointment outcome was impacted by their daily duties or lifestyle. Similar findings are discussed in the HCI literature. While discussing volunteer motivation of online citizen science projects, Rotman et al.2014 differentiated between short- and long-term volunteering motivation, suggesting that volunteer motivation varies during different stages of their commitment. The short term motivation is linked to factors that initially attract the volunteer to the project, such as personal interest. However, the motivations for long-term participation depend on developing and managing relationships with the volunteers. This can be achieved through implementing long-term enablers and eliminating barriers that may be demotivating, e.g., time demands of the volunteer tasks and technology availability. Massung et al. 2013, also discussed 'motivators' and 'enablers' in online volunteering apps. Massung and colleagues argued that contextual factors, such as lifestyle and opportunity, influence volunteer participation levels. Thus, while volunteers may have high intrinsic motivation to participate, their intentions to participate may get thwarted due to practical considerations. As mentioned earlier, my research in study 2 was limited because I did not compare the two conditions at the same time. This was due to not having control over who volunteers and when they volunteer. I also did not want to make any assumptions about whether and how frequently the students will send messages of gratitude to the SPs. I therefore designed a pre-test/post-test study which allowed me to compare the average measures between baseline and intervention phases but limited me because the measures could have been influenced by temporal factors. Future studies should address that limitation.

4.5 Study 3: Investigating SP Perceptions of Relatedness

4.5.1 Background

Relatedness in volunteer work in HCI

There is a history of designing for happiness and wellbeing in the HCI community. Taking a eudaimonic approach to wellbeing, engaging in enriching activities that are intrinsically pleasing to individuals in the right set of conditions leads to a life of meaning, self-realisation and genuine happiness (Ryan & Deci, 2001; Ryff & Singer, 2008). Various predictors are linked to creating those conditions (Calvo & Peters, 2014). Relatedness, in particular, is linked with several wellbeing markers that benefit volunteers on an individual and community level (Kasser & Ryan, 1999; King, 2015; Pavey et al., 2011). The concept of relatedness is explored in a number of theories on belongingness (Baumeister & Leary, 1995), social connection (Lee & Robbins, 1995), and others. Within HCI, Morse et al. (2008) developed doGooders, a social network for volunteers to engage potential volunteers and motivate existing ones, thereby improving volunteer recruitment and budget outcomes for non-profits. In a study on the role of mobile social software for volunteering, Kane and Klasnja (2009) highlighted the importance of leveraging social connections and encouraging community expressions. Furthermore, Farzan et al (2012) found that implementing a socialization regimen that built 'a sense of community' among volunteers improved volunteer contributions in an online community. While previous studies have emphasised the importance of relatedness for online volunteering communities, they mainly focus on improving certain outcomes like increasing the number of volunteering contributions and improving volunteering opportunities. In this study, my goal is to understand how volunteers perceive relatedness with respect to volunteer work and the possible design strategies to achieve that.

Gratitude to improve relatedness in HCI

The field of positive psychology postulates that experiences such as compassion, empathy, forgiveness and gratitude can enrich a person's life and enhance subjective

wellbeing (Snyder & Lopez, 2002). Gratitude involves appreciating and acknowledging the value that we receive from others (Emmons & Mishra, 2011). Gratitude has been used in designed interactive systems to improve wellbeing and health metrics such as mood (Ghandeharioun et al., 2016), body image (Fuller-Tyszkiewicz et al., 2019), amongst others. Practising and receiving gratitude is particularly known to mediate relatedness (Emmons & Mishra, 2011). I found this to be true in my previous study in on OSPIA (K. Z. Naqshbandi et al., 2020a), where expressions of gratitude made online volunteers feel related to the volunteer work organisers, members of the volunteers' community, and the individuals who directly benefit from the volunteers' work (i.e. the beneficiaries). Kim et al. similarly found gratitude to be important for motivating members of an online Q&A community platform called EnishiSource, a system where beneficiaries who asked questions expressed their gratitude to volunteers who answered those questions (Y. Kim et al., 2013). In their investigation, Kim and colleagues studied gratitude as a discrete quality and found that by itself, gratitude did not significantly impact volunteer contributions. However, they noted that the feature supporting gratitude in their platform operated on a sense of implicit desire in the beneficiary to respond to the deed of the volunteer, thus positively impacting social interactions. My research goes a step further, to understand volunteer relatedness from the lens of gratitude rather than studying gratitude in itself. In this paper, I present a case study on volunteer work using a qualitative investigation. I engage volunteers in conversations about their perceptions of relatedness in general, and also via reflections on instances of gratitude. In doing so, I aim to identify opportunity to cultivate relatedness in future volunteer work.

4.5.2 Methods and Analysis

I conducted four co-design workshops with a total of nine volunteer SPs from both OSPIA (four SPs) and the face-to-face modules (five SPs) – two workshops with face-to-face SPs and the other two with the OSPIA SPs. I included both groups because this was found beneficial in the previous studies in order to generate deep insights (K. Z. Naqshbandi, Taylor, et al., 2020; K. Z. Naqshbandi, Liu, et al., 2020). Workshops were moderated and facilitated by an HCI researcher(Thesis author). An additional researcher took notes and assisted with the workshop proceedings for workshop 1, workshop 2 and workshop 4. Workshops 1 and 4 were held at a conference room in the University of Sydney, given that these were online SPs and the venue did not matter to them. Workshops 2 and 3 were held at an examination

room in UNSW Medicine, given that these were campus SPs and were used to that venue. All participants provided written informed consent. The study protocol was approved by an ethics committee (ref HC16048).

Using generative tools and craft material, I developed activity worksheets around the SP experiences of relatedness and gratitude. These worksheets identified and marked all steps involved in a successful SP–student interview session. These steps are similar in the online and campus sessions. These worksheets helped facilitate conversations about volunteer experiences. At the beginning of the workshop, the moderator welcomed the participants and introduced the objectives and activities of the session. A short introduction of relatedness and gratitude was followed with specific examples from daily life. All participants gave written informed consent before activities began. Sessions were audio recorded and the assisting researcher took notes.

In each workshop, participants were asked to think of an OSPIA session when they experienced a feeling of being close or connected with a medical student. Participants then used a 'relatedness worksheet' to indicate details of their experience step-by-step and in parallel with the OSPIA session timeline (relatedness activity)(Fig 4.16). Next, participants completed a similar activity using a 'gratitude worksheet' to share their experience of a time they felt appreciated in relation to the OSPIA program (gratitude activity) (Fig 4.15). The SPs reflected on their overall work and not just the student-SP interview session so as to capture their overall experience. A set of 40 stickers represented generic expressions of pleasure, displeasure, confusion, annoyance amongst others but also expressions that are symbolic of appreciation, community, helping and so on that are specific to the users of this platform and tailored to the context of this study (Fig 4.17). These stickers consisted of popular emoticons (e.g. happy/sad face) as well as graphical expressions of feelings in the previous study (e.g. helping, appreciation). The generative tools were designed to aid subsequent participant discussions on the topics rather than being a validated tool for assessment. Each activity lasted about 15 minutes.

Next, the participants were engaged in a facilitated discussion to expand on the key moments captured in the worksheets (see Fig 4.18).
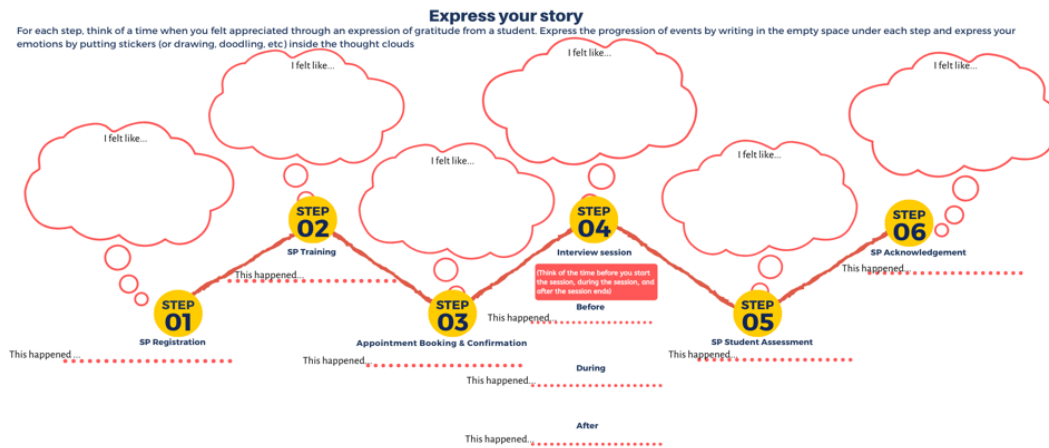
Fig. 4.15: Worksheet for gratitude activity for participating SPs in which they were asked to express a story in text and emotionally expressive stickers about a time when they felt appreciated through gratitude shown by a student

4.5.3 Analysis and Results

The workshops produced rich data based on the generative activities and discussions. Workshop one lasted for about 70 minutes, Workshop two lasted for about 45 minutes, Workshop three lasted for about 72 minutes, and Workshop four lasted for about 49 minutes.The conversations resulting from these workshops were audio recorded, transcribed and analysed thematically, using interpretative phenomenological analysis (J. A. Smith & Shinebourne, 2012). Through a bottom-up analysis, I generated codes, and meaning-making was guided by interpreting the underlying themes. For instance, participants' satisfaction arising from the student's desirable formal behaviour was coded 'etiquettes', and participants' appreciation of others being conscious of their time and efforts was coded 'consideration'. These were later combined to form the theme 'courtesy'. Likewise, all the text under the codes 'appreciation' and 'encouragement' was categorised under the theme 'reciprocation'. All worksheet activities were combined for analysis as I aimed to understand relatedness on its own and via instances of gratitude. The analysis yielded seven themes highlighting volunteers' perceptions and values in relation to their relatedness experiences, as well as the corresponding opportunities, as discussed below.
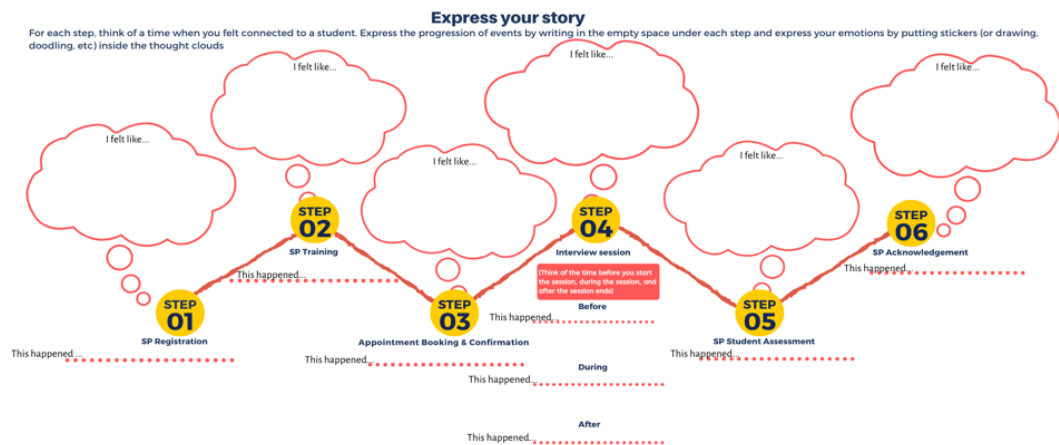
Fig. 4.16: Worksheet for relatedness activity for participating SPs in which they were asked to express a story in text and emotionally expressive stickers about a time when they felt connected to a student

Courtesy

This refers to the volunteers' notions of deservedness of respect for their volunteering efforts by the beneficiaries (i.e. students) and the programme organisers. Participants identified two opportunities for expressing courtesy. Firstly, participants discussed their preference for general formality in interactions with students, such as presentation, professionalism, and preparedness shown towards the volunteers. *"The reason I picked this one [memorable experience] was because the student was generally well prepared. She was very interested. . . She was really impressive. She seemed calm. It was her presentation. She listened and she was organised."* OP1. The second opportunity was linked to valuing volunteers time. *"It [the appointment booking process, which allows booking 72 hours at the most in advance to the SPs] could be made a little bit better. . . Maybe I could offer a little bit more [appointments], but having to do it 72 hours, I have to be really sure that afternoon I am going to keep it open."* OP1. *"I don't volunteer to get the kudos. But I think if the student just acknowledges that you have given me the time, that is really quite nice... It is part of politeness, manners, that sort of thing."* OP2

Fig. 4.17: Context-relevant stickers for emotional expressions used in the workshops by the SPs

Pride in their work

Participants discussed the importance of being able to do everything in their power to help the students;, the beneficiaries of their volunteer work. The impact that their volunteering work has on the students is a source of pride for them. *"The nice thing is that I will often see first year [students] and they come back their second year . . . and I will often say, 'I remember you, my God you have come a long way!' It's fabulous!"* CP3. In line with taking pride in their efforts, the SP volunteers strive to be prepared and presentable for their volunteering work. *"In terms of the actual student assessment, I felt very pleased that I had prepared, I had been given the role a week in advance, I had prepared because it wasn't entirely easy."* CP1. Participants also noted the opportunity for the OSPIA system to help indicate this impact via an immediate student feedback on their volunteer contribution to help build their relatedness, as demonstrated by the following conversation: OP1: *"I guess there is an opportunity there –'Thanks, I have noted your comments'– Maybe in that particular it comes back to us. What do you think?"*. OP2: *"That would be great! I would love to see what they thought of how the interview went. They rate us in a similar fashion"*.
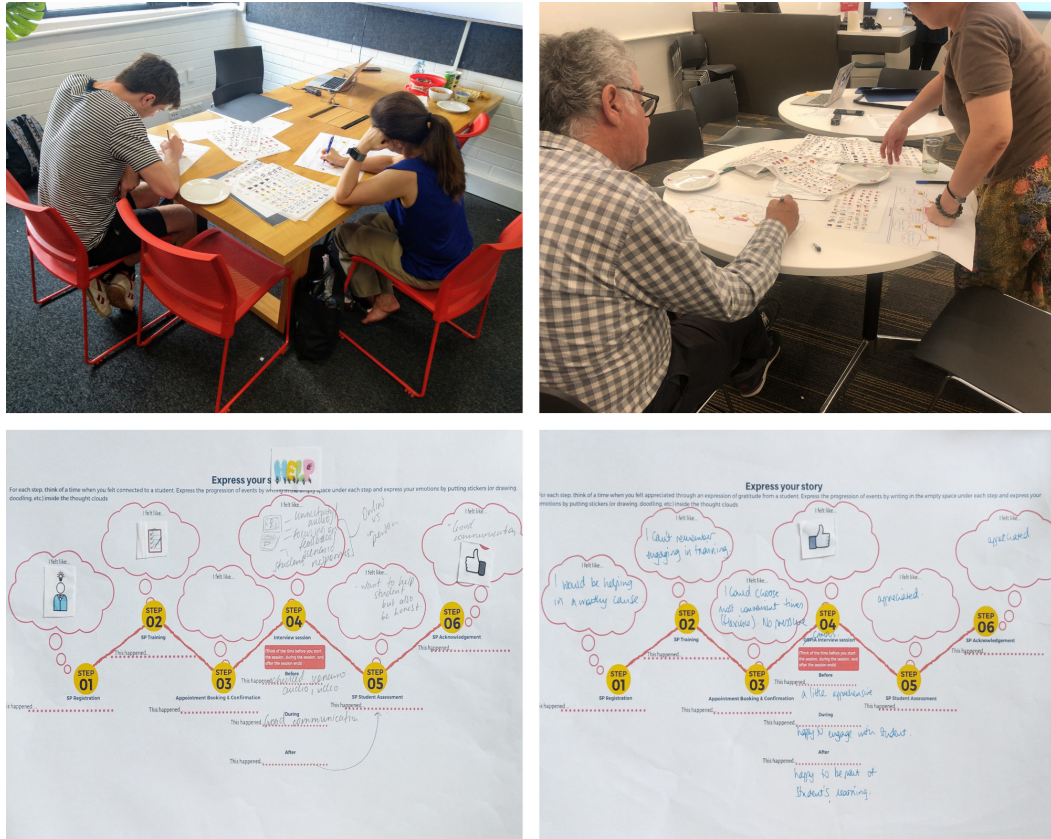
Fig. 4.18: Volunteers in the workshop (top), worksheets used in co-design workshops (down)

OP1: *"Yeah, and even if they commented on things that they felt hadn't gone so well. Like just a little bit of back and forth"*.

Reciprocation

When their volunteer work was reciprocated via explicit acknowledgement and feedback by the students or the program organisers, the volunteers felt appreciated. Participants indicated the opportunity that reciprocation can be designed and be directed at them as individuals. *"It's the same student [referring to online acknowledgement], the fact that she thanked me in the end, I felt valued."* OP1. They also indicated that reciprocation can be directed towards volunteers as group (which they self-identified with). *"We got an invitation to go to the university with the other OSPIA simulated patients as a thank you and I thought that brought it home to me cause we actually got to meet Silas and Kiran [the organisers]."* OP2.

Managing expectations

Participants identified that providing adequate information at different points of their volunteering journey helps set expectations which can then provide seamless and relatable experiences for them. For instance, adequate onboarding augmented with information at the beginning of the program is important in building their initial expectation about the program, e.g. while referring to the lack of clarity in the initial description of the program, an SP mentioned: *"I was glad that I was accepted, because the information that I saw wasn't very descriptive."* OP2 Additionally, the upkeep of regular communication regarding the OSPIA community may help retain volunteer interest in the program and build relatedness. *"We also had the opportunity to find out a little but more about the program . But we didn't really know, like facial recognition and some of the other things. I had no idea about the enormity of the program. I knew that obviously a lot of students doing undergrad for medicine at UNSW, but I did not know how many of us there were"*. OP2 They noted that knowing what is expected from the volunteers would reduce ambiguity in their relationships *"So, it is a two-way street. You can talk about how we get the acknowledgement weekly, but actually getting to meet people and know where they are coming from and also what their expectations are of us too. That meant a lot to me."* OP2

Reflecting together

A number of participants expressed pleasure in sharing thoughts and reflections with students and vice-versa. They identified the value of enabling personal growth through this. For instance, opportunities for reflections as part of work may allow the volunteer to understand the student's perspectives. This may cultivate growth for both the volunteer and the student. *"Maybe they could have the option to reflect, on what you have told them, see if they thought if it was useful or not, or were they worried about other things that went on."* OP1 Participants also mentioned how the casual nature of such reflections led to rapport building via sharing personal stories, informal banter and small talk. *"If we had time at the end, they [student] would ask, 'What do you usually do?' They were interested in us as well! "*CP2.

Taking charge of their volunteering work

Participants noted that taking control of their volunteering tasks and personalising their performance helps them express themselves and their individuality which then reflects on their connection with others. Giving the volunteers flexibility in the means and methods of performing their volunteering task was preferred. *"What I find a bit more difficult, I guess more if it's not a straightforward scenario, is that you don't get a lot of time to memorise. You don't get a lot of time to remember it and I am not great at learning things quickly. I just try and remember the name bits and just freeball after that. Like come up with my own stuff."* CP5

Community building

Participants reflected on the importance of access to a supportive community that they identify with. Building belongingness to a wider group of volunteers can help volunteers gain peer-support and build confidence. *"It would be really nice to talk to like-minded people. I thought it would be nice to talk to socially, but also find out where they are coming from. When you take on something like this, you know you are on your own, but I guess attending one of those things [an organisational event to socialise volunteers] you realise you are reinforcing the issues that you are having is same as the other people."* OP2 Additionally, integrating non-task related interactions with other volunteers, students, and organisers contributes to community building. *"Cause I guess if you wanted to use an analogy, in this particular it is recruiting the cart before the horse. Because we are doing the program and then we are meeting the people [via organisational events]."* OP2. In the following section, I discuss the results in light of certain matters that elucidate my previous argument about social and psychological factors that are relevant to volunteering in OSPIA, and also to provide further insights for building relatedness in other online platforms that use volunteer labour.

4.5.4 Discussion

Emotional labour in volunteering

This study on volunteer perceptions and values in relation to relatedness points towards emotional investment of the volunteers in their work, which manifested itself in themes such as courtesy, pride in their work, reciprocation and others. As the volunteers in this study pointed out, this emotional labour must be recognised by the beneficiaries as well as others involved in the program. Emotional labour was termed by Hochschild (1983) who established that some forms of work demand more emotional efforts than others, e.g. customer facing workers, flight attendants. Raval and Dourish (2016) discussed affective and emotional aspects of labour in online crowdsourcing platforms that use volunteers. Online volunteering platforms, especially the ones where the volunteers perform emotionally demanding work, e.g. disaster and crisis response (Cobb et al., 2014), counselling (K. Naqshbandi et al., 2019), moderating online communities (Wohn, 2019), do not always adequately address the emotional labour of these volunteers. This is an underexplored opportunity which I plan to address in future research. Moreover, the first study had highlighted the higher participation of female volunteers in the OSPIA program and its face-to-face counterpart. Related research has shown that in most instances of face-to-face volunteering, women usually outnumber men, rank higher in prosocial traits and are usually more motivated (than men) to provide help (**united_nations_volunteers_state_2015**; Einolf, 2011). However, this trend doesn't always follow in all online spaces. Wikipedia, for instance, is known for its lack of gender diversity among its volunteers, with women forming less than 15% of Wikipedia volunteers. Assumptions about lack of technical skills in women were previously shown to be responsible for this trend (Collier & Bear, 2012). However, a study by Menking Erickson (2015) attributed it to gendered emotional labour in Wikipedia, as women termed 'Wikistress' to describe the emotionally volatile and unsupportive atmosphere which drove them to quit volunteering on the site.

Formal v/s informal relations

Delving deeper into the nuances of volunteer experiences that were evident in the themes, I find a contrast between the volunteers' desire for formal vs informal connections with the beneficiaries and others within the community. Growth and

flourishing were cultivated in volunteer experiences through sharing reflections when they had the opportunity to get to know others, empathise with them, and share personal stories, rather than formal work tasks. However, they recognised the value of formalities and wanted professionalism, respect and reciprocation for performing the volunteering work. I propose that future design strategies should foster both, however I acknowledge that achieving a balance between the two may be challenging. Achieving that kind of balance takes a holistic perspective that designing for social interactions in volunteering platforms should aim for.

4.6 Design Implications from the Case Study

A number of design implications can be generated based on my research in this case study. These could be useful for developing digital platforms that aim to enhance volunteer motivation through cultivating relatedness, gratitude and the various nuances in interpersonal communication in online volunteering platforms. These could also pave way for reducing structural, systemic and other barriers for volunteer participation. Thus, these directly contribute to the three research aims outlined in 1.5. I propose four main design recommendations, as discussed next.

Findings in the first study suggest that the social aspects of the volunteering experience are grounded in the inter-personal relationship between the volunteer and beneficiary. This is an important element in the traditional, face-to-face form of volunteering but may be lost in online volunteering. The first design implication I propose is to use a volunteer-centric technology design approach where design features support natural social interactions in online volunteering platforms. This could facilitate the rapport building between volunteers and beneficiaries. Examples could include exploring technology forms such as relational agents (Vardoulakis et al., 2012) and online chat features (K. Naqshbandi et al., 2019) that enable additional social interactions.

Based on the second study, I propose a second design implication. I suggest design features to foster gratitude in online volunteering platforms as a way of supporting the beneficiary-volunteer relationship and experience. I showed receiving appreciation improves wellbeing and propensity of helping behaviours. This is a relevant consideration for volunteer-centric technology design and can be achieved through built-in features. For instance, this type of expression is used on social media plat-

forms such as Facebook and Twitter through user 'like' button or similar affordances (Bucher & Helmond, 2017). In a volunteer-centric design, similar actions can be explored to express gratitude (via text or graphics), foster the social dynamics between the giver and receiver of gratitude (beneficiary and volunteer), and increase the frequency of gratitude expression (via synchronous or asynchronous features) (Wise et al., 2006).

The findings also suggest the value of a multi-perspective design approach that recognises the roles of all stakeholders involved and not just those of the volunteer and beneficiary. There were various instances where the SPs recalled how the input and efforts of others in the program were valuable to them and helped in their engagement, e.g. when the system failed due to a glitch, some SPs personally contacted the program IT support personnel while others contacted the program manager. Thus, the third design implication is that of a multi-perspective approach in the volunteer-centric design of a system that recognises the roles of the volunteer managers, program organisers, the beneficiaries, the designers of the system, among others, in shaping the experiences of volunteers.

The final design implication is to recognise the emotional labour as well as the disparities in the emotional labour in volunteering. Volunteer work is, by definition, not compensated materially. This makes it essential to ensure that the social and experiential aspects of their voluntary participation that result in emotional labour are recognised and addressed adequately. This includes recognising and appreciating their work adequately and taking steps to avoid issues that could lead to volunteer burnout and disengagement. This consideration is important given it directly impacts volunteer wellbeing. Further, the existing systemic, structural, and infrastructural disparities may get exacerbated for those who are generally not suitably represented in the design of online volunteering systems. This case study specifically points to a potential disparity in recognition of emotional labour of women, thus revealing a gendered nature of emotional labour in online volunteering. Thus, I believe that future strategies in designing online volunteering platforms should recognise and be inclusive of the emotional labour of all volunteers, with a focus on those who are generally under-represented. The outcome will be online volunteering inclusive of not only women, but other genders and groups who are emotionally committed in online volunteering work as well.

4.7 Conclusion

In this paper, I describe three studies. Study 1 is a mixed-methods exploratory study on face-to-face and online volunteers (called SPs) on the OSPIA platform, an online program for training medical students in communication skills. Study 2 is experimental and compared volunteer motivation and behaviour when they received a system-generated acknowledgement message in the baseline phase to an intervention phase where volunteers received a personalised message of gratitude from the beneficiary. In study 3, I used generative tools and methods in four co-design workshops to explore volunteer perceptions and expectations of relatedness in their volunteer work.

In study 1, the findings demonstrated significant differences between the campus and online volunteering experiences based on basic psychological need satisfaction (competence, autonomy, relatedness), intrinsic motivation and amotivation. Relatedness was found an important issue on the OSPIA platform in study 1, so I tested how a personal message of gratitude from student beneficiaries can improve volunteers' experience and output. Medical students were asked to write personal messages and I hoped to invoke in them an implicit sense of returning the volunteer favour. Results showed that the volunteers' perceptions of student gratitude messages were overwhelmingly positive and significantly improved their sense of relatedness and led to immediate session appointment booking behaviour. However, the intervention did not result in an increased volunteering output during the study time. Possible explanations are (1) the impact of temporal factors that were not controlled in the study, and (2) not addressing the volunteers' need for autonomy and competence at the same time as relatedness. In study 3, a number of volunteer-centric opportunities to build relatedness and consequently improve volunteer engagement are identified. Findings are further discussed to inform future design to support an adequate level of formality and emotional labour in online volunteering communities.

StepUp for Dementia Research - Exploring Volunteer Motivation, Identity and Meaning-Making in Digital Science-Based Research Volunteering

> *Their volunteers - they're called 'subjects,' of course - are given mescaline or LSD and they're all opened up to their surroundings, very sensitive to color and light and other people's emotions...Most of them say afterward that they'll never do it again.*

> **— Alexander and Ann Shulgin**
> (Pihkal: A Chemical Love Story)

Preamble:

This chapter is derived from an Article published in the International Journal of Human-Computer Interaction published on August 29, 2022, copyright Taylor Francis, and available online: http://www.tandfonline.com/10.1080/10447318.2022.2109246. This chapter further addresses the three research aims outlined in this thesis - **Research Aim 1**: To investigate the motivational aspects critical for enhancing digital volunteerism experiences, **Research Aim 2**: To identify digital platform attributes linked to volunteer wellbeing, and **Research Aim 3**: To create guidelines that can be used for effectively supporting engagement of volunteers in digital volunteering platforms. This is achieved by investigating the experiences of volunteers on an online platform that represents the volunteer-using domain of science-based research volunteering. The main research activity in this investigation includes an

online survey with n=266 participants where nuances in participants' demographics, experiences, motivations, wellbeing, and psychological needs are captured. The findings reveal features that facilitate or impede sustainable volunteer participation and the five identities based on which volunteers derive meaning from their work. The main contribution of this chapter is captured as a set of eight design recommendations to navigate the digital divide and foster inclusion, build wider participation by engaging with the social construction of volunteering and focusing on prosocial values, and enhance volunteer well-being by fulfilling their cognitive, emotional, and psychological needs.

5.1 Introduction

Voluntary work takes many forms in the digital realm. Digital or online voluntary services are used during crises and disasters (Starbird, 2011; Starbird & Palen, 2011), for advocacy and in civic services (Hansen et al., 2014; Warren et al., 2014), for capacity building in NGOs (Blythe & Monk, 2005; Morse et al., 2008), and more. In the last two decades, online voluntary work has additionally extended work associated with knowledge contribution. Whether it is Free Libre and Open Source Software development (FLOSS) (Gardinali, 2003) or online wiki creation and management platforms (Nov, 2007), these online voluntary workers, also known as 'digital volunteers' or 'online volunteers' (K. Z. Naqshbandi et al., 2020a; Starbird, 2011), have organised to form thriving communities with their own collaborative practices to create and manage knowledge. The understanding and definition of digital or online volunteerism has therefore expanded to include many forms of online work. This has also provided a design impetus to understand the motivational and social complexities that emerge due to the use of digital platforms for volunteerism.

The research presented in this chapter explores an online platform that enables digital volunteering for the purpose of participating in scientific research. This is a specific domain of online voluntary work which involves volunteers who employ their intellectual and cognitive efforts in order to contribute to science. Some existing examples linking science and volunteering include citizen science where volunteers collectively work with scientists as amateur researchers towards a discovery (Nov et al., 2011), or science-based research platforms such as Volunteer Science (Radford et al., 2016) where volunteers become research participants. These practices have been subject to research in Human-Computer Interaction (HCI), Computer Supported Cooperative Work (CSCW) and other related research communities. However, while citizen science volunteers are often viewed as co-creators of knowledge who collaborate with scientists on specific subjects and objectives of inquiry, voluntary participants in scientific studies are, by and large, themselves the subjects of research inquiry. The perceived difference in the "function" and roles of volunteers in these types of digital scientific volunteering platforms would shape volunteer motivation, engagement and sense of wellbeing resulting from their volunteering. The research presented in this chapter explores these attributes specifically in relation to digital volunteering for science-based research, which is an under-explored area of inquiry.

Motivation, engagement and wellbeing are highly interconnected, with many determinants of wellbeing directly or indirectly impacting engagement (Peters et al., 2018). Importantly, volunteering has a strong potential for contributing to meaning in life, which is also a predictor of wellbeing (Martela & Ryan, 2016; Martela et al., 2018). Further, volunteer identities are shown to impact their engagement and wellbeing (Thoits, 2012). Science-based research platforms such as Volunteer-Science or Project Implicit have been mostly studied from the perspective of their domain-specific scientific research findings rather than the socio-technical aspects of volunteer engagement with those platforms (Radford et al., 2016; Xu et al., 2014). Volunteer motivation, identity and meaning-making on these science-based research platforms remain largely under-explored leaving a gap in HCI that might allow us to better support volunteer engagement in ways that are sustainable, inclusive of various markers of identity and conducive to their wellbeing. The research presented in this chapter will address this gap.

Moreover, building volunteer platforms for scientific engagement also means considering a vision of the future for our communities. There is an increased awareness about the need for improving science education and communication with the general public due to the COVID-19 pandemic to ensure people follow public health recommendations. Rather than relying solely on reactive science communication with public which are sometimes entangled with misinformation and disinformation, there is merit in developing platforms that engage the public with science voluntarily, particularly in relation to issues that directly impact them (e.g. personal health), and their future (e.g. public health policies). To increase participation in volunteering platforms, research and development must seek to understand how we can enhance inclusivity, particularly for those who are underrepresented in scientific volunteering platforms.

In this chapter, we report a survey study of volunteers on an online platform for science-based research participation. The platform is called StepUp for Dementia Research and helps dementia researchers in Australia to recruit participants for their studies. We characterise those registered with this platform as volunteers because they are registered on an ongoing voluntary basis, they agree to contribute their time and knowledge and engage with the program (through various forms and activities) should they be matched with a research study, without a promise of monetary compensation for their participation. Thus, additionally our research also seeks to reframe the traditional view of unpaid participation in science-based research as volunteerism, similar to other forms of volunteerism within other domains. Through highlighting the experiential aspects of digital volunteers on the given platform, we

validate our current understanding of digital science-based research volunteerism as being the same as other forms of digital volunteerism, i.e., voluntary activities using digital technology for common good and without any financial gain. We aim to empirically explore volunteer motivations, identity and meaning by investigating their past and ongoing experiences of and expectations from voluntary roles. These factors, as we established earlier in this section, are linked to volunteer wellbeing. In doing so, we view both identity and meaning-making to be value-based. We explore three research questions:

R1 How do past and current experiences, motivations, needs and future expectations of volunteers in digital science-based research platforms shape their wellbeing?

R2 How do volunteers draw meaning from and form identities around science-based research volunteering?

R3 What design strategies can be used to improve volunteer experiences on digital platforms for science-based research?

Our survey questionnaire included both qualitative and quantitative questions, addressing volunteer demographics, their volunteering history, motivation, expectations, perceptions and wellbeing. All recruited participants were registered with the volunteering platform at the time of our study. Through the analysis of quantitative and qualitative data, we contribute an empirical understanding of digital volunteerism for science-based research and highlight five volunteer identities on such platforms. We additionally elaborate opportunities for future technologies to strategise and support plurality focused and volunteer-centric design, an approach proposed in our previous work in other domains such as education and mental health (K. Naqshbandi et al., 2019; K. Naqshbandi et al., 2021; K. Z. Naqshbandi et al., 2020a; K. Z. Naqshbandi et al., 2020b). We hope our findings inform the design of online science-based research platforms such as StepUp for Dementia Research in the future. Finally, we hope to help researchers and organisers of science-based research programs who rely on volunteer participants to increase the diversity of their programs and remove barriers to participation for volunteers, especially those with marginalised identities.

5.2 Background

5.2.1 Wellbeing and Motivation in Science-based Research Volunteering

There is an emerging interest in designing technology for psychological wellbeing and happiness, indicated by the popularity of wellbeing applications for mood tracking, mindfulness (K. A. Cochrane et al., 2021), meditation (K. Cochrane et al., 2020), and journaling (Tholander & Normark, 2020), with many promoting long-term wellbeing rather than immediate gratification (Calvo & Peters, 2014). Along those lines, we focus our attention towards volunteerism and wellbeing. Long-term volunteerism, specifically in a traditional face-to-face setting, is strongly associated with psychological wellbeing and happiness (Musick & Wilson, 2003). This is especially important because this impact on happiness is not subject to hedonic adaptation, making volunteerism a way forward for overcoming the 'hedonic treadmill', and building significant increments towards happiness (Binder & Freytag, 2013). It is therefore natural to ask how the wellbeing benefits of traditional volunteering can be transferred to digital environments.

In science-based research platforms, the motivations and experiences of voluntary participants may be considered secondary to that of the "actual" scientists, highlighting the need for researching strategies to support volunteers motivations and the values that they associate with their work (Rotman et al., 2012). In this study, we use the self-determination theory (SDT) (Deci & Ryan, 2002) as a lens to understand volunteer motivation. An influential theory of motivational psychology, SDT has built a strong reputation with regards to designing user experiences with desirable motivational outcomes in sports (Allen & Shaw, 2009), education (S. W. Park, 2013), gaming (Gee, 2012), and health (Balaam et al., 2011), among other disciplines. SDT is generally characterised by its focus on determinants of wellbeing and motivation, and provides technology researchers with assessment tools and a lens to interpret experiences associated with design features that may enhance or hinder wellbeing (Peters et al., 2018). Specifically, SDT has been used for improving motivation and in the design of wellbeing-focused technology for volunteers, which makes it a theory relevant for this study (K. Naqshbandi et al., 2021; K. Z. Naqshbandi et al., 2020a; K. Z. Naqshbandi et al., 2020b). Ryan and Deci postulated that the more self-determined the motivation of an individual towards a goal, the happier they are. They envisaged motivation as a spectrum with an increasing level of

self-determination, where the lower end is (i) amotivation or lack of motivation, followed by (ii) external motivation to gain external rewards like social acceptance or maintaining social image, (iii) introjected motivation, which is driven by self-esteem, (iv) identified motivation, where the individual identifies with a cherished value or virtue associated with the goal, (v) integrated motivation, where the individual fully endorses an external value and integrates it with their own values to derive meaning, and (vi) intrinsic motivation, where absolutely no external pressure or values are present and the individual is mainly motivated by the enjoyment associated with the goal (Deci & Ryan, 2002). This scale has been applied to the volunteering context successfully by Millete and Gagne (Millette & Gagné, 2008).

The self-determination theory also examines three basic psychological needs that a goal should satisfy in order to fulfill its utmost wellbeing potential: (i) autonomy is the need to feel in charge of the goal, (ii) competence is the need to feel confident about one's performance to achieve the goal, and (iii) relatedness is the need to feel meaningfully connected to others via the said goal (Ryan & Deci, 2017).

In our previous work on designing for digital volunteers, we used SDT to understand and enhance the experiences of volunteers in the medical education context (K. Z. Naqshbandi et al., 2020a). In the current study, we explore what roles or identities volunteers consider for themselves in science-based research volunteering and the impact these have on their motivation and wellbeing.

Voluntary participation in science-based research is characterised by a quality that is specific to its context – the potential power imbalance between volunteers and researchers. This can have implications for volunteer motivation, wellbeing and happiness. Howard and Irani (Howard & Irani, 2019) examined this issue in research subjects who care deeply about their participation on socio-technical platforms such as Wikipedia and termed them as research collaborators who shape knowledge production. However, one may argue that voluntary participants in traditional natural science-based research setting may not enjoy the same agency as Wikipedia contributors. Particularly for scientists in medical health research or similar contexts, these participants source data as "human subjects" (Cox & McDonald, 2013) and may be considered "guinea pigs" to be experimented on (Howard & Irani, 2019). To further elucidate this, we point to a scathing passage in an editorial published in the Lancet that decries the level of autonomy of voluntary participants in medical research programs where the innocuous use of the term "volunteer" may oversimplify the motivational and ethical complexities in human participation in medical research:

> One of the reasons for the richness of English language is that the meaning of some words is continuously changing. Such a word is "volunteer". We may yet read in a scientific journal that an experiment was carried out with twenty volunteer mice, and that twenty other mice volunteered as controls. (**poliomyelitis_a_new_approach_poliomyelitis_1952**)

The above also raises ethical tensions around what "volunteering" means and how consent in medical and health research can prevent unethical practices, particularly in relation to oppressed peoples with documented grievances such as various African and Indigenous populations (Graboyes, 2015). Understanding consent practices with volunteers necessitates research into the circumstances surrounding their participation including volunteer motivations and values to then eliminate the possibility of coercion (Townsend & Cox, 2013). Digital platforms for scientific and medical research enable volunteer recruitment and participation in scientific studies. Digital adds a layer of unknown as the volunteers' motivations and experiences get shaped by the medium and impact their wellbeing and happiness in different ways. To address the nuances of volunteers' wellbeing and happiness, we investigate the motivations, experiences, and expectations of volunteer digital participation in science-based research programs.

5.2.2 Identity and meaning-making in volunteering

Identity is an important facet of motivation that is known to contribute to an individual's wellbeing (Stets & Burke, 2000). This has also been studied in volunteerism, where various facets of volunteer identity predict their participation and experiences (Finkelstein et al., 2005).

The social identity theory defines how an individual identifies oneself based on their affinity with a social group. This social identity is then invoked to various degrees in social contexts where differences in power, status and interests are observed (Hogg & Abrams, 1988; Sherif, 1936; Tajfel et al., 1979). Accordingly, volunteering for any science-based program can be associated with the volunteers' identification with the community or in-group represented by that cause. The social identity theory can explain why people engage in prosocial (helping) behaviours such as charity and volunteering to benefit certain groups and causes (they identify with) over others (Hackel et al., 2017). Similarly, it has also been used to elucidate the anti-science positions of anti-vaxxers (Motta et al., 2021), climate change deniers (Fielding &

Hornsey, 2016) or anti-maskers during Covid-19 (Abrams et al., 2021) whose social identity may overwhelm their ability to accept scientific evidence.

Volunteers engage in roles they embrace by choice rather than strong beliefs in obligations, for example, towards workplaces or family. Volunteer roles and their corresponding identities help in deriving meaning in life, which consequently contributes to volunteer wellbeing (Thoits, 2012). Volunteering in many online communities involve specifically defined roles. For instance, open source communities usually have a defined hierarchy of roles, where newer members peripherally participate in small tasks at first and gradually move up to bigger roles (e.g. project leader, core member, active developer) (Ye & Kishida, 2003). Role identity has been positively associated with intention to continue volunteering (Marta & Pozzi, 2008). In their study on motivating online volunteer contributions based on local neighbourhood, Moreno et al. found that using a gamification mechanism that involves assigning roles based on volunteer perceived neighbourhood identity improves volunteer engagement (Moreno et al., 2015). Preist et al. found that strategies that focus on generating meaning through role identity in a volunteer community encourages long-term engagement of volunteers (Preist et al., 2014).

Service to others and beneficence, traditionally known to be synonymous with the spirit of volunteerism, contributes to a life of meaning (De Vogler & Ebersole, 1983; Debats, 1999; Martela et al., 2018). Meaning in life has been explored in Psychology and social sciences from phenomenological as well as empirical points of view. It is shown to have a positive impact wherein an individual feels a sense of fulfilment with respect to their life goals and is thus, strongly associated with wellbeing and happiness in life (Battista & Almond, 1973). The salience of both role identity and social identity, especially in the context of volunteering, are associated with improved motivation and engagement as well as a meaningful and happy life (Gray & Stevenson, 2020; Lambert et al., 2013; Thoits, 2012).

The association of identity, meaning and motivation was observed in online science-based volunteering, where understanding and encouraging the role identities of online citizen science volunteers within a supportive community supported their motivation. This research also indicated that because of this, the volunteers learned the nuances of scientific methodology on a deeper level instead of merely a superficial understanding of science (Jennett et al., 2016).

Prior research studies examined the motivations and experiences of participants in online citizen science, which explored how volunteer identity factors into their

engagement (Nov et al., 2011; Rotman et al., 2012). To our knowledge, similar studies are lacking in relation to digital volunteers in science-based research participation. Thus, we examine factors that are associated with science-based volunteers' motivation, identity and meaning-making to identify strategies for designing better digital platforms and interactions for the volunteer participants and those who recruit them.

5.2.3 Inclusion and wellbeing of the margins

Social margins is a reference to those who fall outside the various socially constructed norms and are systemically pushed to the fringe of the society (Peace, 2001) due to perceived differences in ethnicity, religion, race, economic level, class, ability, sexuality, gender amongst other often intersecting identifiers (Crenshaw, 1989). Lack of agency and power to determine the outcomes that concern one's quality of life characterise the process of marginalisation (Seeman, 1959). The position of margins in a society constantly evolves with the changes in the societal factors such as technological disruption, market innovation, policy changes, and political upheaval (Vrooman & Hoff, 2013). The conventions that alienate marginal groups are enforced by the mainstream populace who posses privilege based on their difference from the 'other' in terms of their identities, associations, environments or experiences (Hall et al., 1994).

Design plays a direct role in creating or sustaining the process of marginalisation, whether it is through the design of social policies (Jacobi et al., 2017), or digital experiences (Sin et al., 2021). As an example, design can include people with varied abilities, or exclude them by normalising ableism, thus, extending marginalisation (Newell et al., 2011). Similarly, policies and governmental processes can have similar impact, for example, affirmative actions such as reservations and quotas for scheduled castes and tribes in India, which intend to increase equity for historically marginal groups. We argue the potential role of design in marginalisation extends and is extended by marginalisation in science.

The positivist belief in political neutrality of science has been challenged through postmodern philosophy which legitimises many ways of knowing (as opposed to one quantified way of knowing) (Wall, 2006) and prioritises equity, justice and social responsibility in the scientific community (Rose & Rose, 1973). Within the field of Human-Computer Interaction (HCI), the consideration of politics of power

in socio-technical processes and systems is outlined in several social emancipatory frameworks such as the critical race theory (Ogbonnaya-Ogburu et al., 2020) and feminist theory (Bardzell & Bardzell, 2011), emphasising the social situatedness of research and its outcomes. Moreover, these frameworks advocate for socio-technical design and research that challenges the status quo perpetuated in "engineering" or modular system thinking in order to critically engage with complex problems through examining context, histories, power structures and associated praxis (Khovanskaya et al., 2018). Narrowing the social margins has, therefore, turned into a design approach that centres social justice (Dombrowski et al., 2016), reflexivity (Rode, 2011), openness to collaboration and participation in research (G Johnson & Crivellaro, 2021), and critiquing existing design practices that may perpetrate marginalisation (Tran O'Leary et al., 2019).

Digital volunteering has digitised the many traditional ways of in-person volunteering (Amichai-Hamburger, 2008). However, the inequities associated with digital volunteering are increasingly visible, challenging the wellbeing of those involved (or left behind) even when volunteers are motivated to engage (Ackermann & Manatschal, 2018; Piatak et al., 2019). Lack of power and agency caused by marginalisation is directly associated with the loss of meaning in life which also results in adverse wellbeing outcomes (Hommerich & Tiefenbach, 2018; Seeman, 1959). Core to examining online volunteering work is, therefore, identifying how designed platforms contribute to social equity, facilitate participation of marginalized groups, and contribute to their wellbeing. In science-based volunteering platforms, digitisation can potentially remove barriers to participation for some marginalised groups (e.g. due to availability of transcription and language translation for linguistically diverse volunteers, accessibility features, preserving anonymity). However, digital platforms may also hinder volunteer engagement when varied identities and capabilities of volunteers are overlooked in design. Previous research into online volunteers in a medical education platform revealed opportunities to tackle gender-based marginalisation by supporting women, whose motivations are often exhausted due to a lack of addressing their emotional investment in their work (K. Naqshbandi et al., 2021). Irani et al. additionally suggest postcolonial computing as a lens to shift design and analytic practice in order to acknowledge cultural ways of knowing and address uneven relations in research (Irani et al., 2010). Through illustrative case studies, they showed how failure to do so can negatively impact knowledge produced through research and even cause harm, for instance when researchers lack understanding of cultural beliefs of Australian Aboriginal participants (Irani et al., 2010).

Finally, technology design has important ethical implications for consent practices (Graboyes, 2015), particularly in relation to participants or volunteers from marginalised communities who have routinely endured higher risk and harm in health and science-based research (Alexander et al., 2003). The design process must seek insights to sustainably create social change and technology innovations for and with volunteers (Krüger et al., 2021). It is this kind of insight that we seek to uncover in our research, in order to achieve what Noble described as long-term success through engagement (Noble, 2012) in addition to fostering digital volunteers' wellbeing.

5.2.4 Case Study- StepUp for Dementia Research

We will now describe the platform and the associated volunteer-involving program used in our case study. https://www.stepupfordementiaresearch.org.au is an online initiative initially funded by the Australian Government Department of Health, and modelled after and partnered with a UK government program called Join Dementia Research program (See 5.1). All associated processes such as documentation, research participant recruitment and handling of data are reviewed by a specially convened Governance group within the University of Sydney consisting of experts in research ethics, data protection and information governance, consumers (people living with dementia and carers), and researchers. Implementation of StepUp for Dementia Research is also approved by the University of Sydney Human Research Ethics Committee.
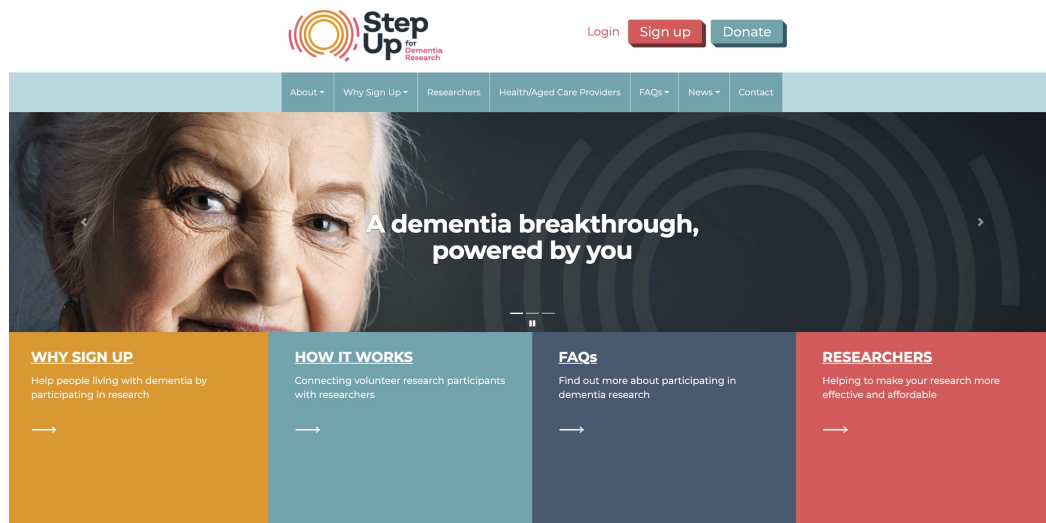
Fig. 5.1: The landing page of StepUp for Dementia Research website

The Stepup for Dementia Research program seeks to facilitate participant recruitment for dementia related studies by matching a pool of registered adult volunteers located within Australia with appropriate dementia research studies. The researchers are affiliated with universities and research institutions across Australia. The platform includes checks and processes to ensure that the registered research programs comply with ethical standards and policies. Institutions using StepUp for Dementia Research are also required to sign a Data Access Agreement outlining policies specifically developed for the platform implementation and responsibility and accountability for appropriate use of data by researchers.

For our research, we sought participants from the volunteers who were already registered with this platform and those who joined during the period that our study ran. Some volunteers, especially in the initial stage of recruitment, had not yet participated in any dementia research facilitated via the platform. Therefore, in our survey, we asked about their expectations for the programs and their volunteering history, both online and face-to-face. We did this in order to understand their motivations, values, expectations and identities associated with volunteering and explore how their participation in science-based research contributes to their wellbeing. Details of the survey questions are discussed next.

5.3 Methods

5.3.1 Positionality

Author 1 is responsible for leading the project. *"I am an HCI researcher and this chapter forms a part of my PhD research. My interest in research on volunteerism did not occur by chance, but was deliberately crafted based on my own history of volunteering in a few areas of interest, both in online and traditional face-to-face environments. I have contributed as a volunteer to several scientific projects on citizen science platforms such as Zooniverse, Galaxy Zoo and others based on my personal amateur interests in topics such as astronomy, literature, amongst others. So, I naturally made an effort into getting involved in this project when the opportunity arose. Additionally, several circumstances in my personal life (lived experiences of oppression due to being raised in a politically disputed region, living as a non-Anglo immigrant in a Western nation) in addition to my work associated with several vulnerable groups of people (refugees and asylum seekers, people with spinal cord injuries and neurological conditions, the*

homeless, among others) have brought a strong awareness of how marginalisation can make people invisible and how it routinely occurs through the design of policies, processes and objects around us. The core topic, the design of the study and the lens through which I analysed the data are inspired by my own stake in the aforementioned topics."

As a team, we are positioned at the University of Sydney. This affords us access to a wide network of researchers in HCI, Science and Health. Our collective research on health, volunteerism and citizen science affords us an intimate understanding of the research context. The second author is the director of StepUp for Dementia Research. Her knowledge of the program guided us in designing and disseminating our survey on their dementia research platform where volunteer participants in our study are registered with. The first and third authors have lived experiences of multiple cultures through their background (South Asian and Middle Eastern) and relocations which afforded them a lens in this study to examine participant comments on culture and marginalisation. All authors were involved in the design and dissemination of the survey study. Authors 1 and 3 collaborated on data analysis and manuscript preparation. All authors collaborated on finalising the manuscript.

5.3.2 Survey

Our research was approved by the ethics committee at the University of Sydney (reference number 2018/680). This research was conducted at a time when StepUp volunteers were not yet assigned to any dementia research. We chose to use an online survey as it is a fast and efficient way of collecting information from many participants. REDCap, an online survey tool was used to disseminate the survey. The participant information sheet (PIS) was integrated into the survey and shown to participants before starting the survey. Participant consent was obtained via submission of their responses. A pilot survey was tested within the research team and a few pilot participants to ensure clarity of questions. The survey was then advertised on the StepUp for Dementia platform, after which all registered volunteers were notified about the availability of this study.

There were 22 questions in total with embedded logic and branching to the survey questions. The survey included five major sections as follows:

1. Demographics- Included questions about age, gender, employment status, highest level of education attainment and ethnic background.

2. Volunteering history and experiences- Included seven questions about participant past and current volunteering experiences, both online and face-to-face; the time spent on their volunteering endeavours, as well as dementia related and other kinds of volunteering. These included a combination of Yes/No questions in survey branching where the participants could choose only one option and then specify the numerical value of hours spent on different kinds of volunteering. Additionally, there was an open-ended qualitative question for further clarification.

3. Volunteering motivation- We used the standardised motivation rating scales by Millete and Gagne (Millette & Gagné, 2008) to assess volunteer motivation, which included six items corresponding to six types of motivations on a spectrum i.e., intrinsic, integrated, identified, introjected, external and amotivation. The responses to the questions were on 7-point Likert scale (7 being the highest), ranging from strongly disagree to strongly agree (Millette & Gagné, 2008).

4. Volunteer wellbeing- The Personal Wellbeing Index is one of the scales used in Australian Unity WellBeing Index (Cummins et al., 2003) to assess volunteers' satisfaction in life as a measure of their individual wellbeing (Stukas et al., 2016). Using the seven items on this index, we measured the satisfaction of volunteers with their standard of living, health, achievements in life, personal relationships, personal safety, community connectedness, and future security. The responses to the questions were on 7-point Likert scales (7 being the highest), ranging from strongly dissatisfied to strongly satisfied.

5. Perceived psychological needs satisfaction- Measured the level of needs satisfaction as perceived by the volunteers. The six items in this scale were adapted from Psychological Need Satisfaction in Exercise scale (PNSE) by Wilson et. al. and included two questions to measure each of the three SDT constructs of autonomy, competence and relatedness (P. M. Wilson et al., 2006). The responses to the questions were on 7-point Likert scale (7 being the highest), ranging from strongly disagree to strongly agree.

The survey contained six open-ended qualitative questions (including a final question) in order to obtain a nuanced understanding of volunteer experiences, expectations, identity and meaning-making through this form of volunteering.

1. Please describe your most memorable experience using an online dementia research platform.

2. Please describe your most memorable volunteering experience for other volunteering activities. Tell us what motivates you and what your experience is like.

3. Please tell us the reasons you have chosen to volunteer through online means.

4. Please tell us about the experience of using online technology for volunteering. Feel free to elaborate on your experience as much as possible (e.g. how easy/difficult it was, what features/services appealed to you, what made you leave or come back to the website/app, or how the experience compared to other types of volunteering).

5. Please describe your reasons for volunteering for dementia research in your own words. Feel free to elaborate on as many factors as you like.

6. What could help you in using dementia research platforms in the future and make your participation easier?

While the survey scales provide a measure of volunteers' perceived motivation, wellbeing and psychological need satisfaction, the open-ended survey questions are designed to gain meaningful information about participant values, identities, and experiences. To be able to answer our research questions, we aim to make connections between the two forms of obtained data. For example, motivation scales provide a classification of volunteer motivation in a science-based research program which can then be compared to volunteer motivations in other programs such as education programs (K. Naqshbandi et al., 2021). We hope that by making such connections and comparisons, we can provide directions for designing better volunteer experiences in similar platforms in the future.

5.3.3 Data Analysis

Data was collected over a period of 10 months starting from October 2019 to August 2020. The qualitative data provided deep insights into participants' volunteering on StepUp for Dementia Research and in general. Complementing the qualitative data was the quantitative data collected through rating scales, which established measures of participant wellbeing, motivations and expectations, adding more nuance to the overall findings. All quantitative survey data was analysed using SPSS and Microsoft Excel. The analysis included summary statistics of measures in the five sections of the survey. For reporting the scores of the standardised scales which included the volunteer motivation scale, wellbeing scale and perceived psychological needs scale, we used medians instead of mean, due to the asymmetry of data. We also performed a non-parametric correlation analysis to understand how investment in volunteering (hours of volunteering) is linked to types of motivation, psychological needs satisfaction and perceived wellbeing. Descriptive analysis of volunteer demographics and volunteering history aimed to make visible potential issues of diversity and group representation. Together, the knowledge produced reveal a number of avenues for understanding and improving volunteers' motivation and wellbeing. The findings from quantitative analysis were then paralleled with qualitative findings through thematic analysis, to elucidate what the volunteer experiences and expectations entail, highlighting their motivations and needs, answering RQ1. Additionally, we located a number of volunteer identities based on how they draw meaning from their participation to answer RQ2.

A thematic analysis was performed based on an inductive (bottom-up) approach following the 6-steps outlined by Braun and Clarke (2006): (i) gaining familiarity with the data; (ii) generating initial codes or labels; (iii) searching for themes or main ideas; (iv) reviewing themes or main ideas; (v) defining and naming themes or main ideas; and (vi) producing the report. The codes and labels were first generated by the first author, then reviewed together with the third author before refining and finalising the themes together (Braun & Clarke, 2006). It took a total of four rounds of analysis to finalise the codes and the resultant themes.

In the initial round of thematic analysis, we analysed the responses to each qualitative question separately using a bottom-up analysis. After two rounds of thematic analysis, we found that there was a notable overlap in the codes and themes generated across the responses of the six questions. For instance, the codes 'Family relevance', 'Personal relevance', and 'Helping others', amongst others were repeated

in all questions. Therefore, we found it more insightful to merge all the responses to create a holistic understanding of the experiences, expectations and values of the volunteers. Therefore, our final themes represent responses to all open-ended questions.

A number of codes and themes we identified reference the practicalities in the form of enablers and impediments surrounding volunteering work of the participants. As an example, we identified codes such as 'Provide variety of participation options', 'Lower the barrier for participation' and 'Time-based flexibility' where participants expressed a desire for having more flexibility in terms of the technology, applications and time in order to be able to volunteer regularly. This was categorised under a 'Flexibility in participation' theme. Importantly, this type of finding shows that science-based volunteering can be paralleled with other forms of digital volunteering, such as on education focused platforms in our previous work where volunteers desired flexible platforms to balance volunteering and non-voluntary commitments and roles (K. Z. Naqshbandi et al., 2020a). This is important because our study is among the first studies to frame and term participation in scientific inquiry through digital platforms as volunteering. The implication of this finding is the wealth of design strategies that can be then used to enhance science-based volunteering. These are later discussed to answer RQ3.

Finally, codes that captured volunteer identities based on their values highlight how they derive meaning through volunteering work. For such codes, the latent meaning was interpreted by the first author based on the underlying values and concepts. For instance, the codes 'collaborate with others', 'meet others with similar experiences' and 'build a community with others' were interpreted to surface volunteers desire for connections and characterise an identity labelled 'I connect with others'.

To address the two broad groups of themes mentioned above, we finalised the themes along the lines of participation enablers and impediments and volunteer identities. We will describe these themes interspersed with quotes from the participants in the next section.

5.4 Results

A total of 307 submissions were recorded. Out of these, 266 submissions were complete and used for analysis. We will detail the descriptive analysis followed by the thematic analysis.

5.4.1 Demographics

The average age of the participants was 61.15 years and the median age 64. Table 5.1 shows the frequency distribution of the participants' age groups.

Tab. 5.1: Age distribution of the participants

Age range	Frequency	Percent
18-19	1	0.37
20-29	6	2.25
30-39	13	4.88
40-49	18	6.76
50-59	63	23.68
60-69	98	36.84
70-79	57	21.42
80-89	10	3.75

In terms of gender, 77.4% of the participants self-reported as females and 22.6% as males. None of the participants selected 'other' for gender. It should be noted that participants were given the option to specify their gender identity in a text field if they chose 'other'.

In terms of ethnicity, most of the participants identified themselves as English (57%), followed by Irish (12.7%) and Scottish (12.4%). Table 5.2 shows the frequency and percentage distribution of the ethnicity of the participants.

Some (n=58) participants specified their self-identified ethnicity, out of which 24 included variations of Anglo-Australian, 20 more used European and other ethnic identifiers commonly associated with the Global North such as Swiss, Welsh, Spanish, Slovenian, Canadian. The remaining 34 participants specified ethnicity associated with the Global South such as Zimbabwean, Colombian, Indian, and Taiwanese.

Tab. 5.2: Ethnicity distribution of the participants

Ethnic Background	Frequency	Percent
Australian Aboriginal or Torres Strait Islander	12	3.96
Chinese	6	2
Dutch	8	2.6
English	175	57
German	14	4.6
Greek	4	1.3
Hong Kongese	3	1
Indian	2	0.7
Irish	39	12.7
Italian	8	2.6
Malaysian	4	1.3
North American	4	1.3
Scottish	38	12.4
South African	2	0.7
South Korean	1	0.3
Singaporean	1	0.3
Other	58	18.9

Participants specified their highest level of education attainment as post-graduate (30%), followed by bachelors (27.4%) and diploma (17.7%). Table 5.3 shows the frequency and percentage distribution of the education attainment of the participants.

Tab. 5.3: Distribution of the highest level of education attainment of the respondents

Education	Frequency	Percent
Post-Graduate	82	30.8
Bachelors	73	27.4
Diploma	47	17.7
High School	33	12.4
Graduate Certificate	16	6
Other	15	5.5

In terms of employment status, a majority of the respondents were retired (51%), followed by employed (40.6%) and other (5.3%). Table 5.4 shows the frequency and percentage distribution of the employment status of the respondents.

Tab. 5.4: Distribution of the employment status of the respondents

Employment Status	Frequency	Percent
Retired	136	51.1
Employed	108	40.6
Other	14	5.3
Student	13	4.9
Unemployed	5	1.9
Looking for work	2	0.8
Unable to work	3	1.1

5.4.2 Volunteering history and engagement metrics

In total, 32 (12%) of the 266 participants had a history of prior or ongoing partici-
pation in dementia research supported by various online platforms. In addition to
StepUp for Dementia Research, examples include research platforms such as the
Healthy Brain project (https://www.healthybrainproject.org.au/), Maintain your
Brain (https://www.maintainyourbrain.org/) and online courses (MOOCs) to learn
about dementia and dementia research such as the one supported by the University
of Tasmania (https://www.utas.edu.au/wicking/preventing-dementia). Participants
reported spending an average of 11.3 hours (SD=27.25) and median= 2 hours
on online dementia research in the last 12 months. Some 114 (57%) participants
performed other forms of volunteering (either online or face-to-face) for an average
of 157.45 hours (SD=274.80) and median=60 hours in the last 12 months. Out
of these 114 participants, 41 (15.4%) reported having used technology such as a
website or an app for volunteering.

5.4.3 Volunteer motivation scale

On a 7-point Likert scale where 7 indicated the highest level of motivation and
1 indicated the lowest, participants reported high levels of intrinsic (Mdn=6),
integrated (Mdn=7) and identified (Mdn=6) motivations, while as moderate to low
levels of introjected (Mdn=3), external social motivations (Mdn=2) and amotivation
(Mdn=1).

5.4.4 Wellbeing scale

On a 7-point Likert scale where 7 indicated the highest level of satisfaction with domains of subjective wellbeing and 1 indicated the lowest, participants reported high levels of wellbeing measures in all aspects of their lives specified on the 7-point rating scales; standard of living (Mdn=6), health (Mdn=6), achieving in life (Mdn=6), personal relationships (Mdn=6), safety (Mdn=6), feeling a part of the community (Mdn=6), and future security (Mdn=6).

5.4.5 Perceived psychological needs satisfaction scale

On a 7-point Likert scale where 7 indicated the highest fulfillment of perceived psychological needs and 1 indicated the lowest, participants reported high levels of perceived satisfaction with fulfillment of their psychological needs of competence (Mdn=6), autonomy (Mdn=7), and relatedness (Mdn=6).

5.4.6 Correlations

To explore associations between various variables in our survey, we used Spearman's rho non-parametric correlation analysis. For the sake of brevity and specificity, we will discuss only the significant correlations between motivation, wellbeing, perceived psychological needs, and hours of volunteering which will help us explore associations of wellbeing with experiences, motivations, and needs of volunteers as mentioned in our first research question (RQ1).

Results of a bivariate Spearman correlation indicated significant strong positive correlations between integrated motivation and autonomy($r(266) = .224^{**}$ p = .0001), integrated motivation and competence($r(266) = .185^{**}$ p = .002), integrated motivation and relatedness($r(266) = .295^{**}$ p = .0001),integrated motivation and wellbeing($r(266) = .224^{**}$ p = .0001), intrinsic motivation and autonomy($r(266) = 0.179^{**}$ p = .003) , intrinsic motivation and competence($r(266) = 0.162^{**}$p = .008), intrinsic motivation and relatedness($r(266) = .305^{**}$ p = .0001), identified motivation and relatedness($r(266) = .282^{**}$, p =.0001), wellbeing and autonomy ($r(266) = .227^{**}$ p = .0001), wellbeing and competence ($r(266) = .242^{**}$ p = .0001), hours of volunteering and intrinsic motivation($r(152) = 0.225$, p = .005),

	Hours	Intri	Integ	Ident	Intro	ExtS	Amot	Well	Comp	Aut	Rel
Hours	1.00										
Intrinsic	.22**	1.00									
Integrated	.11	.41**	1.00								
Identified	.23**	.50**	.70**	1.00							
Introjected	.14	.21**	.01	.07	1.00						
ExtSoc	.09	.13*	−.13*	−.04	.63**	1.00					
Amotivation	−.02	−.23**	−.29**	−.33**	.14*	.23**	1.00				
Well-being	.08	.13*	.22**	.28**	−.04	−.11	−.10	1.00			
Competence	.01	.16**	.18**	.26**	−.13*	−.12*	−.08	.24**	1.00		
Autonomy	−.08	.17**	.27**	.23**	−.03	−.04	−.12*	.22**	.35**	1.00	
Relatedness	−.04	.30**	.29**	.28**	.05	.03	−.14*	.14*	.26**	.34**	1.00

*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).

Fig. 5.2: Correlations for hours of volunteering, motivations, wellbeing, and perceived need satisfaction of the participants

and hours of volunteering and identified motivation(r(152) = 0.231, p = .004). Findings showed a significant positive correlation between intrinsic motivation and wellbeing(r(266) = 0.134* p = .029), and relatedness and wellbeing(r(266) = 148* p = .016).

Significant negative correlations were observed between amotivation and relatedness (r(266) = -0.149* p = .015), introjected motivation and competence (r(266) = -.132*p = .031), external-social motivation and competence (r(266) = -.123*p = .045), and amotivation and autonomy (r(266) = -0.123* p = .046). Figure 5.2 shows the correlation matrix displaying correlations between hours of volunteering, motivations, wellbeing, and perceived need satisfaction.

Qualitative questions from the survey	No. of responses	Avg. length	Std. Dev.	Min. length	Max. length
1. Please describe your most memorable experience using an online dementia research platform.	32	9.5	11.06	1	45
2. Please describe your most memorable volunteering experience for other volunteering activities. Tell us what motivates you and what your experience is like.	156	36.66	32.58	2	191
3. Please tell us the reasons you have chosen to volunteer through online means.	41	20.80	15.46	1	79
4. Please tell us about the experience of using online technology for volunteering. Feel free to elaborate on your experience as much as possible.	41	45.75	42.92	2	206
5. Please describe your reasons for volunteering for dementia research in your own words. Feel free to elaborate on as many factors as you like.	269	36.23	31.72	3	297
6. What could help you in using dementia research platforms in the future and make your participation easier?	266	17.09	17.43	1	119
	805			1	297

Fig. 5.3: Summarised information about the number of response statements for each question, average length of those response statements (displayed as word count), the standard deviation of those response statement length, and the minimum length and maximum length of responses statements for each question

5.4.7 Thematic analysis

A total of 805 qualitative response statements were generated from the 266 participants of the survey. Responding to the qualitative questions was optional, not every participant answered these qualitative questions. As a result, the total number of response statements is not the same as the total number of participants. Additionally, some questions were more readily answered or resulted in richer response statements, helping with conceptualising nuanced themes. For instance, there were 269 very nuanced response statements for question five about the reasons for volunteering in dementia research, mostly pointing to the importance of family and the volunteers' desire to contribute to future generations as important motives. Figure 5.3 shows a summary of the number and frequency of overall responses as well as responses to each question. The extensive responses and the rich and illustrative accounts of volunteer experiences that were generously shared by our participants provided a highly nuanced set of data the allowed us to identify the enablers and impediments surrounding volunteer participation as well as the current volunteer identities based on meanings derived through volunteering.

Participation enablers and impediments

Flexibility in participation. Participants acknowledged technology has expanded their volunteering opportunities in terms of contribution, learning, integration of operations, ease of organising action and reducing cost and efforts. Flexibility made their experiences engaging and was mentioned as an expectation as well. This included being able to choose what kind of technology they use for participation: *A phone call or Skype call or using Zoom for focus groups would suit me best as I'm working,* P71. *I do not have a camera for online chats so other electronic communication through forums, message boards or messenger services would help greatly,* P166. Tasks which had a low barrier to participation, i.e. did not require too much one-off investment were preferred: *Shorter burst to fit in with my busy life,* P234. Finally, flexibility in time, both in terms of duration of the tasks as well as being able to choose the time of participation, were considered conducive to their participation: *Flexible time commitments as I work, have teenagers and my available time fluctuates,* P24. *Great to filter amount of time willing to volunteer[...]* P21. Volunteers also asked for flexibility and consideration of their time and efforts in hybrid volunteering, especially, when travel is involved: *Some type of compensation for my time would be ideal. I am happy to volunteer, but I can't afford to pay for transport/parking,etc. I would love to get another job but at the moment I have undiagnosed health issues that hinder my ability to work long hours,* P126.

Clear information and communication. Participants suggested that minimising ambiguity in information and communication improves their motivation. This may be even more important in science-based research that follows a rigid protocol to maintain data quality and research integrity. Participants referred to aspects of user experience such as easy access to help and learnability, as well as communication aspect of volunteering platforms such as notifications about upcoming or existing volunteering opportunities: *If they can email me of any new study with ample notice. I just finished this and another survey but when I received the deadline was over. I tried and managed to get through,* P301. Participants also desired adequate notice or reminder for each volunteering opportunity: *I just need notice, I'm a full time student working part time as a nurse plus caring for my mum. If I can get adequate notice of upcoming events/surveys/testings I just need to be able to lock it in early. I want to be as of much assistance as possible,* P286. *All I require is a week or two warning for any activity,* P210. This also extended to access to diverse promotional channels to inform potential suitable volunteers: *I actively searched for a way to help with dementia research and found you. Other people might be happy to be involved but not*

know about you, P155. This could involve expanding the mediums of communication to reach a wider pool of potential volunteers: *Last time I was a research participant I accidentally heard about it on the radio[...]* P166.

Finally, participants specified adequate information about the research protocol including how their data or specimen was collected and stored: *[...]I would like to have known more about the data storage plans. (i.e. how safe is it, how long do you store my data, etc). As a general public, there is uncertainty in regards to the data/biological samples collected, and this is a deciding factor for me whether to participate or not- especially if I was giving confidential information [sic]* P295.

Impact of digital divide. The results provide a lens into the many ways that the participants are digitally marginalised, highlighting the potential for addressing the digital divide in science-based volunteering platforms. Some participants wished for better technology and internet: *A good NBN [National Broadband Network] connection, but I guess that will be one of those things outside your and my circles of influence. ;)-* P31. Other participants expressed frustration over challenges to perform online tasks because of their limited technological abilities: *My computer literacy is very limited. Before I can complete this survey I have great difficulty in opening the link[...]* P233.

Many of the registered volunteers with the program are older adults (see Table 1 for age distribution of participants). Participants noted the impact of age on their technology use: *Not complex digital, older people not as at ease with apps etc.[sic]* P29. A few participants found their various physical and cognitive disabilities impede their technology use: *To get someone else to do it [volunteering tasks] for me because I can't write and read anymore,* P32; *Please note that most people with dementia don't check emails regularly[...] The concept of information being held online is not useful for us[...] And self service is the same as no service I'm afraid,* P283.

A number of participants reported on the impact of geography on participation: *Distance will always be an issue, but people living in rural remote [areas] have unique issues that should be included in research,* P279. Finally, participants felt less motivated to participate in online science-based volunteering when they faced a lack of understanding of their culture and values particularly relating to non-Western and non-Anglo cultures: *I had a negative experience with a survey on aging and diet, because the platform did not accommodate non-European ways of*

Volunteer identities	How volunteers derive meaning	Example quotes
I am a learner	Through personal growth and learning via volunteering	"I find this area of understanding of what happens to the mind extremely interesting and would like to understand it better." P121.
I create impact	Seek achievement by making a difference and bring positive change via volunteering	"When we go most weeks to spend time with them - singing, listening to a talk and discussing, to see the appreciation and change in the women's lives is rewarding for me[…]." P291.
I connect with others	Foster new, deeper connections via volunteering	"Meet others in the 'same boat'" P94.
I build on familiarity	Volunteer by building on familiar social institutions that enrich my life (family, faith, work & school)	"I am motivated by a Christian faith and a desire to help others." P250.
I care about my legacy	Volunteer to create a better future for others	"Motivation for me, is more about planting the tree that I will not enjoy the shade of. It's not about accolades or certificates or badges, never has. It's about informing and educating for the future." P33.

Fig. 5.4: Tabular view of volunteer identities, how volunteers derive meaning from volunteering and corresponding quotes from participants supporting those identities

eating[…] Research projects that do not presume an Anglo cultural background [participant's suggestion for improvement], P68.

Volunteer identities and meaning-making

In total, five types of identities were identified. These are summarised in Figure 5.4, where for each identity, we provide a descriptive archetype (e.g. I am a learner), a description of how meaning was generated and attributed to that identity followed by exemplifying quotes from participants. These are described as follows.

I am a learner. Participants suggested they volunteer to learn new things that help them grow intellectually: *I find this area of understanding of what happens to the mind extremely interesting and would like to understand it better,* P121. Some were happy with being a research participant as long as it helped them learn: *More time to involve myself in projects I find interesting i.e. conservation and human health without being the one to take responsibility for successful completion of a study or project - just being a participant and gaining some knowledge about my own health[…],* P132. They also mentioned other dimensions of growth through participation based on their past and current experiences, concerns, as well as their perceived identity: *Some of my younger relatives have suffered from dementia, and I have already been diagnosed as having a Mild Cognitive Impairment, so I would like to gain as much insight as I can about new initiatives and theories about the treatment of, and prevention of, dementia,* P110. *I participated in a tape recording in Chinese*

language re elder abuse information which will be launched by the Government. I am a member of the the Northern Settlement Group which supports the retired Chinese migrants in Newcastle[...] It was challenging but good experience,[sic] P233. Participants mentioned how volunteering helped them use their existing skills or keep their minds active and gain confidence: *I have a health sciences background and am ageing myself. I like to keep up to date and find ways to age gracefully*, P50. This aspect especially stood out as a motive after significant life events such as retirement: *Being a Board Member and suggesting ways to update the methods of contacting the members. I enjoy being in the workforce again,* P134; or having been diagnosed with cognitive impairment: *Being included even post dementia diagnosis... I'm motivated by using the talents I still have left,* P103.

I create impact. Participants desired *making a difference*, P102, or *giving back to the community*, P72. They achieved this by investing in programs that they deemed worthwhile such as nature conservation projects, like *repairing bushland,* P113, research projects such as *health and wellbeing,* P19; or by helping the disadvantaged communities such as refugees: *Working for a case where we helped Afghan refugees prepare for DIMEA [Department of Immigration and Indigenous Affairs] interviews,* P14; Australian First Nations people: *Working with First Nations people to try to recover some of their stolen wages. I never had my wages stolen,* P292; and those who are incarcerated: *Kairos Prison Ministry: when we go most weeks to spend time with them singing, listening to a talk and discussing, to see the appreciation and change in the women's lives is rewarding for me[...],* P291, amongst many others.

Participants expressed satisfaction in feeling the impact of their work via some indicators such as: *seeing joy on others' faces,* P170; *seeing an important organisation grow,* P50; or *receiving feedback from the researcher/organisation,* P103. Participants also mentioned how helping elevated them personally: *A warm and fuzzy feeling that I've made someone's day, that I've helped the planet, just made the world a better place for one teeny, tiny moment,* P209. It improved their sense of self-worth and made participants feel needed: *I am motivated by the feelings that come from giving. A personal and ongoing sense of worth that comes from sharing,* P123. *We enjoy doing this as it gets us out and helps my self esteem, it give me a purpose,* P163. Conversely, lack of appreciation was termed as "emotionally draining", P206, and could possibly lead to volunteer disengagement.

I connect with others. Our participants expressed interest in collaborating with other volunteers based on their shared interests: *It's great to be with like minded*

people helping a cause that matters, P274. Connecting with others over shared experiences such as dementia diagnosis or caring for relatives with dementia was meaningful to participants, where volunteering helped the participants to *meet others in the same boat,* P94. Additionally, participants wished to get to know the researchers who they perceived to be in a position of authority, suggesting that the researchers should build confidence and trust with them: *Answering questions from researchers who seem to know what they are doing,* P60. Importantly, participants desired to build a community which included the researchers: *Maybe an annual event where participants could network with the researchers would be a nice way to build community*, P148.

I build on familiarity. Volunteers were keen to learn new things via their roles, but at the same time, they mentioned how the inspiration or pathway for volunteering came from already existing and familiar social institutions. Some of these were selected because they were within participants' comfort zone. This included work: *I have worked as an Occupational therapist for many years in aged care and the last few years specifically with people who have dementia,* P21; and education: *I am a medical student with a strong interest in neurology and I find the lack of hope for people with neurodegenerative disorders, due to lack of disease modifying therapy, absolutely outrageous. I want to play whatever part I can in fixing this,* P196. Other participants identified with social institutions that were a source of support for them. These included family as a pathway for volunteering, whether it was volunteering for children's schools, clubs, or programs: *Volunteering as a Cub Scout leader - it was hard work!* P24; or volunteering because they witnessed their family member go through a health challenge: *Father has Lewy Body Dementia. As the child of someone with dementia, I believe I should be involved in dementia research,* P15. Some participants engaged in faith-inspired volunteering: *I visit the residents at the local Aged Care facility, I help out at Scope and I assist at a Community Kitchen. I am motivated by a Christian faith and a desire to help others,* P250. Among this group of participants, some mentioned their faith-based institution helped to facilitate volunteering: *We held a cake stall organised though my church to help raise money for leukaemia,* P107. Thus, using familiar social institutions that the volunteers identify with seem to play a role in adding meaning in their lives.

I care about my legacy. Many participants volunteered knowing that their work would not necessarily benefit anyone from their own generation: *Motivation for me is more about planting the tree that I will not enjoy the shade of. It's not about accolades or certificates or badges, never has. It's about informing and educating for*

the future, P33. Many mentioned they want their work to *help future generations,* P1. Participants referred to motivation to contribute to *science,* P67; *medical science,* P200; or a community they identified with. In a way, they wanted their volunteering to transcend time and build a legacy. Often, but not always, the comments that suggested caring for their legacy were accompanied by participants recalling some traumatic event that occurred in their lives such as them or their loved ones getting afflicted with neurodegenerative disorders. Voluntary participation in science-based research seemed to provide catharsis for participants by helping them understand the science behind their personal experiences. Participants viewed this as taking proactive steps towards finding a solution for others who share that experience in the future. This helped participants construct something positive from adverse events in their lives and extend their legacy.

5.5 Discussion

Our study revealed that science-based volunteering is nuanced and complex, with motivations beyond simply advancing science. In this section, we discuss our findings in relation to volunteer motivations, needs, future expectations and wellbeing (RQ1). This is achieved by examining the measures based on wellbeing, motivation and psychological needs satisfaction scales and putting them in the context of participant comments and their demographics. Further, our thematic analysis presented earlier uncovered the identities based on participant values and motivations through which volunteers derive meaning from their work (RQ2). While these identities do not serve as an assessment tool such as those provided in theories like SDT, they allow us to conceptualise the design and ideate design strategies for science-based research volunteering platforms. Accordingly, throughout the discussion section, we specify how understanding the above can help improve volunteer engagement and experiences with digital platforms for science-based research. We then propose a set of recommendations and design strategies (RQ3). For example, our research findings suggest many older adult participants have the desire and ability to contribute to science-based research and even learn new things through their volunteering. Yet, despite their cognitive resources, their participation is impeded by the digital divide or barriers to inclusion of linguistic needs, cultural values and identities. We further explore our finding in this section to show the importance of recognising that privileged and marginalised identities in volunteers can exist side by side. Finally, we propose how future research can be tailored to capture more diverse voices through

better study design, e.g. by considering resources for participation by proxy. The first three discussion sections correspond to the first three subsections in our related work, to emphasise our empirical contribution to the existing knowledge. The final section of our discussion presents a summary of eight design strategies to enhance volunteer experience and wellbeing on science-based research platforms.

5.5.1 Mapping the divide

Our thematic analysis shows that participants were aware of a notable digital divide in science-based volunteering. Digital divide is the varied use of technological resources demarcated along socio-economic lines (Gunkel, 2003) that lead to disadvantaging some user groups. Further, research on this topic suggests that exclusion can be linked to many domains. The Australian digital inclusion index outlines digital divide for people in Australia due to (i) access to internet, technology, data; (ii) affordability; and (iii) digital ability which includes attitudes, capabilities and skills (C. K. Wilson et al., 2019). The ways that some participants felt excluded (outlined in section 4.6.1) also concurs with the categories specified in this index.

The findings also show that the demographic data is highly skewed towards participants from an Anglo background, a majority of them females, retired, and highly educated. Participants were aware of the limited cultural diversity and commented on the lack of representation of cultures and values of non-Anglo volunteers in scientific studies. Recent research also points to the lack of cultural diversity in dementia research in general, and specifically dementia research on online platforms (Jeon et al., 2021). Jeon and colleagues noted that communities such as Australian Aboriginal and Torres Strait Islanders who would benefit from dementia research, given the high prevalence of dementia in these communities, remain significantly underrepresented in online platforms. This was true for many other culturally and linguistically diverse (CALD) communities as well (Jeon et al., 2021). While comments on cultural disparities in our survey responses were not frequent, we note this may demonstrate a self-selection bias where disengaged groups do not participate in research on science-based platforms and therefore their needs and values do not surface in research findings. This could be considered a limitation in our study, which we aim to address in the future through engaging with the participant cohort in more reflexive and participatory ways and creating safe spaces for a diverse group of (potential) volunteers. We propose that online volunteering platforms would benefit from such plurality focused considerations.

A major issue that arises specifically for culturally and linguistically diverse (CALD) online volunteers is the issue of science communication and translating scientific concepts. While language has been mentioned as a barrier to inclusivity in online volunteering (Cravens, 2006), it becomes even more pronounced in science-based research volunteering. English, being the current International Language of Science (ELIS), encapsulates complicated cerebral concepts in unique ways that might not readily exist (or have been developed yet) in other languages (Tardy, 2004). This may result in a knowledge gap due to inadequate vocabulary to capture research concepts. For instance, in their research on medical ethics in Eastern Africa, Graboyle captures medical researchers' quandary with a not-so-hypothetical scenario where they have to translate concepts such as 'experimental medicine' into the Swahili language. (Graboyes, 2015). The issue also extends to field-specific vocabulary which might be challenging to understand even in the English language. For instance, in our previous research on a volunteering platform for medical education focused volunteers found medical student assessment to be ambiguous and difficult to understand because of the specialised vocabulary and pedagogical terminology used in the assessment rubric (K. Z. Naqshbandi et al., 2020a). This issue would be potentially compounded for volunteers with intersectional and marginalised identities, e.g. volunteers with limited technology skills as well as English language communication skills.

Our finding highlighted the importance of *enhancing information and communication* for engaging volunteers. This would result in clear and unambiguous communication that improves volunteer experience in general, but more specifically it could improve the experiences of those who have accessibility and other specific needs as was indicated by many participants. Based on our findings, design strategies could focus on having regular desired notifications or reminders with ample notice for when a new relevant opportunity is available. It could also focus on providing information when needed (e.g., 'FAQs' option), and tailoring the learnability of the platform to suit the demographics, e.g. by adequate training and onboarding mechanisms.

Ambiguous communication and lack of culturally and linguistically diverse options can also deter engagement for those who are underrepresented on digital research platforms such as many CALD groups as indicated in our findings. Previous research has shown that many culturally marginalised groups are vary of participating in science-based research volunteering because of the harm caused through the research process when their specimen, data, or artefacts are used without their consent (Scharff et al., 2010). To address this issue in the design of online platforms, we suggest *building more language options in the volunteering platforms* which could

help with adequate clarification of the research protocol for these participants. In addition to providing language options, strategies that include language accessibility features e.g. translation and definition would be useful in this regard. Additionally, language support options that involve getting help from skilled staff in addition to 'Help' and "FAQs" features could be useful.

Our findings confirm that volunteers in science-based research programs intimately experience challenges outlined by the latest Australian Digital Inclusion Index that highlighted a steep divide between rural vs non-rural Australians due to issues of internet access, infrastructure, and geographic remoteness (C. K. Wilson et al., 2019). In general, this issue is also relevant to volunteer participation in the Global South and places where inadequate or restricted access to technology, infrastructure and resources could be a barrier. Possible solutions may lie in *improving flexibility of participation* by providing a range of technological options and channels, and the time and duration of volunteering. This is also important in order to accommodate volunteering with the other priorities and circumstances (work, family, health, accessibility, etc), thus making volunteering more accessible to a wider range of people in life as was mentioned by some volunteers. Based on our findings, design strategies include increasing the options for technology such as allowing a variety of devices, applications. Flexibility in terms of scheduling the volunteer tasks (e.g. flexibility in booking appointments) and duration of the volunteer tasks (e.g. breaking volunteer work into smaller tasks) is also desirable. Mapping the digital divide could also require providing a choice to volunteer face-to-face or digitally, thus providing flexibility by using a hybrid volunteering model. An important aspect of approaching this issue is to acknowledge that over-reliance on digital solutions may not always suit the populations that we want to include in such volunteering endeavours. Therefore, socio-technical investigations should allow alternate ways of being and knowing where the resultant solutions focus on the people rather than the technology (Milan, 2020).

Our experience in conducting the study also touched upon the importance of supporting proxies for participants that may not be able to perform the research tasks independently on their own. Some participants required assistance to perform research tasks for a variety of reasons, such as their old age, physical mobility issues and neurological or neurodegenerative disabilities. The contact researcher (first author) received a few enquiries from relatives of potential survey participants about this issue. While working with proxies has received much attention in medical research (Overton et al., 2013; Sugarman et al., 2007), we focus on the socio-technical aspect of it. Dai and Moffat have outlined guidelines for socio-technical research

with proxies in dementia care, including careful consideration from research design to data interpretation to avoid proxies overshadowing the voices of the vulnerable participant (Dai & Moffatt, 2021). For our study, we faced a few challenges. First, we did not have the resources to support proxy participants. Further, our research design and ethics approval did not extend to including responses completed by proxy participants. Finally, our data collection was completed in 2020 after the COVID-19 pandemic hit, resulting in limited opportunities to meet with participants face-to-face. Thus, we had to turn down those requests. We recommend these considerations for improving inclusivity in future research involving similar socio-technical systems and research participants who may need proxies to assist with research task completion.

5.5.2 When social is personal: Construction of a 'good' identity

Data obtained through the motivational scales in our survey shows that participants regard their volunteering participation as good social conduct. Integrated and identified motivations that are linked to prosocial values in volunteering (A. M. Grant, 2007; K. Z. Naqshbandi et al., 2020a), scored very high, with integrated motivation scoring higher than even intrinsic motivation. However, the thematic analysis revealed that values that focus on benefiting the self frequently accompanied those that focus on benefiting others. For instance, the desire to benefit others was often paired with the immediate and larger concern for one's own health and family. Participants frequently mentioned "doing good", "giving back" and "making a difference", which are expressions commonly associated with prosocial behaviour such as volunteering and charity (D'Archangelo, 2009; Germann Molz, 2017). While it is meaningful to capture the perspective of the volunteer, the volunteer's social circles (e.g. family, work, school), and the organisations/platforms that facilitate volunteering, it is also important to understand the wider social construction of volunteering. This construction is shaped by the various altruistic notions surrounding volunteering and charity work and linked to socio-political and moral discourses that situate volunteering as a culturally and socially valuable act (Evans & Lewis, 2018).

As an example, government social policies in many countries, such as Australia (Department of Social Services, Australian Government, 2021; of Foreign Affairs and Trade, 2021) and the UK (Holmes, 2009; Hutchison & Ockenden, 2008), promote volunteerism through civic engagement discourses. Likewise, the altruistic aspects

of volunteering are highly regarded in several religious traditions, such as *'the Good Samaritan'* in Christian tradition, *'Sadaqah'* in Muslim tradition, *'Seva'* in Sikh tradition, and more. Many of our survey participants also self-identified with some form of higher calling as their inspiration or pathway to volunteering, some based on interest (passionate about *'science'*, *'medical science'*) and others based on religion *(service to 'God', 'Church'*). We propose that by understanding these wider social discourses and capturing how they contribute to the values and motivations of volunteers, we can improve volunteer engagement and experience in science-based programs. For instance, some of our participants lamented not knowing online science-based research volunteering programs that may interest them. Broadening the promotion and communication channels for such programs and reaching out to and *involving institutions that help shape the volunteers' identities and motivations, such as religious institutions, and value-based non-governmental organisations*, may be useful. The lack of inclusiveness of identity-shaping entities and values, specifically those concerning faith, religion and spirituality in HCI with respect to the design of volunteering platforms has been noted in our previous work (K. Naqshbandi et al., 2022). Strategies that focus on highlighting collaborations with these and other relevant institutions, people, and influencers in promotional campaigns for the volunteering program as well as within the platform could help indicate involvement and building trust, thus, attracting potential volunteers.

5.5.3 Wellbeing of science-based research volunteers

Previous research established that frequent face-to-face volunteering is associated with wellbeing (Creaven et al., 2018; Musick & Wilson, 2003). Our findings suggest this to be true in this instance as well, showing that online science-based research volunteering also follows this pattern. In their written statements, our participants described how helping others brought about intense feelings of happiness, which the literature terms as the Helper's High (Dossey, 2018) with immediate wellbeing impact on volunteering. This is also demonstrated through high scores of wellbeing, motivation and psychological needs satisfaction and volunteering efforts (hours of volunteering) of our participants.

Our correlation findings show many positive correlations of intrinsic, integrated and identified motivations with wellbeing and perceived psychological needs (as seen in correlations between intrinsic and autonomy, intrinsic and competence, intrinsic and relatedness, integrated and autonomy, integrated and competence, integrated

and relatedness, and identified and relatedness). The findings therefore suggest that while internal regulation is key to volunteer engagement because of its intrinsically pleasurable aspects, prosocial value-based regulation for volunteering could also enhance volunteer wellbeing. Internal and value-based regulation are also associated with the efforts that individuals put into volunteering evidenced by both intrinsic and identified motivation being strongly associated with hours of volunteering. Such finding implies that in addition to supporting intrinsic motivation through strategies for enjoyment of the task itself, supporting volunteers' prosocial value-based motivation and identities identified in this study (see sections 5.2.1 about supporting volunteers' prosocial identity and 5.4.7 about identities and meaning-making), are central to supporting their sustained engagement and wellbeing. For instance, volunteers identified with creating impact which indicates that *showing volunteers desired achievement indicators such as their prosocial impact* on others could improve their wellbeing. These have implications on how we can design digital platforms. For instance, we could include feedback and acknowledgement features that allow volunteers to observe positive changes associated with their individual or collective volunteer work. Common gamification mechanisms and other methods could be used strategically to achieve this.

Our findings demonstrated very high participation of females in this platform as compared to men and other genders, which adds a gendered layer of participation in this and some other online volunteering platforms (K. Z. Naqshbandi et al., 2020a). Previous research has acknowledged the wellbeing focused design opportunities that arise with gender distribution being skewed towards females in some online volunteering platforms which includes sufficiently addressing the relatedness needs and addressing the emotional labour of volunteers (K. Naqshbandi et al., 2021).

The results also highlighted that most volunteers registered with the dementia research platform are educated and many of them are retired. This demographic information turned out to be quite important as comments by participants revealed they thrived by putting their cognitive reserves and knowledge into good use after facing life-changing events such as retirement or getting afflicted with neurodegenerative disease. Legacy building, specifically after facing adversity or life-changing events, as mentioned in our results, is shown to be a way of passing and honouring one's essence, particularly one's values and beliefs (Hunter, 2008), and an intrinsic motivation to create meaning for individuals confronting their own mortality (Cozzolino & Blackie, 2013). Prior research suggests that helping others based on one's own adverse experience facilitates creating meaning out of adversity by building a legacy and thus, constitutes an essential step towards maintaining one's own wellbe-

ing (Hughes, 2016; Linley & Joseph, 2011). The value of relatedness has already been outlined as a design opportunity in our previous work on online volunteering on a medical education platform (K. Naqshbandi et al., 2021; K. Z. Naqshbandi et al., 2020a; K. Z. Naqshbandi et al., 2020b). Our study revealed that volunteers in science-based research programs wanted to be able to *foster a community of peer volunteers* based on shared experiences to improve their engagement. Based on our findings, community building for volunteers could consider similar volunteer identities in terms of adverse (or general) life experiences such as retirement, being a dementia survivor, etc. This could also include identifiers such as culture, prosocial cause that they are passionate about, or educational and other interests. Design strategies that focus on community building such as forums and direct and indirect ways of communication such as chat could be beneficial for this. Broadening the community to *include researchers and scientists* as indicated in our findings would also help with improved communication and building trust with the program in general in addition to fulfilling the need for relatedness. In addition to chats and forums, community-building strategies that feature researchers and highlights their work could contribute to fulfilling relatedness by giving a face to the program as well as build trust with the researchers. Our findings also extend previous work by Wald et al. on online citizen science volunteers who suggested designers to consider issues beyond usabilty and examine the contextual factors to tap into the 'cognitive surplus' of volunteers (Wald et al., 2016). We propose that designers of science-based research platforms such as StepUp for Dementia Research should consider tailoring strategies that support volunteers' wellbeing through opportunities to engage and sharpen their cognitive reserves and skills. For instance, our participants expressed a desire for additional resource that enhance their learning and education about dementia care and related topics (see identity claim "I am a learner"). Thus, design strategies that *include learning and educational opportunities* for volunteers would help in their engagement. Design features that support this could focus on learning and providing information about relevant learning opportunities, causes and associated information such as associated wikis, webinars, informational blog posts, etc.

5.5.4 Recommendations and design strategies

We propose eight design recommendations to support volunteer motivation, identity and meaning in life on science-based research platforms that contribute to the three research aims outlined in 1.5. Figure 5.5 summarises the recommendations, the

rationale for the recommendations, and some examples of design strategies that correspond to these recommendations for science-based research volunteering. The recommendations are based on the clear findings in the results and discussion section where the rationale is based on improving aspects of volunteer motivation, identity and meaning in life. We also give examples of the design strategies to highlight how these design recommendations can be translated into actionable measures and features. The corresponding strategies are based on (i) suggestions by research participants, and (ii) existing design knowledge in literature and design practice.

Enhancing information and communication standards to improve clarity and reduce ambiguity could include regularity in conveying information through reminders and notifications, options that provide easy access to help such as FAQs, and supporting learnability through features such as tutorials. We elaborated before on the need for *increasing language diversity* to improve representation of various cultural groups which can be achieved through using language accessibility features, live chat, Help and FAQ features. We also recommend *improving flexibility of participation* by providing various options in terms of technology, time and scheduling, and giving a choice to volunteer face-to-face or online where required. This would act as an enabler of online volunteering by taking into consideration the available resources and life circumstances of the volunteer. We also recommend *involving identity building social institutions* which can be achieved through strategies such as engaging with and highlighting collaboration with influencing value-shaping institutions and people. In order to highlight their achievement and contribution to the cause, *showing the impact of volunteer work* is also recommended. This could be achieved via feedback and acknowledgement features such as those found in gamification mechanisms. *Fostering a community of volunteers* is recommended to engage them through shared experiences through community features such as forums, chats, etc. Similar design strategies that involve direct and indirect communication are also applicable to enable *building relationships with researchers and other key members* involved in the program to build trust and resolve issues of science communication. Finally, *including educational and learning opportunities* is important to engage those who volunteer for growth and learning. Examples of corresponding design strategies include including wikis, webinars and informational blog posts.

Recommendation	Rationale	Design strategy examples
Enhance information and communication	To provide clarity and reduce ambiguity	Regularity (e.g., reminders and updates), easy informational access (e.g., Help and FAQ), learnability (e.g., tutorial)
Promote linguistic diversity	The program should reflect the CALD found among the target users. That would improve consent seeking and participation of marginalized groups.	Language options and accessibility features, e.g., translation and definition
Provide flexibility in participation	Accommodate volunteering with life circumstances and available resources	Provide options for technology (e.g., mobile or laptop, applications) time (e.g., scheduling tools) and other aspects of participation (e.g., hybrid volunteering)
Involve identity building social systems, e.g., faith, professional, govt units and NGOs closely linked to the research cause	Help with initial recruitment of volunteers and their long-term well-being and engagement. This would potentially engage more CALD in volunteering	Highlight collaborations with relevant institutions, people and influencers in promotional campaigns and within the platform
Show impact of volunteer work	To highlight their achievement and acknowledge contribution to the cause	Feedback and acknowledgement features for volunteers to observe positive changes associated with their individual or collective work, e.g., through gamification
Foster a community of volunteers	They can form groups based on interests and shared experiences	Community features, such as forums, DMs, etc.
Build relationships with researchers and other key members	Resolve issues of science communication and build trust	Direct communication, e.g., chats, forums, etc., or indirect information, e.g., featured scientist associated with the program
Include educational and learning opportunities	Engagement of those who volunteer for growth and learning	Learning and informational features about relevant causes and associated information, e.g., wikis, webinars, informational blog posts, etc.

Fig. 5.5: Design recommendations, rationale for the recommendations and examples of design strategies associated with the recommendations

5.6 Limitation and future work

Our work is limited in a number of ways. Our survey was disseminated at a time that many registered volunteers on StepUp for Dementia Research had not had the opportunity to participate in much research on the platform, however many did comment on their prior volunteering experiences in and outside of science-based research programs including dementia research programs.

Additionally, our research was conducted less than a year after StepUp for Dementia Research was launched. The platform was advertised through media and social networks. It is possible that at the time our research was conducted, the program had not reached its full potential in terms of participant numbers and demographic diversity. Finally, we were pleased to find generous responses submitted to our open-ended questions in the survey, however we had planned to conduct additional interviews with participants to discuss our findings in more depth. We were unable to fulfill our plan due to disruptions caused to our research following the global COVID-19 pandemic. We believe these are all opportunities to consider for future work to confirm the validity and extend the depth of our findings.

5.7 Conclusion

In this chapter, we describe a survey study where we investigated the various experiential and motivational aspects of volunteer participation in online science-based research and how that impacts their engagement and wellbeing. This survey included qualitative and quantitative questions to gauge their volunteering history and experiences, volunteering motivations, their wellbeing, and perceived psychological needs satisfaction associated with their ongoing and future volunteering. The responses of 266 volunteers were analysed - thematic analysis for qualitative data and descriptive and inferential statistics for quantitative data. The qualitative results were structured as identities expressed by the volunteers through their values and how those help derive meaning in life through volunteering, in addition to categorising three enablers and impediments to their participation. The quantitative results showed high measures associated with overall wellbeing with demographic information such as disproportionately high participation rates of Anglo, females and highly educated volunteers in this platform. The findings pointed to some trends in volunteer demographics, motivation, experiences, needs and expectations and

how they are associated with wellbeing. These findings and associations helped shape eight design recommendations for online science-based research volunteering that focus on setting proper information and communication standards, provide flexibility in participation, promoting language diversity, involving identity building social systems, including educational opportunities, fostering a community, improving information and communication with researchers, and showing the impact of volunteer work.

Our study uniquely validates the notion of research participants as volunteers, which extends our abilities to better design and engage them in science-based research platforms. Volunteering is a potential solution to improving many aspects of our societal welfare. Many voluntary organisations affiliated with the social welfare sector invest in socio-technical research to understand and design for volunteer engagement in countries like Australia (K. Naqshbandi et al., 2019) to address issues such as degrading youth mental health (K. Naqshbandi et al., 2016), amongst others. Likewise, science-based research is also tailored to correspond to the temporal needs of the society. Neurodegenerative diseases such as dementia are on the rise globally and in Australia (D. Australia, 2021), so there is a strong emphasis at the policy level to improve digital volunteering opportunities to manage such issues (ABS, 2017). Platforms such as StepUp for Dementia Research promote civic engagement with science and also contribute to scientific discoveries while also improving societal welfare. While existing volunteer engagement strategies already exist in other sectors, our study has specifically investigated online science-based research volunteering usually associated with innovation across various sectors, thus fulfilling a research gap in this area. We hope that our work will inspire future investigations into this promising area of online science-based research volunteering and improving volunteer wellbeing and engagement on such platforms in particular, and online volunteering in general.

Care Ethics in Digital Volunteerism: Learnings from Case Studies

<div style="text-align: right">6</div>

> *"Becoming caring is not about becoming good or nice: people who have 'being caring' as their ego ideal often act in quite uncaring ways in order to protect their good image of themselves. To care is not about letting an object go but holding on to an object by letting oneself go, giving oneself over to something that is not one's own."*
>
> — **Sara N Ahmed**
> The Promise of Happiness *(pg 186)*

Preamble:

This chapter addresses the third research aim of this thesis - **Research Aim 3**: To create guidelines that can be used for effectively supporting engagement of volunteers in digital volunteering platforms.

In this chapter, I create a care-focused framework using relevant HCI publications where care ethics are used in a volunteering context. This framework consists of seven conceptual categories with respect to concepts, processes, experiences, and consequences that highlight care ethics in digital volunteerism. This framework is used to perform a content analysis of the findings of the three case studies presented in chapters 3, 4, and 5. Through this analysis, I derive some reflections for the volunteer-centric design of digital volunteering platforms.

6.1 Introduction

If there is a silver lining to the COVID-19 pandemic, it is how it highlighted the contribution of the care economy, both paid and unpaid, and how care came to be understood as absolutely essential for healthy social and economic outcomes. Volunteerism engenders the unpaid care economy in many ways through the participation of volunteers in various ventures involving support, relief, and maintenance. Volunteering is also associated with much social and economic impact (UNV, 2018). During the pandemic specifically, many digital platforms, such as Coronahelpers (https://coronahelpers.nl), Angel Next Door(https://angelnextdoor.com.au/) and digital mutual aid initiatives (Solnit, 2020), emerged to enable volunteers to translate their care and concern into action and sustain many such social processes.

This brings to the forefront the ethics of care, also known as care ethics, and how it comes into play in volunteerism, more specifically digital volunteerism. Care ethics was not a consideration when I started this research. However, during the course of this research, care ethics emerged as a strong notion for framing the insights and core to the translation of some of the findings into design guidelines for digital volunteerism. Thus, in this chapter, I mainly focus on the research objective of exploring the manifestation of care ethics in digital volunteerism and subsequently develop a framework of care for the design of digital volunteering platforms.

In this chapter, I will first synthesise a lens of care ethics in volunteerism as found in the existing relevant research in HCI. I will then focus on the three cases studies presented in chapters 3, 4 and 5 and use the lens of care ethics in volunteerism to analyse those. In the next section, I first provide an overview of key literature on care ethics. This will be followed by a summary of related work in HCI that uses care ethics in the context of volunteerism. I synthesise the common concepts found in that related work to construct an analytical framing. I then discuss how those concepts apply to the findings from my research case studies and how they contribute to volunteer-centric design.

6.2 Care Ethics: A Brief Overview

Many theories of ethics have presented virtues and morality from a universal point of view. Kohlberg's seminal work on moral development, for instance, presented

all humans as essentially individual, with independent learning of moral principles (Kohlberg, 1971). This had impact on the framing of justice, fairness and the associated reasoning and decision-making that stemmed from an independent perspective of ethics.

In the 1980's, Carol Gilligan observed that the research findings at the time undermined the abilities of women for moral judgement, whose social development was (and overwhelmingly is) generally directed (through social and cultural constructs) to prioritise responsibility, care and connections with others (Gilligan, 1988). This aligned with the work of Noddings (Nel, 1984) (published prior to Gilligan's work) who noted that "receptivity, relatedness, and responsiveness" are essential to ethics of care where justice is seen to extend from caring relations and empathy, rather than from an individualistic perspective. Care ethics has been foundational to *care-focused feminism*, which acknowledges the gendered aspect of caring in the society and the constant devaluing of care-focused endeavours, but also advocates for caring responsibilities irrespective of gender (Tong & Botts, 2018). Thus, care was framed as a strength with a focus on mutual benefit from the perspective of care ethics.

Care ethics has since been used to emphasise on self-reflection as a way of addressing bias and raising awareness about the impact of context of human actions and situatedness of decisions. Rather than basing design decisions on modular framing, care ethics advocates for critically engaging with a given matter and taking design decisions to address inequalities (Robinson, 1997).

Indisputably, care ethics is associated with and encourages care through attitudes and actions. Thus, caring as represented by volunteers could entail attitude of 'caring about' something or someone, or caring action of 'caring for' something or someone (Collins, 2015). Tronto further explicates this idea by including care giving and care receiving as aspects of care in practice (J. Tronto, 2013).

In the next section, I will provide some examples of how care ethics have been used in HCI research in the context of investigation, analysis, or design of volunteer-using endeavours.

6.3 Care and Care Ethics in HCI: A Volunteering Focused Perspective

In this section, I initially mention some of the influential works on the ethics of care from a socio-technical and technology perspective that were frequently used to inform the related work in HCI. Next, I detail how the ethics of care have been used in the context of volunteering in HCI. Within the discussion of that work, I highlight the important concepts associated with care ethics in a volunteer-using context in HCI. These highlighted concepts are further used to inform my methodology in the next section.

Many papers that I found in the survey of related literature (such as Howard and Irani, 2019; Krüger et al., 2021; Rossitto et al., 2021) were inspired by Tronto and Fisher's 2020 definition of care, "*On the most general level, we suggest that caring be viewed as a species activity that includes everything that we do to maintain, continue, and repair our 'world' so that we can live in it as well as possible*". Additionally, Maria Puig de la Bellacasa's "Matters of care in technoscience: Assembling neglected things" (de la Bellacasa, 2011), which advocates for the use of care ethics in works of science and technology, has been used to pinpoint and articulate aspects of care that are typical in socio-technical systems by most of these papers. For instance, many of these papers discuss the action of care-giving within the framework of care ethics, which usually entails caring for the vulnerable as a manifestation of caring for the neglected. These and other characteristics of care in volunteering socio-technical systems will be discussed further in the paper.

Related work in HCI within the context of volunteering has used care or care ethics in a variety of ways. Care ethics has been used as a lens to understand, analyse, critique, or modify the various aspects of volunteer-involving programs/causes in HCI research to inform design. In some of this work, care ethics served as a core philosophy to augment an existing design or research methods. For instance, Braybrooke et al. reframed and modified co-design workshops in order to design 'with' rather than design 'for' the marginalised stakeholders (Braybrooke et al., 2021). Related to the topic of methods, some articles placed the responsibility to generate care on researchers through the use of appropriate design and research methodology. For instance, Rossitto et al 2021, Kruger et al 2021 and Howard and Irani 2019 suggested socio-technical explorations in the form of co-design research or other

similar participatory research that can support narratives of care in community-run initiatives (Howard & Irani, 2019; Krüger et al., 2021; Rossitto et al., 2021).

Analysing the work of a volunteer-involving maker community using the lens of care ethics, Vyas 2019 provided a commentary on how care is inherent to the wellbeing of volunteer community. Vyas observed that wellbeing associated with care work spans from the individual level to the group level and extends to the community level (Vyas, 2019). Thus, it focused on wellbeing for self and others, and as a result, representing *mutual benefit* (Vyas, 2019). Related work also noted the similarity of research objectives, processes, and outcomes in research methodologies such as action research to the concepts of mutual benefit and reflexivity found in care ethics which focus on benefiting the researchers, research participants, and stakeholders (Hayes, 2018; Krüger et al., 2021).

Care ethics has also helped critique the existing practices of volunteer-using initiatives. For instance, Rossitto et al 2021 introduce the concept of anti-designs to critique the existing design research practices that do not consider the various aspects of care in volunteer-using, community-run initiatives. This helped them ideate ways that could highlight care in the design of these platforms (Rossitto et al., 2021).

Care ethics was also used in tandem with or to support other topics and concepts to synthesise new understandings in a volunteer-using space. For example, Kruger et al (2021) used care ethics to elucidate the issues of social justice and sustainability through volunteer action in volunteer-using initiatives (Krüger et al., 2021). Howard and Irani (2019) used care ethics in tandem with the topics of ethics, morality, and politics in volunteer-using work. Howard and Irani use these to further delve into issues of accountability, representation, and emotional labour of volunteers in Wikipedia, a volunteer-using platform (Howard & Irani, 2019).

There were a few other things associated with care ethics in volunteer work that were prominent in related work in HCI. For instance, care ethics highlighted volunteer-led *action as a form of care-giving* to bring about social and community change via building, maintenance, and repair in addition to emotional orientations and attitudes of care (Howard & Irani, 2019; Krüger et al., 2021; Rossitto et al., 2021). This action involves work in the form of functional and key tasks that are assigned to the volunteers and community members. However, it also involves constant *peripheral work, relationship maintenance, and sociability* on such platforms. While the more explicit channels and forms of communication and relationship maintenance are

highlighted in a number of publications, some other literature emphasised the more invisible aspects of sociability. Also referred to as invisible work, boundary work, and articulation work, sociability is often rendered invisible and constantly devalued (Geiger et al., 2021). Related work also focuses on the issues of boundary work and relationship maintenance as an important aspect of how technology can support manifestations of care in volunteer-run initiatives (Rossitto et al., 2021).

Related literature also highlights the importance of *ownership of labour* by related communities and volunteers on those volunteer-involving platforms and programs (Krüger et al., 2021; Taylor et al., 2013). This is specifically an issue in many forms of digital voluntary work where the labour of volunteers tends to go unrecognised, rendered invisible or is poorly compensated, a phenomenon termed by Ekbia and Nardi as *heteromation*, to describe a capitalistic framework which enables corporations to gain economic value from this "free" labour of people (Ekbia & Nardi, 2017). The authors associate this capitalistic framework with the alienation of the volunteers with the product of their labour. As a remedy to mitigate the ill effects of the capitalistic framing, Karusala et al 2017 used an approach of care to establish the sense of ownership among the stakeholders which included volunteers and other supporting actors. This approach analysed the existing social interconnectedness and how it upholds the contextual values. Karusala et al also focused on the use of technology to support these existing values and practices, conceptualised as assets-based design, rather than innovating new ones which may typically be framed as "user needs" or "user values" (Karusala et al., 2017). As an extension of the point about ownership of labour in digital volunteering platforms, it is relevant to mention that the main focus in many investigations in HCI and related fields is technological innovations, discoveries and invention. However, recent research on care in socio-technical systems juxtaposes innovation with care, and acknowledges that technological innovation goes against the ethics of care that focuses on maintenance and repair. This caring considers not only the technology, but all the social actors and context, and emphasising on *relational work and interdependencies* between these (Howard & Irani, 2019; Krüger et al., 2021; Rossitto et al., 2021). Related work also discusses the matter of ownership and care v/s innovation with the perspective that many aspects of care are better integrated in traditional non-digital volunteer-involving spaces rather than digital volunteering spaces. To explain this, a possibility is put forward that the former exhibits a more libertarian ethos rather than a capitalistic framing of many prominent digital volunteering spaces (Rossitto et al., 2021; Vyas, 2019). Thus, there is constant tension between the socialisation as represented in care ethics and innovation as is expected in a capitalistic paradigm

in some digital volunteer-involving spaces such as Open Source communities (Geiger et al., 2021).

Related work highlighted *reflexivity* in methods and overall approach during socio-technical investigations. Openness to change and also building connections with those in volunteer-involving programs are emphasised (Krüger et al., 2021). This also involves acknowledging positionality - identity, privileges, marginalisation - and biases in relation to positionality (Rossitto et al., 2021; Toombs et al., 2017). A potential tension arises in literature in terms of romanticising care, a phenomenon where care-focused endeavours such as volunteering are overly glorified in an unrealistic way (because of their association with supposedly "noble" ideals) while minimising the harm associated with them. This includes ignoring the practicalities and social complexities in a given context and oversimplifying the narratives, histories, and power relations in care-focused endeavours. For instance, de la Bellacasa et al, Tronto, Kruger et al, and Howard and Irani all mention that romanticization of care in volunteering contexts could lead researchers to overlook uneven relations between caregivers and care-receivers (de la Bellacasa, 2011; Howard & Irani, 2019; Krüger et al., 2021; J. C. Tronto, 2020). Other work also associates "perpetuation of rich world paternalism" to romanticising of care, as it produces universalist assumptions about how care can address the needs of those considered or portrayed as marginalised (Puig de la Bellacasa, 2017; Ticktin, 2011). In contrast to that, care ethics encourages critical engagement with the social, historical and other contexts, and focuses on "self-determination of lived lives" (Tuck, 2009) rather than taking a simplistic, non-critical, and paternalistic approach to design interpretations.

Care for all in the community is also seen in many related works. Some projects focused on service to those who are marginalised and the vulnerable as found in care ethics (Braybrooke et al., 2021; Krüger et al., 2021). In addition to that, there was also mention of inclusion of human and non-human actors, which was achieved through complex critical engagement and identifying social context (Karusala et al., 2017; Rossitto et al., 2021).

Literature pointed to *gendered socialisation* in volunteer-involving digital platforms such as Wikipedia and Open Source communities (Howard & Irani, 2019). A similar trend was also visible in technology focused academic disciplines such as Computer Science amongst others (Cheong et al., 2021). Singh 2019 observed that comments such as "you have to be brave; you have to be strong; you have to ignore; you have to be extra smart; etc." were commonly shared by female newcomers in Open Source communities. This made the author "wonder why participation in a community

where you are contributing your skills, often without pay, should be such a crusade! In addition to the knowledge and skills that these women bring to the community, why do they also have to do this onerous labor of managing a hostile environment?" (Singh, 2019). The above works demonstrate that the work has begun to embed care ethics in HCI design and research with respect to digital volunteerism, highlighting some important concepts as shown in this section. There is an opportunity to consolidate these concepts to holistically guide design for digital volunteers.

An important observation of related works is that they approach digital volunteering from a *socio-technical* systems approach. A socio-technical systems approach entails looking at the various interdependencies that include all the 'social' and 'technological' aspects of a system that are representative of this complex phenomenon (Cooper & Foster, 1971). This approach forms an important consideration for design for digital volunteerism that incorporates inputs from a wide range of technological and social influences as confirmed by my research as well. The socio-technical systems approach is associated with satisfaction and many other predictors of wellbeing of the people involved, thus making it an important consideration for design conceptualisation for digital volunteerism based on my research aims (Winter et al., 2014).

In the following section, I will first explain the methodology that I used to derive the concepts from selected literature, and will also specify the corpus of literature I used. I will then detail those concepts in the following subsection and explain how and whether they apply to my case studies. This will be followed by a reflective section about the lessons learned from this chapter and suggest implications for the volunteer-centric design.

6.4 Analysis of the Case Studies

6.4.1 Methodology

Building a Focus of Care for Digital Volunteering

My interest in care ethics in digital volunteering and HCI was motivated by a reading of Kruger et al (Krüger et al., 2021), Howard and Irani's (Howard & Irani, 2019)

and Rossitto et al.'s (Rossitto et al., 2021) papers which outlined care-focused socio-technical investigations of volunteer-using programs/platforms. The cursory reading helped me gain an understanding of how some of my research processes, observations, and findings closely aligned with various aspects of care ethics in volunteer spaces as seen in these works. Further searching included the snowballing technique for literature review that allowed me to survey more relevant recent publications within the discipline of HCI, CSCW and related disciplines.

Of a number of publications that were relevant to various aspects of care ethics, I selected seven core publications for further analysis. The selection was based on these papers' focus, topic, and approach that combined volunteering, care ethics, and critical perspectives presented in terms of consequences of using socio-technical platforms for online volunteerism. These publications were characterised by their focus on socio-technical investigations of volunteer-using spaces and their use of care ethics for investigating, analysing and interpreting the various aspects of these spaces. Figure 6.1 lists those publications along with a brief description/highlights.

Based on a thorough reading of the selected corpus, I conducted a content analysis and found patterns with respect to concepts, processes, experiences and consequences that underline care ethics. There were some nuances of care ethics associated with each pattern in the context of socio-technical investigations of volunteerism. I isolated these patterns, categorised them, examined the examples and descriptions relevant to each and then labelled them. This yielded seven categories, which I call "conceptual categories" for the purpose of analysing my case studies. For instance, I identified the conceptual category "focus on action", because I found that volunteering in each of the above mentioned works was associated with action which added value to the organisation, the cause, the beneficiary, or the larger society. Overall, seven conceptual categories were captured through this process. These conceptual categories are: (i) focus on action, (ii) mutual benefit, (iii) reflexivity in approach, (iv) relatedness and interdependence, (v) ownership of the product of labour, (vi) care for all, and (vii) gendered socialisation.

A Care-focused analysis of the three case studies

The seven conceptual categories synthesised from the selected literature were further used to perform a content analysis of the findings from the three case studies in my research. The material for analysis of my research included previous thesis

Publication	Brief Description
Braybrooke, Janes, and Sato (2021)	With the view of improving inclusivity in digital experiences during COVID, the paper presents a modified model of online design sprints which combines care ethics with co-design approach in a case study that included arts and culture sector in Japan and the UK.
Geiger, Howard, and Irani (2021).	In this study, Geiger et al report the invisible labour of F/OSS members which goes beyond building, maintaining and repairing code/systems and is more interpersonal in nature.
Vyas (2019)	This paper investigates a community of women's interest-based craft makerspace as a case study of care in volunteer maker communities.
Rossitto, Korsgaard, Lampinen, and Bødker (2021)	This paper contributes to understanding of the various configurations of care practices in community-led, volunteer-involving initiatives via two relevant case studies, as well as how technology can facilitate or hinder these practices.
Karusala, Vishwanath, Kumar, Mangal and Kumar (2017)	In this paper, authors have used care as a lens to understand the interactions among humans and technology in a case study of underserved and learning context.
Howard and Irani (2019)	In addition to examining the ethics, values, care and politics in HCI research associated with qualitative research subjects who are deeply invested in knowledge production systems such as Wikipedia, this paper presents an experiential narrative of these research subjects, with a focus on their accountability, representation and emotional labour.
Krüger, Weibert, Leal, Randall, and Wulf (2021)	This paper reflects on care practices in a community initiative, aimed to serve refugees and migrants in Germany, and how they contribute to sustainability of design results in a sociotechnical project, and then links it to how that supports the larger social sustainability and the agenda of social justice.

Fig. 6.1: List of the publications that were used for the content analysis of care-ethics in volunteering and HCI and a brief description of each publication.

chapters, peer-reviewed articles relevant to this research, in addition to the reports, documentations, and meeting notes with collaborators and volunteers associated with each case study. For each conceptual category, I went through my research and reflected on how the conceptual category was demonstrated in methods, interactions, findings and outcomes of each case study. For instance, for the conceptual category "Care for all", I reflected on the various care-focused values and actions of volunteers (such as "giving back to the society") and who benefited from those values and actions. I found that in all these case studies, there was an element of caring for those who are deemed marginalised or vulnerable. Another example is that of "Reflexivity in approach" where I reflected on the various instances of how my research approach involved accountability, positionality, and open and flexible approach in my interactions with the stakeholders. Additionally, I used this concept to reflect on my own research methodology where equity for those involved in the research is an extension of care on my behalf as a researcher.

6.4.2 A Care-Focused Discussion of Findings

I used the seven categories synthesised from the content analysis of the selected literature to understand whether and how they applied to my own case studies. In this subsection, I outline and discuss the findings. Figure 6.2 shows the care-focused framework for design of digital volunteering platforms that includes conceptual categories synthesised from each of the selected publications and their representation in each publication.

Focus on Action

Findings in all case studies pointed to volunteer prosocial values being translated into actions that are oriented towards creating, sustaining or maintaining processes or people. The action focused on *(i) creating a better future or society*, *(ii) providing value for beneficiary*, and *(iii) providing value to a cause or an area of interest*, where these focuses often overlapped with another.

ReachOut volunteers and community managers (in my first case study) supported distressed youth in an online space based on the program objectives and their own values, "The support that peers can give to each other: That is quite separate and different and unique to the support [you can get] from self-help or professionals,"

Conceptual Categories

	Focus on action	Mutual benefit	Reflexive approach	Relatedness & Interdependence	Ownership of the product of labour	Care for all	Gendered socialisation
Description of conceptual category	*Action to create, sustain, and maintain processes/ people as caregiving*	*Considers the benefit of all stakeholders involved. Wellbeing is an important component of this.*	*Openness to change and building connections with stakeholders to highlight accountability and manage complexities*	*Strong aspects of relationship-building and sociability, including invisible labour that goes into these*	*The sense of ownership of the work of volunteer as perceived by the volunteers*	*Caring for those considered socially vulnerable and marginalised*	*A gender-based divide in design and participation is observed in volunteer-using platforms*
Braybrooke, Janes, and Sato (2021)	☑	☑	☑	☑		☑	
Geiger, Howard, and Irani (2021)	☑	☑	☑	☑	☑		☑
Vyas (2019)	☑	☑	☑	☑	☑	☑	☑
Rossitto, Korsgaard, Lampinen, and Bødker (2021)	☑	☑	☑	☑	☑	☑	
Karusala, Vishwanath, Kumar, Mangal and Kumar (2017)	☑	☑	☑	☑	☑	☑	☑
Howard and Irani (2019)	☑	☑	☑	☑		☑	☑
Krüger, Weibert, Leal, Randall, and Wulf (2021)	☑	☑	☑	☑	☑	☑	

Publications (row axis label)

Fig. 6.2: A matrix depicting the conceptual categories and their representation in each publication

(Moderator 2). Consequently, it was seen as a positive contribution to the society, "building capacities in our community of young people around understanding, recognising, and supporting" (Community Manager 2).

For OSPIA volunteers (second case study), the volunteers frequently valued improving the quality of medical service for future doctors by contributing to the education of the medical students.

> "I was a practising physio many years ago and I always felt we were not trained at all in interpersonal skills. I hope my contribution to the doctors of tomorrow can assist them in their long journey!" (SurveySP5).

While they aimed to benefit the students they were interacting with, they also wanted to benefit the cause of medical education and medical service, and also, benefiting the society. *"Giving something back to the community and helping to be part of the student learning experience."* (CP2)

The value based actions to improve the cause of dementia research and benefit those impacted by it was also seen in StepUp volunteers. Just like the other two case studies, their actions were seen to *"help future generations"* (P1) and *"giving back to the community"* (P72).

> "Motivation for me is more about planting the tree that I will not enjoy the shade of. It's not about accolades or certificates or badges, never has. It's about informing and educating for the future." (P33).

Mutual Benefit

While volunteers benefited others in many ways through their service, they also acquired benefit from it. The theme of giving back to the beneficiary, the cause and the society was found as a motivational value in each case study. However, findings also pointed to the many ways the volunteers sought value-based benefits from their volunteering. For instance, in all these case studies, volunteers mentioned their own professional development, learning and engaging in their prosocial needs to serve others. Consequently, an important benefit of volunteering was how it generated wellbeing for volunteers. The wellbeing outcomes associated with volunteering

include the individual, and permeate through the cause-related community and the society in general.

Another example is that of volunteers generating wellbeing for themselves and others based on their own life experiences. Findings from all three cases of ReachOut, OSPIA and StepUp showed that volunteers care about the cause because of their own experiences, and thus, being able to build empathy for those causes or people going through such experiences. This was even more pronounced if volunteer experiences involved adversity. For example, in ReachOut (the first case), being young themselves, volunteers had been in the shoes of the distressed youth. In OSPIA (the second case), it was personally relevant bad medical experiences. In StepUp (the third case), volunteers themselves or someone close to them may have gone though an adverse neurological condition. Also pertinent to mutual benefit is how many retired volunteers, specifically in OSPIA and StepUp (ReachOut volunteering is restricted to an age limit of 16-25) found meaning in life and happiness by engaging in volunteering.

> "A potential problem for people who retire, it is quite an interesting concept, and it is called invisibility. People talk about it, which is not noticed. How do you have a voice? How do you have anything? ...It is also to have a feeling of relevance and currency and these voluntary places, they help you to keep up with life and people." (CP1)

In all these cases, findings pointed towards volunteers taking agency in their own wellbeing by caring for the cause and for those who are impacted by it. Thus, volunteer prosocial identity (i.e. engaging in generating mutual benefit) is important for creating their wellbeing.

Reflexive Approach

It became apparent during the investigations in these case studies, that a rigid approach focused on a modular and simplistic requirements gathering process would be unsuitable. Rather a critical approach was needed where I and my research teams could reflexively refine our understanding of the needs of these organisations as well as the research participants (i.e. predominantly the volunteers).

An important aspect of reflexivity involved considering my own association with the core topic of this research, i.e. volunteering. This included reflecting on my motivations and values associated with volunteering specifically and with prosociality in general. For instance, it is pertinent to acknowledge that my personal involvement as a volunteer and with other forms of prosociality have been strongly shaped by my Islamic beliefs and experiences as a Muslim and the corresponding values of doing and being good (Co-incidentally, the importance of recognising Muslim religious identity in a Western intra-community volunteering context, specifically in Australia, is supported by recent published research (Peucker, 2022, 2020)). Thus, my belief and associated values and experiences influenced this research as well. Indeed, I pointed to the importance of considering faith in prosocial endeavours in HCI in my recent publication (K. Naqshbandi et al., 2022). Moreover, the merit of using a care framework in a volunteering context became more apparent to me after I gave birth and became a primary care-giver for my child. This made related systemic issues such as devaluing of care-focused endeavours, invisible labour, and the gendered aspect of care in the society more obvious to me. Similarly, my research association with specific domains of volunteering such as science-based research volunteering in StepUp for Dementia Research (the third case) were shaped by my personal domain-related interests. While analysing the data of this project, I remember being overwhelmed by the deeply personal and compelling narratives presented by some volunteers which resonated with some of my personal experiences and motivations. This made the importance of researcher positionality all the more important and is portrayed in the author positionality statement in the corresponding chapter on the third case.

Reflexivity was essential in my investigations in terms of caring for the outcomes for those involved. Thus, a participatory research approach was useful for achieving my research objectives as well as benefiting the volunteer-involving organisations by fulfilling their design needs. Benefit from research for the organisations came about by fulfilling the organisational needs by providing research, design, and engineering services. Benefit also included giving credit for the research outcomes in the form of co-authorship or acknowledgement in research publications. For instance, in the ReachOut project, both the community managers who were closely involved in the research process were credited as co-authors in the paper.

Reflexivity also involved a component of relationship building with volunteers as well as others involved in the research and design process. For instance, based on the conversations with the program manager and volunteers, and observations of the OSPIA interview campus sessions, my research had to adjust to the organisational

protocols, schedules and comfort level of the participants rather than what would have been optimal in order to design innovative features. As an example of reflexivity with participants, I had to adapt my research method in a workshop with a few volunteers who refused to complete a worksheet based on their preference to casually chat rather than write or sketch. An example of reflexivity with the involved organisations was when I had to negotiate the design strategies that would be applicable in the system. For instance, in OSPIA, my decision to choose the gratitude strategy to motivate volunteer engagement and relatedness was not entirely based on a rationale of efficiency. Other suggested features to build relatedness included a monthly newsletter featuring an OSPIA volunteer or student, and implementing a regular volunteer feedback strategy that would include updates based on the outcomes of the Volunteer Simulated Patient program. The choice of the design strategy resulted out of negotiations with the organisers based on what would be the most maintainable feature, especially after the completion of my PhD program after which I would no longer be involved in these projects. The reflexive approach in OSPIA research is also highlighted by the critical engagement with the various aspects of volunteer experiences during workshops and interviews. Finally, the information gained from program organisers, combined with information from quantitative data helped me arrive at some insights such as the gender and age-based differences in experiences of volunteers.

I joined the ReachOut project after the initial conversations and contextual observations had been performed by the other researchers in the team who launched a chat feature trial on the platform. However, the final decision to implement a chat system was determined following a careful and continuous negotiations based on the organisational context and their need to improve volunteer workflow and efficiency. The volunteer moderators and community managers were involved throughout the process of designing the chat widget and features were added and removed based on their feedback.

Finally, for the StepUp research (the third case), the decision to use a survey in addition to co-design activities such as a workshop (which were planned but did not occur due to the COVID-19 pandemic), and the components of the survey for initial investigation were based on the conversations and careful negotiations with the programme director.

Relatedness and Interdependence

In all three case studies, themes surrounding relatedness and sociability emerged strongly for the engagement and wellbeing for volunteers. The findings in my thesis support previous research that points to how important relatedness and various aspects of socialising are with respect to realising the wellbeing benefits of traditional face-to-face volunteering (Creaven et al., 2018). My research adds to this knowledge by showing how it is true for digital volunteering as well.

Aspects of socialising were already built into the ReachOut website, such as the on-line forum, but it was obvious that it needed more attention. Although standardised scales were not used in this study protocol, the preliminary investigations that took place before the research I have presented in this thesis pointed to how important the relatedness aspect is, which in turn influenced the decision to design a chat widget (Milne et al., 2016). The investigations included in this thesis which followed the initial chat trial also highlighted the interdependencies between the volunteers, community managers and the beneficiaries that were expressed as features supporting communication, collaboration and rapport building. *"You form a connection with them based on what they have said to you"* (Moderator 4).

Relatedness was also apparent in the second case study, OSPIA. Here the experience of relatedness became the primary topic of investigation after the initial research. Comparing the experiences of online volunteering with face-to-face volunteering gave a direct frame of reference for the important aspects of volunteer engagement in online platforms. The research started off as an exploration of general volunteer engagement, but it gradually became clear that relatedness and all that it encompasses such as respect for volunteer efforts, reciprocity, and empathetic interactions among other factors impact overall volunteer engagement. The findings in the second case study also highlighted the many forms of invisible work that are performed not just by the volunteers, but others in the community such as the volunteer manager, that contribute to the sustainability of the platform.

> "She is very responsive, very quick. Even though she only works certain days she makes that very clear in her communication 'sorry I'm not here' or you get a bounce-back saying she's not here, but then when she is it's very, very, very responsive and any tech issues that I've had have been acted on so quickly, it's like 'Wow!'." [BothSP1]

In the third case of StepUp, relatedness stood out as an important aspect of volunteer engagement with a specific focus on their wellbeing. The survey in this case study included standard measures of wellbeing which helped make a case for how fulfilling the sense of relatedness positively impacts the wellbeing of various demographics such as older, retired adults that volunteer on this platform. Socialising and meeting others, specifically with similar life circumstances, was seen as an initial motivation for volunteering. Additionally, enhancing social connections with other actors in the volunteering ecosystem, such as researchers in this case study, was seen as crucial in improving volunteer engagement.

The research insights in all three systems pointed to the various ways in which relatedness and and social interdependency were manifested and contributed to volunteer wellbeing and engagement. This forms an essential component for maintaining the sustainability of the volunteer-using programs.

Ownership of the Labour

Ownership is a multi-faceted concept that involves (i) having a sense of control over something, i.e. a tangible or intangible object and/or its use, (ii) knowing the object intimately, (iii) personally investing in the object (Jussila et al., 2015; Pierce et al., 2001). In the absence of tangible products of labour, digital volunteers focus on caring and maintenance which represent intangible contributions. For these volunteers, identity building is an important contributor to their sense of psychological ownership of the products of labour (Belk, 1988). Additionally, as the volunteers' psychological needs are met, they feel more inclined to claim psychological ownership (Van Dyne & Pierce, 2004). Thus, the values embedded in digital volunteering platforms as well as the design affordances integrated in the digital products can either support or hinder the volunteers' sense of ownership.

Each of the three platforms presented in my research was designed by centring the cause (and by extension the beneficiaries). In ReachOut, the design was serving the distressed youth that need help. The OSPIA platform was designed to provide education to the medical students. The StepUp for Dementia Research platform was designed for recruiting appropriate volunteers for dementia research studies. Thus, the functionality and objectives of these platforms reflected the cause and beneficiaries whereas volunteers' psychological needs were fulfilled to a varying degree which would then impact volunteers' sense of ownership over these platforms.

My research highlighted some of those aspects that would contribute to fulfilling the volunteers' psychological needs, and thus points to how design may increase their sense of ownership. For instance, both ReachOut and OSPIA volunteers mentioned following up or jointly reflecting with the beneficiaries as a way of building rapport. While this demand highlighted a relational need, it was also closely associated with volunteers sense of fulfilment who wanted to create an impact through their work. Knowing about impact also emerged as a need among StepUp volunteers, for whom feedback strategies were mentioned as a way of fulfilling a sense of ownership.

Another thing that emerged in my research with respect to the sense of ownership was that face-to-face volunteers were more likely to expect compensation for peripheral volunteering work, such as costs associated with travel, as compared to the labour performed by online volunteers. This was directly mentioned by some StepUp volunteers, "Some type of compensation for my time would be ideal. I am happy to volunteer, but I can't afford to pay for transport/parking, etc. I would love to get another job but at the moment I have undiagnosed health issues that hinder my ability to work long hours." (P126). However, online volunteers may perform a lot of additional labour and it never came up directly in the interview and workshop conversations or survey. For instance, in addition to initial training (lasting 15 minutes to 45 minutes) and the OSPIA interview session itself (15-minutes), some OSPIA volunteers mentioned spending anywhere between 15 to 45 minutes for preparation before a session and to mark each student assessment post-session. "*Half an hour is not enough. So for me 1 hour exact*." (OnlineSP2). However, this work was treated as a given rather than something valuable enough to be compensated. Thus, an issue in relation to ownership of products of digital volunteering is that of devaluing of peripheral and invisible digital labour. For instance, as has been mentioned before in this thesis, a lot of boundary work goes into maintenance of online communities, which is in addition to the "actual" work that is performed on digital volunteering platforms like Open Source platforms, Wikipedia and other digital volunteering platforms. The lack of consideration of peripheral labour and boundary work may be contributing to the devaluing of many efforts involved in digital volunteerism. This could be attributed to the lack of care-focused lens in the design of most digital volunteering platforms that do not consider the interdependencies and invisible aspects of labour that contribute to their sustainability.

Care for All

Caring attitudes and actions were targeted towards beneficiaries who the volunteers believed were in need of their services. Caring for all was relevant to the values of volunteering in all three case studies in this research. Additionally, many volunteers mentioned serving people who were marginalised in their other volunteering endeavours (beyond the case studies). Thus, volunteering on these platforms was an extension of general caring attitudes of many of these volunteers. For instance, StepUp volunteers mentioned serving various other groups who the volunteers believed to have been systemically disadvantaged, such as refugees and First Nations people among others. "Working with First Nations people to try to recover some of their stolen wages. I never had my wages stolen." P292. Some OSPIA volunteers also mentioned the other volunteering they were involved in. "I used to volunteer as a dentist in various countries ... And then, I've worked with sex workers ... So yes, a variety". [OnlineSP3].

However, in this respect, it is pertinent to mention the aspects of romanticising of care, which presents care from an overwhelmingly positive standpoint, often moralising it and ignoring any related issues. If overlooked, this may contribute to inequity through the volunteering outcomes. For instance, it was clear that the OSPIA volunteers held an upper hand as assessors of student performance. This was true in the Reachout case as well, where moderators performed as care-givers and visitors as care-receivers, which is clearly an unequal relation, especially in a mental health context. The issue of using proxies for StepUp volunteers (based on the StepUp volunteer enquiries during the course of the survey study) that arose in my investigations could also be a potential cause of concern if not addressed adequately through design. Thus, including the perspectives of other actors or stakeholders who benefit or are involved in volunteering systems could be associated with more equitable volunteering outcomes. Finally, there were some other inequities uncovered in my research that should be of concern to designers of digital volunteering platforms. For instance, we saw how the sole reliance on the English language in online scientific research could be a barrier towards involving CALD volunteers, which has led to online scientific research being dominated by Western, Anglo perspectives and design considerations. This is in addition to the inequities associated with many forms of digital divide such as those based on age, gender, ability, geography, amongst others. Thus, an approach that uses care ethics would consider these factors that highlight equity in designing for digital volunteerism.

Gendered Participation

As an extension of the previous point about equity in design, it is pertinent to discuss the gendered aspect of participation and socialisation in digital volunteering. While the design of the digital platforms in my research did not actively encourage or discourage participation based on gender, it was found that women formed a significant majority of the volunteers.

The ReachOut study did not include a formal survey (only an informal one, which was not included in the chapter findings) as when this research was undertaken, only five unique volunteer moderators (4 females, 1 male) participated out of 19 volunteers in total. However, in OSPIA and StepUp, I formed a better picture of how the participation numbers skewed in favour of female volunteers in these online volunteering spaces. While the gender composition at that time in OSPIA revealed 69.7% women and 30.3% men, the latest report on gender composition of StepUp volunteers is 76.6% women, 23% men, and 0.4% other genders (for Dementia Research, 2021).

The above stands in complete contrast with volunteering in some other digital spaces that have been studied in HCI. For instance, an analysis of the contributions to Zooniverse by Ibrahim et al. (2021), one of the most successful and widely used digital citizen science platforms, revealed some useful demographic information. While it highlighted that this volunteering was mostly confined to Western and (what is considered in dominant classifications as) developed nations, where volunteering is a result of the ample time and investment in science, it also depicted only 30% overall female participation. More interestingly, it compared the patterns of female participation in online citizen science to some other volunteer using platforms such as Wikipedia which also has very low rate of female participation. Ibrahim et al. (2021) also mentioned how female participation rose in some fields of scientific research based on the topics. For instance, the participation of women rose to almost 50% in nature and wildlife topics but in topics such as astronomy, the participation of women dropped below average. Ibrahim and colleagues reflected that this trend parallels the participation based on *perceived* capabilities of females in educational disciplines (STEM) and professional settings such as engineering and technology (Ibrahim et al., 2021). Similar statistics and findings were reflected in a report by the National Academies of Sciences (**national_academies_of_sciences_demographic_2018**) that analysed several online citizen science projects. The report also suggested that even though women were

more likely to be interested in a wide range of STEM topics, they were increasingly less likely to volunteer for them as the their voluntary role moved from participatory to competitive or where a degree of recognisable command and expertise were required.

Thus, the stark differences between these seemingly similar digital volunteering platforms are laid bare when viewed from the lens of gendered participation and care ethics. The next section will conclude this chapter by reflecting on the findings and considering their implications for design.

6.5 Chapter Reflections

In the previous sections, I characterised seven concept categories that are core to a care focus in digital volunteering. As a result, I found that a digital volunteering system can be positioned along a care spectrum based on how strongly a system embodies the above mentioned care characteristics.

On one end of the spectrum lie the volunteering platforms that are quintessentially care-focused. These platforms are typically community run, with an emphasis on mutual benefit, cooperation and participation of others. Care-focused platforms may be found in domains where discovery and innovation are regarded highly (such as StepUp for Dementia Research). However, there is a strong focus on sustaining and maintenance to provide care in a relational context rather than a mere focus on producing innovation or discovery as the sole outcome of volunteering. The reflexive nature of socio-technical investigations surrounding those platforms stands out, as does cultivating a sense of ownership in volunteers for the (often intangible) products of their labour. The motivations, values and actions of those participating in care-focused platforms include caring for people who are considered marginalised and vulnerable based on the existing social norms. Consequently, the public understanding of care-focused platforms is often informed by romanticised notions of care. These platforms also tend to attract a higher participation of women. The analysis presented in this chapter highlights how the case studies in my research characterise care-focused patterns to varying degrees, placing all three platforms (ReachOut, OSPIA, StepUp) somewhere near the care-focused end of the care spectrum.
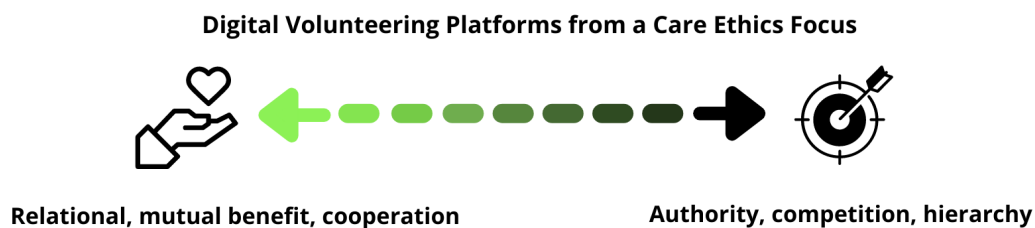
Digital Volunteering Platforms from a Care Ethics Focus

Relational, mutual benefit, cooperation　　　　**Authority, competition, hierarchy**

Fig. 6.3: Figure visualising characterisation of digital volunteering platforms on a spectrum of care

On the other end of the spectrum lie those systems that are perceived to be representative of authority, competition, hierarchy, and mastery over (a) knowledge domain/s, often at the cost of neglecting care (giving or receiving). As it stands, these platforms are typically dominated by a higher participation of those identifying as men. Volunteer-using platforms such as Wikipedia, Open Source contribution platforms and many Citizen Science platforms and those volunteer-using platforms that emphasise user-generated content and a mass participatory culture enshrined by Web 2.0 (such as Reddit) typically represent this characteristic. These reflect biases ingrained in our cultural norms at the cost of pushing out women and gender diverse participants. Figure 6.3 shows a visual depiction of digital volunteering platforms when placed on a care ethics spectrum.

This spectrum provides a lens through which we can view a divide in the conceptualisation of these platforms in popular culture and societal normalisation of gender roles and expectations of performance. The spectrum can be used as a provocation to highlight where more work is needed to achieve equity of access, dismantle hierarchies and empower participation to build equitable digital volunteerism. Overall, the initial conceptual categories presented in this chapter along with the subsequent care spectrum can aid in theorising, researching, and for further challenging of existing instruments for digital volunteering to then develop new direction to achieve design justice for digital volunteering. For instance, an understanding of these conceptual categories and care spectrum can aid designers of digital volunteering platforms towards building inclusiveness and engagement in the design of digital volunteering systems. In the next chapter, I will discuss how the findings from this chapter along with the findings in the case studies have implications for a volunteer-centric design framework.

Discussion

<div style="text-align: right;">7</div>

> *"If our hopes of building a better and safer world are to become more than wishful thinking, we will need the engagement of volunteers more than ever."*
>
> — **Kofi Annan**
> (Cited in remarks at a UN event to mark the
> close of the International Year of Volunteers
> 2001)

In this chapter, I present a discussion of my research findings outlined in the previous chapters and synthesise common patterns I identified around the motivation, engagement and wellbeing of digital volunteers. Next, I present a volunteer-centric framework that can be used as a conceptual guide for designing digital volunteering platforms. I also present my research reflections not covered elsewhere within the rest of the thesis, but that aid our understanding of designing for digital volunteerism.

7.1 Patterns of Digital Volunteer Participation, Motivations, Engagement, and Wellbeing in Digital Volunteering Platforms

In this section, I outline the common patterns of volunteer participation, motivation and engagement that I identified in the three case studies. I achieved this by reflecting on the processes and my own experiences of conducting research, as well as by analysing the documentation, notes, findings, design guidelines, and recommendations that resulted from the research associated with these case studies and the care ethics study. I analysed the content from each of these to categorise these into patterns of participation, motivations, and engagement. This helped me to recognise the various similarities and conceptualise them in terms of volunteer participation, motivation, and engagement. In subsections 7.1.1 and 7.1.2, I outline the aspects of demographics, experiences and motives that collectively shape the motivations which are critical for enhancing digital volunteerism experiences and participation. This effectively addresses research aim 1 of my thesis: ***To investigate the motivational aspects critical for enhancing digital volunteerism experiences***. I will elaborate on these in the following paragraphs.

7.1.1 Who volunteers? How and When do they Volunteer? Patterns of Participation of Digital Volunteers

In this subsection, I discuss some common patterns of volunteer participation found in my case studies. While some patterns are based on volunteer demographics, such as gendered socialisation and participation, the large number of volunteers over the age of retirement, and a notable lack of ethnic and cultural diversity among the volunteers, some others are based on volunteer experiences such as their volunteering history or commitment to other volunteering programs, and volunteer availability based on their life circumstances and commitments, including their availability based on the right means and methods of volunteering.

One common demographic pattern in these platforms was the *overwhelming numbers of female volunteers*. This was reflected in the composition of my research participants as well as in participatory workshops, interviews, and surveys. The gendered aspect of volunteering was made apparent through the spectrum of care in digital

volunteering in section 6.5 of the previous chapter. I also discussed how the platforms presented in the three case studies of my thesis strongly represent care-focused characteristics. Therefore, an important observation is how volunteer participation on digital volunteering platforms parallels the notions of *gendered socialisation and participation* in other spheres, such as academic disciplines (STEM v/s Humanities) or professions (corporate, STEM focused v/s care-focused). This is enforced by societal norms about the suitability of disciplines/focus of education, career, and volunteering roles based on whether they represent characteristics typical of care or authority. Thus, volunteering platforms/programs that are typically relational and represent mutual benefit and cooperation tend to be dominated by women, whereas those that represent authority, competition, and hierarchy are dominated by men.

Other demographic information that stood out was the *large number of volunteers over the age of retirement*. The only platform where this was not true was ReachOut, which sets a strict age limit for both volunteers and help-seekers (16-24 years) given its focus on youth peer-counselling. In the other two platforms, volunteering was seen to be associated with issues of esteem and meaning-making for volunteers after a long time of having a purpose and identity associated with their profession.

Demographic data in OSPIA and ReachOut case studies showed a *notable lack of ethnic and cultural diversity among the volunteers* of these platforms. Consequently, this reflects in the design of the digital volunteering platforms, with limited consideration for CALD volunteers and the beneficiaries of these services. For instance, the perspectives of the Aboriginal and Torres Strait Islander demographic that forms a significant minority in Australia is lacking in my research, possibly because the current communication channels do not adequately represent or cater to their communities. It was discussed in the StepUp chapter that cultural and linguistic diversity are important aspects of building inclusive spaces in digital volunteering platforms. The work of digital volunteers in different domains impacts the kind of services for the target beneficiaries. As discussed in chapter 5 about scientific research platforms such as StepUp, the participation of CALD volunteers would improve the research outcomes for those within their respective cultural and linguistic communities. This is true for OSPIA (improved medical care outcomes for CALD communities), ReachOut (improved mental health and wellbeing outcomes for CALD youth), and other digital volunteering platforms.

We also saw variation in other volunteer demographic characteristics based on the domain and the requirements of the programme. For instance, most of the StepUp for Dementia Research volunteers were highly educated, with a majority

of them having completed their tertiary education, which is unsurprising given the intellectual nature of the scientific programme.

A pattern that was observed in all three case studies was their *range of volunteering history or commitment to ongoing engagement with other volunteering programmes*. This was indicated by ReachOut volunteers indirectly through expressing their association with the cause of mental health problems in their communities. In OSPIA and StepUp, many volunteers directly mentioned their association with other programmes related to similar causes, e.g. education and dementia research. Thus, interest in the cause or area of volunteering was an important determinant of participation. There were other participants in my research who volunteered for unrelated causes as well. For instance, in OSPIA, a participant mentioned volunteering to support sex workers, whereas in StepUp, another participant mentioned volunteering for nature conservation. Many other instances of volunteering were mentioned, ranging from serving the refugees or the First Nations people, to volunteering at children's schools or at the Church. The common thread that associated these seemingly unrelated forms of volunteering seemed to be primarily the volunteers' prosocial motives.

Participation for many volunteers was also tied to their availability for volunteering. This included *availability in terms of their life circumstances and commitments* and by extension, the *availability of the right means and methods of participation* (e.g., technology, or applications). We saw evidence of that in all case studies, but moreso in the OSPIA and StepUp case studies. For instance, many volunteers mentioned that they fit volunteering around their family and paid work commitments. However, there was also some indication that availability is also tied to the personal importance that the volunteers assign to the cause and how they prioritise it with respect to other aspects of their lives. For instance, a few OSPIA volunteers mentioned how they make time for volunteering to the extent of taking time off from their paid work. Related to their participation, it was clear during the analysis of participation data of OSPIA volunteers that a few were doing much more work (completing appointments) than others. This was almost along the lines of the Pareto Principle of digital volunteering participation i.e., 20% volunteers performing 80% of the work (Zedlitz & Luttenberger, 2017). While there is not enough data regarding this to draw absolute implications, the information gained from correspondence with some of these volunteers indicated that their motivation was tied to aspects of their identity and meaning-making (which reflects the associated findings about identity and meaning-making of digital volunteers in the StepUp case study). Even though

there is not enough data in my research to justify a strong discussion, this point is worth exploring in future research.

7.1.2 Why do they volunteer? Patterns of Digital Volunteer Motivations

In this subsection, I discuss the common motives and reasons of participation of digital volunteers. These include social and community-based pathways, family and loved ones, desired social circles, making social connections, learning and personal growth, prosocial motives, and enjoyment of volunteering tasks.

In all the case studies, we observe a pattern of volunteers' specific motives associated with their *social and community based pathways*. A good example of source of motive is volunteers' previous, ongoing or aspirational *profession and/or education*. Findings revealed that many people, specifically from the younger demographic (such as the ones in ReachOut), volunteer to gain professional experience. Some volunteers, mostly from older demographics (such as in OSPIA and StepUp), who have gained enough experience or knowledge, want to use that for benefiting others in the present or the future. As seen in Chapter 5, other social or community based pathways influenced volunteers' participation and engagement in volunteering programs. Some of these included *family and loved ones, desired social circles or communities volunteers identified with* (scientific community, mental health awareness enthusiasts, etc.), and *faith, religion, and spirituality based communities*. These social and community based pathways form an unmistakable source of identity for these volunteers, thus playing an important role in their engagement.

Somewhat related but distinct on its own is the motive based on *making and nurturing social connections* through volunteering. Research in the OSPIA case study found that there is much work needed in order to create the sense of social connectedness (as represented in the need for relatedness in SDT) in digital volunteering platforms such as OSPIA. However, using participatory approach in research that with the aim of investigating volunteer motivation and wellbeing helped uncover various aspects of design that could build and nurture social connections.

Learning and personal growth were seen as important motives of volunteering. Whether it was the knowledge gained through volunteering based on interest, wisdom gained through volunteering experiences and interactions, or validation of their

experiences, intellect and skills, learning outcomes were found relevant to all case studies. Findings also indicate that volunteering is a means of creating wellbeing for volunteers. This was found in all three case studies. For instance, volunteers wanted to learn more about medicine, education, science, mental health and psychology, among other interests found in these case studies. More specifically, for those volunteers who had gone through difficulties or major life-changing circumstances such as retirement (OSPIA and StepUp), illness (all case studies), or negative feelings such as guilt (all case studies), volunteering was seen to serve as a way of coping with these circumstances in a way that adds value to their lives. Thus, based on the findings in these case studies, volunteering was seen as a way of creating meaning out of their challenging life experiences, and consequently, for building resilience and was akin to "self-care" for these volunteers.

Prosocial motivations of the volunteers were found salient in all case studies and were manifested in various generic and specific aspirations of the volunteers. In ReachOut, volunteers desired *to give back to the community* in addition to *creating mental health awareness* to benefit distressed youth. In OSPIA, it was the desire to *give back* and contribute to *making future doctors/physicians*, and in StepUp, it was the desire to *help future generations* via their research participation.

We saw some evidence of volunteers' *enjoyment of volunteering tasks* as a motive for participation and subsequent engagement. Participants in all three case studies mentioned aspects of volunteering participation associated with *enjoyment* or *fun* that contributed to their motivation. For instance, some OSPIA volunteers enjoyed acting in a non-serious context, or many ReachOut volunteers enjoyed working within the organisational context, or StepUp volunteers enjoyed the research tasks. In many instances though, enjoyment of the task in itself did not appear as a primary motive but was anchored to other motives. For instance, for StepUp volunteers, enjoyment of tasks was associated with how much the task fulfilled their desire to learn about relevant scientific topics, or the desire to make a prosocial impact. This was similar to the finding about the ReachOut volunteers, whose enjoyment was linked to how much they are able to fulfil their goals and priorities for service through their volunteer work in addition to having a supportive, caring work environment.

Many design factors were identified whose consideration in design would enhance volunteer motivation and sustained engagement or could lead to better participation outcomes for volunteering platforms.

This indicates that engagement is not uni-dimensional, which corroborates a similar notion presented in the related work chapter that engaging volunteers should centre understanding their motivations and experiences. I will next present the idea of anchoring volunteer engagement and sustainability of digital volunteering platforms to certain motivational aspects that impact their participation.

7.1.3 Anchors of Engagement: Patterns of Volunteer Engagement in Digital Volunteering Platforms

In this subsection, I will discuss the patterns of volunteer engagement that I identified in this research. The earlier subsections on volunteer participation and motivation show that motivations and variety of experiences shape volunteer engagement which could be used to draw strategies for design. Accordingly, I present several broad concepts associated with engagement which I refer to as "Anchors of Engagement" and the corresponding design strategies found in my research which aid the engagement of digital volunteers (see Fig 7.1.3. The six anchors of engagement include recognition and reciprocity, relationships and sociability, communication and information, identity, flexibility, and inclusivity. These anchors of engagement effectively address research aim 3 of my thesis: ***To create guidelines that can be used for effectively supporting engagement of volunteers in digital volunteering platforms***.

An anchor of engagement was related to volunteers' desire for *recognition and reciprocity*. This was specified in research in all three case studies and was evident in themes such as recognition, appreciation, acknowledgement, and reciprocity. These could be addressed via design strategies that *focus on feedback* to volunteers. This could potentially involve *highlighting volunteer achievement* through fulfilment of their goals or the *acknowledging the impact of volunteer work* which could help in *building volunteer reputation* for those platforms where that is relevant. It could also mean *acknowledging volunteer work* properly via *gratitude* (as seen in OSPIA) or other strategies for platforms where it is relevant as seen in the OSPIA case study.

The engagement anchor linked to the aspects of *relationships and sociability* was very clear in all of three case studies. Some strategies that were commonly found to be useful for relationship building included *empathetic interactions and rapport-building*. It also included *creating safe spaces* where the volunteers felt respected and validated (as seen in ReachOut case study). Building relationships also involved *setting proper expectations* with others involved right from the beginning (as seen in OSPIA case

study). As the discussion in some earlier chapters shows, a lot of the work associated with relationship building involves *emotional labour and invisible work* that is used to create and maintain these relationships. The case studies indicated that the design of technology could support the hidden aspects of relationship building (as seen through the automation of chat responses for common scenarios in the ReachOut chat), or it could constrain it (as seen in the time and other design limitations of tele-interviews in OSPIA). Strategies that involve *reciprocity in relationship-building* (as discussed in the previous point) were also found potentially useful for addressing emotional labour and invisible work (as seen in OSPIA and StepUp case studies). A *community* perspective on relationship building was also found in all these case studies. Community building here involves not just with volunteers, but with others involved in the volunteers' work and in the design of digital volunteering platforms. Not only is the focus on social and community aspects in design potentially useful for those who volunteer for socially-orientated motivations, but it is important for building good experiences and general wellbeing for all volunteers. Experiences that involve or touch upon the influence of larger societal actors such as family, faith-based, culture-based, government, and other social institutions were also seen to be beneficial.

Communication and information can enhance or diminish motivation in digital volunteering. Effective communication with others within the community, which included having a communication protocol to to aid *learning, exploration, and to fulfil informational needs of volunteers* was seen to improve the workflow of ReachOut volunteers (e.g., by including the moderator handbook). In OSPIA and StepUp, the design focus for enhancing communication and information included *clarity* and a *favourable frequency* of communication as well as *adequate notice* of volunteering opportunities. Proper information and communication embedded as design features at opportune times and places in the volunteer experience were also seen to have the potential to help volunteers learn and grow. For instance, informational tutorials, Help, FAQs and other informational tools were discussed as useful features in this regard in the StepUp case study. It was also seen that volunteers had their own preferences for communication and information channels through which they engaged with the service. For instance, in OSPIA and StepUp, some volunteers preferred using both digital and other channels (e.g. radio, post) for communication and information. In StepUp, I also discussed the importance of publicising the volunteer-involving program/platform through varied channels, including local leaders, social media influencers, among other to build trust, especially among marginalised communities such as CALD populations. This indicates that using *varied information and communication channels* is important in volunteer engagement. Many of these design

factors related to communication and information, when combined with those of relationship building, recognition and reciprocity strategies were revealed to enhance engagement and wellbeing. For instance, building reciprocity in communication, as well as fostering empathy in communication and using acknowledgement and gratitude were likely to generate a positive impact on the volunteer experience, as seen in the OSPIA volunteers' experience.

Volunteering motivation and sustained engagement was seen to be associated with their various forms of *identity*. The case studies show how volunteers are deeply invested in various *causes* of interest such as mental health, medical education and scientific research, and how these are intertwined with their *prosocial* identity. The prosocial aspect of their identity is also evident from the fact that many of these volunteers have prior or ongoing volunteering commitments with these or other causes in other domains, with motivation associated with their prosocial values. There are additional facets of identity that are created through *experiences*, such as identity built around adversity or significant life events. It would be interesting to explore whether volunteer experiences could be shaped by their demographic aspects of identity, such as ethnic identity, gender-based identity, education-based identity, among others. Overall, findings show that a focus on the cause, experiences, and the prosocial facets of identity, and embedding those in design is important in volunteers' engagement. Thus, engagement could be achieved via *embedding identity in other design strategies* mentioned here such as community (identity-based community building) and other tools of relationship and sociability, or using information and communication to highlight or address the various facets of volunteer identity.

Flexibility in participation methods was also found to be an important motivational factor in all case studies. This included flexibility in scheduling, *frequency* and *duration* of volunteering. It also included flexibility in *choosing the volunteering methods, tools and technology*. For instance, for StepUp volunteers, it meant that they could choose when and where to volunteer (providing options for hybrid volunteering), or for OSPIA volunteers, the kind of technology (applications, hardware) used, and for ReachOut volunteers the options provided within the technology to do their work (options for tailoring responses to the visitors).

Additionally, the focus on *building inclusivity* could improve motivation for engagement by increasing usability and access to those who are marginalised through design. For instance, the lack of inclusivity could be caused by *inaccessibility* for people of varying cognitive and physical abilities as found in StepUp case study, or lack of *adequate representation* of the user demographics (such as culturally and

linguistically diverse volunteers) which were revealed through research. Some design recommendations to remedy these include focusing on *accessibility in design* (StepUp), addressing *emotional and invisible labour through design* (OSPIA), and including *diverse linguistic features* to cater to culturally and linguistically diverse groups of users (StepUp). Lack of inclusivity was also found in terms of *resources and infrastructure* for volunteering. This was seen as a major obstacle for participation for those in underserved communities, such as regional and remote areas in countries such as Australia or economically disenfranchised places in the Global South (as discussed in StepUp). One potential strategy to address this in StepUp case study was to focus on people and leveraging their already existing assets (also found in assets-based design by (Karusala et al., 2017)). While this highlights the features that could make digital volunteering feasible to diverse groups of people, it also highlights that this is an area that could do with a lot more research. This points to the importance of proper design research and analytical methods to uncover these issues in digital volunteering platforms. Figure 7.1.3 depicts the various anchors of engagement as discussed in this section and the various (possible) design strategies associated with those.

We observe that these anchors of engagement and the corresponding strategies also encompass various aspects of volunteer wellbeing through design. The following subsection will explore how the methodological approach used in this thesis helped specify the wellbeing for the design of digital volunteerism.

7.1.4 SDT and Other Methods in Design: An Exploration of the Wellbeing of Digital Volunteers

In this subsection, I will discuss how SDT and other methods helped uncover the various aspects of digital platform attributes linked to volunteer wellbeing. This effectively addresses research aim 2 of my thesis: ***To identify digital platform attributes linked to volunteer wellbeing***.

In this research, SDT proved to be an excellent theory for gauging motivations that were classified in terms of their degree of self-determination or self-regulation. SDT was used for motivational and psychological needs assessments in OSPIA and StepUp, and also for experimental design and assessment in OSPIA. For the quantitative results in the OSPIA and StepUp case studies, I found high scores of volunteers' motivations for internal regulation on the motivation spectrum, with

Anchors of Engagement	Design Mechanisms/ Strategies	Reach Out	OSPIA	Step Up
Recognition and Reciprocity	- Feedback on achievement and impact (to build reputation and satisfy volunteer prosocial motives) - Acknowledgement of work (e.g., through expressing gratitude to volunteer)	☑	☑	☑
Relationships and Sociability	- Empathetic interactions - Rapport-building - Setting proper relationship expectations - Addressing emotional labour and invisible work - Community-building	☑	☑	☑
Communication and Information	- Address learning and informational needs - Favourable frequency - Clarity - Adequate notice - Use varied social channels	☑	☑	☑
Identity	Use facets of identity in design: - Prosocial value-based - Experience-based - Cause/Interest-based	☑	☑	☑
Flexibility	Flexible participation in terms of: - Frequency and duration - Methods, tools, and technology	☑	☑	☑
Inclusivity	- Accessibility features for varying physical and cognitive abilities and preferences - Representation, e.g., by building language features for CALD, addressing invisible labour of marginalised gender/s - Address lack of resources and infrastructure (e.g., via leveraging existing assets of communities)		☑	☑

Fig. 7.1: A tabular depiction of the anchors of engagement for digital volunteerism, their corresponding design strategies, and the thesis case studies they are found in
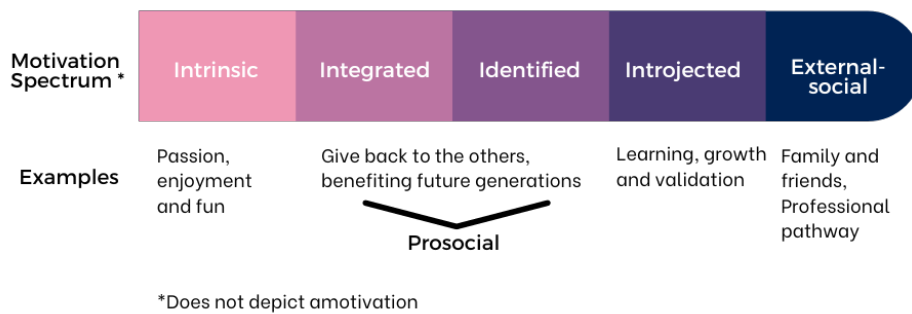
Fig. 7.2: Examples of volunteer motivations found in this research mapped on to the SDT motivation spectrum

highest scores for integrated motivation, followed by intrinsic motivation, then identified motivation and a few others reporting introjected and external-social motivations, and no or negligent measure of amotivation (refer to results of chapters 4 and 5, OSPIA and StepUp case studies respectively).

The qualitative results in all three case studies also offered more clarification around the SDT motivation spectrum and ways of fulfilling psychological needs for digital volunteers. For example, the *prosocial motivations to give back and benefit future generations* corresponds mainly to identified and integrated motivations (see 2.3.3 for further explanation). *Enjoyment, fun and passion* for the tasks or areas of interest corresponds to intrinsic motivation. The motivation to volunteer based on desire to *learn and grow* for meaning-making, which also includes motivational influences from experiences of *adversity* (getting afflicted with health ailments) and the desire for *validation* (for instance, after retirement) corresponds to introjected motivation. The desire to *make social connections and maintain social connections* and the motivational influence from *family, work, and other social influences* correspond to external social motivation. These motivations also contribute to volunteers' identities such as those that are formed based on volunteers' interests or experiences. As a result, it is clear that SDT can provide a theoretical lens as well as an effective assessment modelity for volunteer motivation. It can also guide our understanding of volunteer motivation on a broader level which can put associated design strategies into perspective. Figure 7.1.4 aims to map some of the volunteer motivations found in this research on to the SDT motivation spectrum.

Volunteers also described various experiences (many of them represented as design strategies in 7.1) in the course of these investigations, which ultimately contribute

to or thwart the fulfilment of their psychological needs. This shows the relevance of using psychological needs constructs as postulated by SDT in a digital volunteering context. To demonstrate the relevance of SDT, I will offer a scaffolding next, to clarify volunteer values and platform design features corresponding to three psychological needs underlined by the theory: autonomy, competence, and relatedness.

The values of feedback, recognition, appreciation, impact, respect and achievement were identified in relation to volunteer motivation and fulfilment of needs in all three platforms, encapsulating the relevance of fulfilling the need for competence. Favourable views towards reciprocity, empathy, and rapport building indicated relatedness. While relatedness was evident through community building in ReachOut, we saw it as a multi-perspective approach in OSPIA and relationship building with others in the volunteering ecosystem in StepUp. Flexibility of frequency, duration, methods, tools, and technology for participation represent the volunteers' needs for autonomy. There were also some practical barriers for individuals to volunteer such as technological ability, accessibility, geographical and cultural barriers which also contribute to disengaging these volunteers by thwarting their psychological needs. Thus, addressing inclusivity in design could improve the psychological needs of varied groups of volunteers.

Using the motivational and basic psychological needs framework in my research as encompassed by SDT helped link engagement with the wellbeing of volunteers. The SDT assessments helped determine the health of these systems by pointing out aspects of design linked to volunteer wellbeing. For instance, in OSPIA, it clearly showed the shortcomings to address of psychological constructs. However, it also indicated the severity of issues due to lack of a sense of relatedness among volunteers, which was significantly low in online volunteers as compared to physical (campus) volunteers. This helped in providing a clear direction for design to improve volunteer wellbeing and engagement via looking at SDT constructs, more specifically relatedness.

My initial research (starting with the ReachOut case study) began with looking at wellbeing from an individual volunteer perspective and gradually expanded to include other actors and groups of people within the volunteering context. Thus, SDT proved to be an excellent assessment and interpretation tool to link volunteer wellbeing with the individual and interpersonal aspects of engagement.

However, the qualitative findings from the participatory part of my research revealed that the engagement and wellbeing of digital volunteers are connected with the

functioning and wellbeing of the other actors and stakeholders within and outside the volunteering context with complex social, community, cultural, economic, ethical and infrastructural facets, thus highlighting their interdependence. For instance, when exploring relatedness through co-design workshops and interviews in the OSPIA case study, findings reflected the complex nature of sociability in maintaining engagement and wellbeing. This echoes the idea of using participatory methods in the design process to highlight care in digital volunteering as discussed in Chapter 6 as well as other related work (Howard & Irani, 2019; Krüger et al., 2021; Rossitto et al., 2021). More specifically, this was reinforced in chapter 6 of this thesis where the lens of care ethics highlighted the importance of including the community and societal aspects in designing for digital volunteerism. For instance, considering broader societal aspects could include awareness of government-backed policies representing a certain infrastructural ethos (for instance, libertarian or capitalistic) that tend to influence the socio-technical explorations. This would consequently impact upon the design for digital volunteerism. Thus, socio-technical explorations would show significant contrasts in different countries and even sub-cultures within a specific country. The discussion in chapter 5 also focused on how other familiar social institutions such as family and loved ones, professional and educational influences, and faith-based and other cultural influences impact volunteering participation by forming pathways as well as shaping volunteer motivation. Additionally, there were findings associated with issues of *social inequity and marginalisation* that arose in the course of my research that would not be adequately covered by using the basic assessments of wellbeing and psychological needs only. For instance, the research revealed disparities along the lines of gender and culture. This extended to the disparity in the labour for maintaining the intricate aspects of relationships and sociability and pointed towards invisible and emotional labour which are hard to uncover through the relatedness and other assessments in SDT.

This indicates that relatedness as understood in SDT provides a limited framing of the complexity involved in social experiences and the situatedness of volunteer social identity. Relatedness (according to SDT) views an individual's sense of fulfilment from having meaningful connections to people that *matter to that individual*. This definition is essentially different to the notion of social identity and complexities around factors that shape the social identity (e.g. culture, politics, economy, and other facets mentioned above which link to notions of equity of access and justice in volunteering). These factors facilitate or diminish our social standing and equity of access, among other socially situated outcomes. This observation in my research echoes the observation by Peters et al 2018 who note that SDT can provide designers with an assessment of the the psychological needs constructs against which design

features of technology can be tested, which lead to positive physical and mental health outcomes of the target user. However, Peters and colleagues acknowledge that it does not provide a holistic picture of the various aspects of wellbeing and engagement that extend beyond the individual, more specifically at the societal level (Peters et al., 2018). As a result, there is an argument to be made around the sufficiency of SDT as the sole lens for exploring volunteer engagement and wellbeing.

The limitation of psychological frameworks like SDT in the design of digital volunteerism has methodological implications which surfaced throughout my research. In all three case studies in this thesis, using methods such as open-ended surveys, interviews, co-design workshops, and generative methods complemented the data gathered from SDT and other scales and helped generate a rich narrative for the purpose of design. In Chapter 6, we saw that extending this understanding using a lens of care ethics helped reflect on these and other aspects of design that would generally go unnoticed, specifically when it comes to highlighting the complex psycho-social nuances in socio-technical research in digital volunteerism. This indicates that the use of SDT as a psychological theory with participatory research when combined with a critical lens provided by care ethics has the potential to generate holistic design insights for digital volunteerism.

Therefore, with a view of designing for volunteer wellbeing AND sustained engagement, I look at a framework that combines the individual wellbeing supportive aspects outlined in this and 7.1.3 as well as the societal and community aspects as seen through participatory research and care ethics. This will be a step towards presenting digital volunteering as a socio-technical phenomenon and accordingly design for it. In the next section, I will outline the various societal and community aspects that influence design for digital volunteering.

7.2 The Community and Societal Influences in the Design for Digital Volunteerism

This section is based on my work on the three case studies and the care-focused framework. However, it is pertinent to acknowledge that the inspiration for the conceptualisation was drawn from the research conducted by Volunteering Australia. In December 2021, I started my formal association with Volunteering Australia, serving

on a research panel of 13 members, each providing their discipline-specific expertise to advise on the research for developing the National Strategy for Volunteering in Australia. In this role, I provided expert input with regards to research on using technology for volunteerism in Australia. However, I believe that this association was equally beneficial to me as it helped me to conceptualise a design framework for a Volunteer Centric Design for digital volunteerism. More specifically, it helped me understand how community within a specific volunteering context and the larger society manifest in an applied research setting to design for better, just, and more equitable volunteering outcomes.

The National Strategy for Volunteering is a project (Dec 2021-Dec 2022) that seeks to involve the relevant societal and community influences to derive a strategy for volunteerism in Australia that is *effective, inclusive, and sustainable*. These societal and community influences are collectively termed as the *Volunteering Ecosystem* and include researchers and experts (both academic and non-academic), corporations, government services (especially the ones providing funding for this project), cultural groups (including CALD, rural, and other socially marginalised groups in Australia), among others. Using participatory research methods such as co-design workshops and surveys, the project aims to conduct comprehensive research for one year in order to gain insights for the Australian National Policy related to volunteering. These insights would be used to redesign how volunteering services operate in Australia by providing a service blueprint to achieve the desired volunteering outcomes (effectiveness, inclusivity, and sustainability). While observing the research design and activities for this project, I noticed some similarities with my research process and findings in terms of how design for volunteering experiences involves association with focused communities as well as the broader society during the research process.

The findings presented in my research have pointed to the importance of various societal and community elements in the design of digital volunteerism. We observe the community and societal influences that provide direct or indirect design influence. A participatory research methodology would consider the involvement of these social and community elements during the research process. I distinguish between societal and community elements because the former is broad and encompasses many groups that may be described through cultural, political, economic or other facets. The latter is however specific in terms of a core identity or sub-culture that describes its essence and brings people together. As an example, in an Australian society, we have communities identifying based on faith, language, interest, activism, and more.

In my research, I found that there are people and groups of people that form a volunteer's community whose impact on design is very apparent, both in terms of (i) being involved in the core design process as well as (ii) their association with the digital volunteer. These are identity-based communities of the volunteers, such as interest-based communities (e.g., science) or cause-focused communities (e.g., refugee-advocacy). These are the communities that the volunteers aspire to be a part of or identify with, forming their aspirational communities. However, in addition to being solely aspirational, these communities also benefit from the action of the volunteer, thus being the *action-focused community* of the volunteer. For instance, a volunteer working for refugee advocacy on a digital volunteering platform may also identify with the science-based community based on their scientific interests (aspirational community). However, this science-based identity does not significantly influence their volunteering with the refugee advocacy community (action-focused community), at least not more than it influences their other aspects of life such as work, family, and so on. Additionally, in my research, I found that peer volunteers on a platform or service form a direct association with volunteers, essentially forming a *peer-volunteer community*. Another instance of a community found in my research is the *technology design community* that is formed of researchers, designers, engineers, and others who provide various technical and specialist services for building and maintenance of the digital volunteering platforms and services. There is also the *management community* involved in the management and maintenance of processes and operations associated with the overall program/cause. More specifically, for formal digital volunteering, the community is associated with organisational personnel and those who manage the operations of the specific volunteer-involving organisation (VIO). For instance, community managers in ReachOut, the program director and volunteer manager in OSPIA and StepUp are part of that community. This community may also involve other key stakeholders involved with the service associated with the volunteer-involving program/platform. For instance, in StepUp, scientists and researchers are significant stakeholders, and are thus involved in this community. Finally, beneficiaries of the volunteer work also form a separate *beneficiary community*, more specifically where there are direct beneficiaries (such as in OSPIA and ReachOut). The beneficiaries could also include non-human actors (such as the ecosystem, animals and other species found in nature and conservation volunteering) and could provide contextual insights in the design research process.

My research also pointed to some societal actors and institutions that broadly influence the participation of volunteers in latent ways (see 5.5.2 for supporting arguments). The influence can be in the form of (i) shaping values and motivations related to volunteering, and (ii) forming pathways to volunteering. These

societal actors and institutions provide the broad social influences for volunteering participation by impacting, for instance, the prosocial or other beliefs and values of these volunteers. One such influence is provided by *professional/ educational institutions and backgrounds* of individuals. For example, some people volunteer in education because they had worked as a teacher, or volunteer in mental health because they want to become a psychologist. Additionally, affiliation with professional/ educational institutions was also seen to serve as a pathway for volunteering in the case studies. *Family and loved ones* were also seen to shape one's experiences, decisions and priorities associated with volunteering. Family and loves ones impacted the motivation of volunteers (e.g., volunteer as a research participant because a loved one was struck with a medical condition) or provided a pathway for volunteering (e.g., volunteering in children's school clubs), which was found in all case studies. Similarly, *Government, Legal, and Policy Systems*, *Faith, Religion, and Spirituality(FRS)-based systems*, and *Culture-specific institutions and actors* (such as influencers, local leaders, ethnic groups, etc) influence volunteer motivations, values, and identities. They also impact upon participation in volunteering by facilitating or constraining pathways for volunteering (by regulating or normalising volunteering, e.g., through policies, decrees, cultural trends, etc). *Corporations and organisations* are also seen to impact volunteering experiences and outcomes. Both for-profit and non-profit organisations impact the processes and the technologies used for volunteering and often shape the volunteering perceptions of people. For instance, organisations such as Mozilla and Wikimedia provide the volunteering infrastructure that shapes the experiences of associated FOSS and Wikipedia volunteers. Similarly, social enterprises and other corporations provide design impetus for local causes that involve volunteers, such as those involving corporate volunteerism. While these societal actors and institutions may occasionally form a more direct association with a specific volunteering program based on the cause or interest (e.g., grand/parents volunteering for children's school clubs, volunteering for mosque-specific programs), they often provide strong indirect influences for volunteering participation and engagement.

I note that the distinctness, influence, and nature of various community and societal influences outlined in this section could change with context. For instance, the way the cultural, legal, and FRS-based social systems influence people in China or other societies that share the same socio-historical and cultural outlook may be very different from how they operate in Western or similar societies.

The implications for this conceptualisation are strong. This conceptualisation allows us to understand the involvement of societal and community influences in framing

volunteering, researching it through a participatory methodology or design for it. Understanding the community and societal influences on volunteering are core to my proposed volunteer-centric approach. While the community influences are likely to be more closely and more frequently involved in the design process, the societal influences may be occasionally involved and could be used strategically in design to understand and shape the engagement of volunteers. For instance, the findings in all three case studies and care ethics chapter suggest we must include the various communities (outlined above) very closely during the design process. This includes seeking constant feedback and working closely for an end-to-end design of digital volunteering platforms and services with these communities. On the contrary, in the StepUp chapter, the design recommendation to involve societal influences such as FRS-based and government entities was to improve the publicity and public perception of potential volunteers. However, this would not entail an end-to-end involvement of these influences. This conceptualisation adds to our understanding of a volunteer-centric design framework described next.

7.3 Towards a Volunteer-Centric Design: The Volunteer-Centric Design Framework for Digital Volunteerism

Through my doctoral research, I contribute a set of resources which together form new directions towards volunteer-centric design. Those are:

- six anchors of engagement

- a care-focused framework

- psychological framing of digital volunteering

- societal and community framing of digital volunteering

- a volunteer-centric design framework

The first four are used to develop the last item, as I demonstrate next. In section 7.1 of this chapter, I discussed how the various aspects of volunteers' motivations

and experiences could be used to support their engagement and wellbeing. More specifically, the six *Anchors of Engagement* and the corresponding design strategies discussed in subsection 7.1.3 specify how to build experiences for volunteers' engagement that consider their motivations and life experiences. The importance of methods to critically highlight and design for wellbeing and engagement of digital volunteers was also outlined in subsection 7.1.4. To guide future design to enhance wellbeing (in addition to other critical perspectives for engagement) of digital volunteers, I proposed the *care-focused framework* consisting of seven conceptual categories in the previous chapter in Figure 6.2. In section 7.2, I discussed the various *community* influences and *societal* influences that impact design for digital volunteering directly and indirectly.

To bring all the four perspectives together, I propose the Volunteer-Centric Design Framework as depicted in Figure 7.3. This design framework presents a narrative of designing for volunteer engagement and wellbeing in digital volunteering platforms. It provides a comprehensive overview of design by presenting the four above-mentioned evidence-based resources as essential design components and connects it to the outcomes of volunteer engagement and wellbeing. These components of the framework are described as follows:

First, we have the **Engagement** component which is comprised of the six Anchors of Engagement - recognition and reciprocity, relationships and sociability, communication and information, identity, flexibility, inclusivity - and their corresponding design strategies. These anchors of engagement were synthesised from my research on volunteer motivation, experiences, values and expectations. Most of these also corroborate the existing research on volunteer engagement. However, the anchors provide a well-defined systematic checklist for designers to look into design foci along with their corresponding strategies. The corresponding strategies could be applicable in various contexts, but could be varied based on the constraints and opportunities as investigated through the research process.

Secondly, we have the **Care** component that provides a critical perspective of design in digital volunteerism. It encompasses seven concepts of care - focus on action, mutual benefit, reflexive approach, relatedness and interdependence, ownership of the product of labour, care for all, and gendered socialisation - and all that these entail within a digital volunteering context. It provides guidance for designers in terms of pointing out where critical reflections are essential in the concepts, processes, experiences, and consequences of design in digital volunteering.

Design for digital volunteerism also entails the input and consideration of all those that form direct association with the volunteer's work. This includes the **Community** component, consisting of action-focused, peer volunteers, technology design, management, beneficiary communities that influence volunteering experiences and outcomes. It also involves a critical consideration of the **Society** component that provides indirect influences through impacting volunteers' values and forming pathways to volunteering such as professional and educational institutions, family and loved ones, governmental and legal entities, FRS, corporations and organisations, and other culture-specific entities and actors.

An important consequence for design observed in these components is the methodological need for considering *volunteers' motivations and wellbeing*, which are impacted by many psycho-social factors. Thus, using a motivation and wellbeing focused psychological framework (such as SDT) in a participatory research context and using a critical lens (such as care ethics) would provide comprehensive insights for design.

7.3.1 Guidelines for a volunteer-centric design process

In this subsection, I offer guidelines based on my research for a volunteer-centric design process. These guidelines can be used to understand and enhance currently existing volunteer-involving platforms. However, they could also potentially help designers to create a new digital volunteering platform.

G1. Embed an exploratory participatory research with volunteers and stakeholders in the discovery phase.
G2. Review volunteer engagement data, if any exists.
G3. Assess volunteers motivations, experiences, demographics and other relevant information.
G4. Use a care-focused framework to reflect critically on the design.
G5. Implement, test, and iterate the design with a focus on participation of volunteers and relevant others.

As shown in my research, the design process could start with exploratory participatory research (G1) which includes stakeholder meetings, contextual observations, reviewing relevant documentation, and having one-on-one interviews, and co-design workshops with (potential) volunteers to get a basic understanding of the digi-

tal volunteering context and volunteers' motivations as well as assess the various community and societal influences associated with the volunteering context.

This could be followed by reviewing existing volunteer engagement data (G2), if any, such as appointment rates, user analytics, registration data. It could also involve checking for precedents of volunteer engagement in similar or related digital volunteering contexts.

The next step would involve investigating the motivations, needs, experiences, and other relevant information such as demographics of (potential) volunteers (G3). This could be complemented by assessing volunteers' motivations (such as those found in SDT) that provide an understanding of the quality of their engagement and wellbeing, their demographics, and the affective aspects of design. In addition to standardised methods such as SDT survey tools, this assessment could be supplemented with qualitative research (interviews and workshops) to capture volunteer experiences and meaning-making. The structure provided by anchors of engagement in this thesis could help guide the design investigations and analysis of the resultant data. This would provide insights to improve volunteering experiences to support their engagement and wellbeing in that particular context.

Additionally, designer reflections using the care-focus framework could be used throughout the design process (G4) to help the designer be mindful of the various opportunities and constraints that are offered within a digital volunteering context. For instance, initial exploratory results showing the need for relatedness could help designers focus on designing for the more commonly understood aspects of relatedness such as using community-building strategies (which could focus on their identities) to build camaraderie among the volunteers, their managers, and the beneficiaries, among others. However, it would also offer the benefit of investigating and building for less understood aspects of sociability such as invisible and emotional labour and propose strategies to address that. Additionally, it could offer new opportunities for design justice. For instance, demographic gender data that skews towards female participation could offer a chance to strategise to narrow the gap between achievement and authority aspect of design with the care and cooperation aspect of design, thus paving way for more gender inclusivity.

The resultant insights could be used to build a new platform, or improve the design of the existing platform (G5). This would also include testing and evaluations of usability and user experience goals, among other aspects of design, which could be iterated to achieve objectives. The various iterations would involve close involvement

of the volunteers, stakeholders, and other relevant key communities based on the context. Thus, in this design process that focuses on participation, the needs of the volunteers, the volunteer-involving cause/organisational objectives, and other close and important members of the community would drive the needs and requirements of design.

Thus, a volunteer-centric design in the context of designing digital volunteering platforms could be defined as:

> *A participatory and reflexive approach to design that encompasses psycho-social influences to care for and support volunteer motivation and wellbeing to enhance their engagement.*

The volunteer-centric design offers the potential for improved volunteer engagement and wellbeing through their participation on the platform. Further, it also has the potential for profound impact through focus on design justice. This could improve the volunteer and public perception of the larger volunteer-using service/organisation associated with the platform, thus contributing towards platform sustainability and social equity outcomes.

Fig. 7.3: Vounteer-Centric Design framework that depicts the four major components - Engagement, Care, Community and Social - in the design of digital volunteering platforms and services

7.4 Research Reflections

In the concluding section of this chapter, I outline some personal reflections related to my research on the broader topic of digital volunteerism. These reflections took form once the research on all cases was completed and therefore were not part of the published work presented in earlier chapters of my thesis. Nevertheless, I believe they could help provide critical insights for design.

7.4.1 What's in a Name? Online Volunteering Or Online Voluntary Contribution?

During the course of my research, many people have expressed surprise at the inclusion of some of the domains under digital volunteerism. For many, Wikipedia, Open Source and citizen science contribution is not "exactly volunteering" due to the association of the term volunteering with different mental models that entail altruism, care, compassion, and other similar concepts. In dominant mental models, volunteering is associated with online non-profits or other care-focused volunteering platforms and services. In chapter 6, I touched upon the issue of romanticising volunteerism which may contribute to unequal volunteering outcomes.

The digital medium is known to deepen the divide in unequal volunteering experiences and outcomes, especially when it comes to the use of voluntary digital labour. This point is detailed in the book, *Heteromation, and other stories of computing and capitalism*, where Ekbia and Nardi 2017 attribute the devaluing or rendering invisible of many forms of online volunteering because of the capitalistic framing and conceptualisation of many such online platforms and domains (Ekbia & Nardi, 2017). This contributes to the larger social construction of what constitutes digital "volunteering" and what does not. However, as outlined in this thesis, even though there are differences in these platforms, Wikipedia, Open Source, Citizen Science, and other similar platforms have consistently shown considerable similarities and overlaps with the volunteer motivations and values in typical care-focused volunteering platforms, thus invalidating the dismissive assumptions. Importantly, we can see that these previous findings on volunteer motivations and values overlap with findings presented in my thesis, which contribute to the homogenisation of digital volunteerism, i.e., voluntary activities using digital technology for common good and without any financial gain.

7.4.2 Digital Volunteerism as a Privilege

While reading the UN's State of the World Volunteerism report 2018, I came across this quote by a volunteer.

> "Because of the crisis, volunteerism is considered to be a luxury today. You can think of it as an application of the Maslow pyramid. People try to cover first their primary needs. They try to have food to eat, they try to find a job, they try to support their families... Therefore, the need to help other people without receiving any kind of help by the community does not come first, and this has a direct negative impact on volunteerism." Research participant, Greece, SWVR field research. (UNV, 2018)

This quote captures an essential and profound aspect of volunteering. Engaging in volunteerism is determined by several factors, many of which the individuals have no control over. For instance, my research showed the interplay of social class, gender, ability, language, geography among others to impact volunteering engagement. This is even more exacerbated when it comes to the use of technology for volunteering, specifically when a significant population in the world is not even technologically-abled, i.e. inadequate or no technology infrastructure, equipment or internet connection (France-Presse, 2021). One might argue that volunteerism, by design, is often a privilege of the few who manage to bypass these social and infrastructure obstacles. There is therefore a moral obligation for design to create more equity of opportunity for volunteering, as both the cause of volunteering and the means to volunteer are designed. This is important particularly as I outlined the evidence that volunteering is associated with wellbeing and happiness in life. In this thesis, I have essentially established via the volunteer-centric design that the findings on motivating volunteers are not complete unless we take their life, livelihood and other social circumstances into account. Therefore the volunteer-centric design advocates for looking beyond the technology paradigms and examine all the factors that contribute to volunteer participation and engagement, and ensure that wellbeing and happiness are not "privileged outcomes" for those who can access and use digital platforms.

7.4.3 "Can't put a smiley on it!" The importance of methodological flexibility in digital volunteering research

The demographics of participants in the OSPIA case study indicated many volunteers were retired and above the age of 60. This composition was reflected in many of the workshops whose participants included retirees, mostly people from an elderly generation. The generative activities I designed for the OSPIA workshop mainly consisted of a worksheet followed by discussion. However, additionally I had planned on conducting role-plays as a form of exercise that would enrich the workshop discussions. The role-play would include me playing the role of a student and the workshop participant (an SP volunteer) playing themselves in a session. When the role-playing was piloted in one of the workshops, an elderly participant mentioned that he could not do it as he did not see how he could be useful with that activity. "*It's just pressure to be useful, that's all*". W2P1. After that, I discarded the idea of using role-play in that study. In another workshop, the hesitancy of a few participants, a group of elderly SPs, to partake in generative worksheet activities was exhibited when they mentioned how they could not express themselves clearly on a worksheet. They found it incomprehensible to "write" their feelings instead of "speaking" them out. This was clearly not a case of the method being unsuitable for the cohort as the same activities were used successfully in the preceding and succeeding workshops with other participating SPs.

> "It's almost a reluctance, but I don't mean it against you. It's not my generation, not me. I don't do things like this. It's obvious how I feel, because I keep coming back. Signing up for every single particular session she [the program manager] has, why I like it. That whole [thing], you can't write that down. Can't put a smiley on it!" W3P1

My experiences during workshops and interviews also highlighted the importance of tuning in to the participant frame of mind and group dynamics. This is important in situations where the participant reveals sensitive information. For instance, a female participant once made a sensitive revelation about a student being sexually inappropriate with her.

(WARNING: THE FOLLOWING QUOTE INCLUDES DESCRIPTION OF SEXUAL AS-SAULT WHICH COULD BE EMOTIONALLY DISTURBING FOR SOME READERS).

I had one guy... I have never mentioned it to [name of the program manager], he [the student] was inappropriate and I could have whacked him... It happened about 3-4 years ago. He asked me to take off my bra to see my breasts! I don't even want to go there! Cause I know he will fall flat on his face. Later on, I did say something to him. That "You got a mom!" and that was all I ever said. And he just looked at me and said, "Yeah", and that was it. W3P3

In the same workshop, the participant quoted above and another participant had conflicting opinions about their experiences that indicated them feeling excluded and marginalised. While W3P3 and W3P2 (who identified as women) seemed to attribute their negative experiences to their gender, another participant (who also identified as a woman) seemed to negate their ideas very frequently. This is indicated via a few snippets of their banter as follows:

W3P3: And I think, women of our age tend to pretend to be invisible. I mean I go to a park with my husband and somebody would talk to him and you are not there. W1P1: I actually love it! You don't have to try anymore. You don't have to suck it in.

W3P3: I have had a few students, male students, who have come from clearly, privileged background and top private schools and they have an elevated idea of their own importance and competence. Khushnood: And how do they display that? W3P2: It's almost a little patronising, intimidating, condescending and it is almost they are above you a little bit and almost in your space, that you have to back off from them, their voice, they're everything and almost all the questions asked were irrelevant. W3P1: I have never had that experience...They have never ever made me feel inferior or anything else and they have always been very appreciative of my time. I have nothing but good experience!

These were some situations I experienced as a workshop moderator where appropriate responses and constant management of group dynamics were required. Additionally, it was also essential to make sure that all participant opinions were validated keeping in mind the organisational policy about service and the ethics protocol. Appropriate moderation in these and other similar situations is also important if we are aiming for adequate representation of the marginalised volunteers in the design process, and subsequently, in the design of digital volunteering platforms.

These and some other tricky moments in workshops and interviews were learning experiences for me with respect to how to deal with conflict and sensitive situations as a moderator. After these workshops, I reflected with my supervisor, Naseem Ahmadpour. One thing that stands out in those reflections is that methodologically, what works for some participants in participatory research may not work for others. Also, it is important to be open to participant preferences and aim to build an understanding and empathy between the participant and researcher even if that means we make some changes to our plan in-situ. That requires a degree of flexibility in study design. This also echoes the idea of reflexivity in approach as discussed in the previous chapter. At the end of the day, it is the quality of information, participant wellbeing, and ethical integrity that are paramount during research. Additionally, qualitative research relies on authentic engagement of participants, with research methods and issues such as precision of the method or assessment are viewed completely differently compared to quantitative research. Thus, based on the aforementioned situations, the following lessons learned should be kept in mind for generative research:

- Clarify the role and contribution of participants in the study to create mutual benefits. This is in addition to the participant information to make sure that they understand their role well and know how their contributions fit into the bigger picture of your research. This fits into the idea of mutual benefit as understood through care ethics in socio-technical research on digital volunteerism where our research process addresses the volunteers' needs to make a positive impact through their participation.

- Empower the participants so that they are able to contribute to the research based on their own strengths rather than be stifled because of a rigid methodological approach. Thus, it is important to make room for flexibility based on participant preferences and abilities.

- Create safe spaces so that all participants feel safe discussing relevant information. This would involve trust-building mechanisms as well as those that focus on creating empathy between researcher and participant. This also considers appropriate training for moderators to respond to sensitive situations such as inter-group conflicts during workshop moderation, disclosures of sexual abuse and trauma, among others, especially when managing those with minoritised backgrounds.

Conclusion

<div style="text-align: right;">8</div>

> *"I protest against any absolute conclusion."*

— **George Eliot**
Middlemarch

In this chapter, I conclude my thesis with a concluding discussion and a brief summary of contributions of this research. This is followed by some limitations of my research, and consequently, future directions for research in this space.

8.1 Summary of Research

The research in this thesis focuses on investigating the motivational aspects of design that enhance volunteer engagement and wellbeing in digital volunteering platforms. In order to achieve this, I conducted design research with three Australian volunteer-involving organisations (corresponding with three case studies presented in this thesis) whose design needs surrounding volunteer engagement aligned with my research aims:

1. To investigate the motivational aspects critical for enhancing digital volunteerism experiences (which is critical to their wellbeing).

2. To identify digital platform attributes linked to volunteer wellbeing.

3. To create guidelines that can be used for effectively supporting the engagement of volunteers in digital volunteering platforms.

I used a participatory approach which employed active stakeholder management and several methods for gathering data including co-design workshops, interviews, qualitative and quantitative surveys, a pre-test post-test experiment, user logs and

analytics, and contextual observations. The findings present the complexities of motivations of digital volunteers and provide several context specific and generalisable guidelines for design. I further create a Framework of Care to analyse the findings of these case studies to get critical insights for design for digital volunteerism.

This research resulted in a Volunteer-Centric Design framework that includes four major components — (i) the *Engagement* component consisting of six major Anchors of Volunteer Engagement in digital volunteering platforms (7.1.3), (ii) the *Care* component consisting of the seven conceptual categories that provide critical considerations for design(6.2), (iii) the *Community* component that provides association with core identity or sub-culture that describes its essence and brings people together for the purpose of design in digital volunteering (7.2), and (iv) the *Society* component that provides cultural, political, economic, moral, or other influences that impact the participation of digital volunteers(7.2). I propose that this framework be used in a systematic approach described in (7.3) to achieve volunteering platform sustainability in addition to the desired volunteer experiential outcomes of enhanced engagement and wellbeing.

Moreover, this research also contributes to creating a uniform terminology and conceptualisation for HCI researchers and designers by providing a salient definition of digital volunteerism taking into consideration the social, economic, technological, and other relevant intersecting aspects of this phenomenon. In doing so, the research provides a common lens to homogenise and present various disparate instances and domains of digital voluntary labour under the holistic term of digital volunteerism.

8.2 Research Contributions

In this thesis, I offer an *empirical* contribution by framing the complex psychosocial factors that shape volunteer motivation and engagement and impact upon their wellbeing on digital platforms. The findings corroborate previous research in HCI that highlights the individual interest in the volunteer work expressed as satisfaction, fun, and enjoyment of volunteer tasks as important motivations for participation in many digital volunteering platforms. I extended the existing line of research by additionally highlighting the importance of prosocial values and attitudes in sustaining the motivations of the volunteers at different stages of their work. I further found that volunteers' motivations were shaped by their values and

principles associated with their life experiences, education, and expectations. The impact of influences such as peer volunteers, beneficiaries, volunteer management and VIOs, family, government, FRS, professional and educational backgrounds, and cause- or interest-based communities associated with volunteering was also important in directly and indirectly impacting volunteer motivation and engagement. Therefore, this research highlighted the complexity of motivations for volunteering in various contexts and how it is important to uncover the various motivational and experiential facets supported by proper research methods and tools.

My research also provides a *theoretical* contribution by proposing the volunteer-centric design framework for digital volunteering. The framework consists of four main components - Engagement, Society, Community, and Care - each encapsulating their specific strategies and considerations based on my research findings. The care component consists of the seven categories outlined in 6.2, the engagement component consists of the anchors of engagement described in 7.1.3, and the community and societal components consist of the various social influences described in 7.2. The consideration of these components in design would improve motivation and wellbeing, providing directions for enhanced volunteer engagement.

The research also provides *methodological* contributions to examine volunteer motivation, wellbeing and engagement. These included contextual observations, and co-design methods using generative methods supported by participant surveys consisting of quantitative and qualitative questions exploring relevant demographic, experiential, motivational, and other wellbeing-focused information wherever possible.

More importantly, with respect to methods, I systematically investigated volunteers' wellbeing and how focus on their motivation in a comprehensive way can aid design to support volunteers' efforts to create their own wellbeing through volunteering. This indicated the importance of research methods in determining and enhancing volunteer wellbeing. In particular, I showed how combining a wellbeing focused psychological framework like SDT and a critical focus provided by care ethics within a reflexive and participatory research context can help design for volunteer engagement and wellbeing. This also revealed opportunities to improve experiences of marginalised groups of people and advocate for a justice focused design to bring equity of access to many more people for whom digital volunteering has not been possible. Thus, instead of speculating on imagined universal design principles for digital volunteerism, my research proposes a commitment to inclusivity and wellbeing for those who are usually neglected (such as those from diverse cultural

and linguistic backgrounds) or often not adequately represented (such as people with varying abilities, women, among others).

This thesis also contributes to building a narrative of ubiquitous experiential and motivational aspects of volunteer participation in online volunteerism across several domains and contexts. With many online platforms that seek to build volunteer engagement such as those following crowdsourcing, micro-volunteering or macro-volunteering participation models, the HCI community will surely look towards resources to design for volunteer motivation and engagement. It is my hope that the research presented in this thesis becomes a distinctive design resource for such endeavours.

8.3 Limitations

One of the limitations of this research is that the volunteers and the volunteer-involving organisations included are all Australian. As in any situated research, the generalisability of some of the results within other cultural and social contexts should be treated with care, especially considering many regions in the Global South which are predominantly more collectivist rather than individualistic (as many cultures in the Global North are), where even the definition of "volunteer" can vary to a great extent (UNV, 2018). This could thus lead to variations in the impact of engagement strategies presented in this thesis. This cultural (and the broader societal) limitation is presented as a caveat related to the consideration of various influences of the community and society in volunteer-centric design in my discussion chapter as well. However, it also opens the possibility of studying the volunteer-centric design approach in other social and cultural contexts.

This research has focused mostly on the experiential and motivational aspects of volunteering, thus are limited to the quality of experiences and work performed by the volunteers. As a result, there were not significant design insights related to the "quantity" of volunteer work. To highlight this, the experimental results in Chapter 4 (OSPIA case study) indicated significant variations in the amount of work performed by some volunteers. I mentioned this observation in Chapter 7 about the participation of OSPIA volunteers. This has been referred to as the Pareto Principle of volunteer work that was found in other forms of volunteering held mostly on micro-volunteering and crowdsourcing platforms that use volunteers (Eveleigh et al.,

2014; N. T. Reeves & Simperl, 2019; Zedlitz & Luttenberger, 2017). There could be implications for design based on extending the research to quantity of volunteer work, that remain unexplored in my research, primarily due to the scope of my thesis.

Also, the case studies in this thesis fall on the care-focused end of the spectrum (as specified in the spectrum of care in digital volunteering in Chapter 6) placing another limitation in the applicability of the volunteer-centric design framework in volunteering contexts on the other end of the spectrum. The different strategies and considerations aligned with the four components in the volunteer-centric design framework could vary for volunteering contexts that are not typically characterised as care-focused.

Another possible limitation of this research could be its scope which predominantly examined the volunteers' experiences and motivations. One may argue that focusing specifically on the volunteer rather than the others that are significant in this context such as the beneficiaries, organisers and others is a limitation. However, the Volunteer-Centric Design framework highlights the involvement of other stakeholders and communities in volunteer engagement and wellbeing. This is important because, as pointed in the research gap, volunteer experiences have not been systematically studied to consider their engagement and wellbeing through design. This is because volunteer wellbeing does not always align with paradigms of efficiency and profit that prioritises beneficiary gain or system efficiency, and therefore designing for volunteer wellbeing has been under-explored in the past. Thus, my research ensures that volunteers' experiences and motivations are centeredin the design. Finally, volunteer-centric design, just like other humanistic design paradigms such as value-centred design, does not aim to erase all other actors and processes in the context but aims to draw attention to the characteristics of a good design from the perspective of the digital volunteer.

8.4 Future Work and Final Thoughts

There are quite a few possibilities for future work. The first one is extending the research in terms of cultural range beyond the Australian culture and organisations, including shifting the sole focus on Western knowledge and theories in research. This opens up the possibility of conducting similar research in non-Western contexts

to further this investigation and improve its applicability in other cultural contexts. There are a number of psycho-social factors that could impact the four components of the volunteer-centric design. For instance, the manifestation of care within a volunteering context would likely show some difference in collectivist societies where familial and community responsibilities have a much stronger influence on an individual's action. Besides, the difference between various societal and community influences could be very fluid based on the kind of governing policies or FRS-based systems within a given context. The context would thus impact volunteer involvement, whether direct or indirect, in the design process. Similarly, the various strategies specified for engagement in the anchors of engagement would show some variation in terms of how effective they are based on the cultural and ethical values regarded highly in other social contexts.

Another possibility to extend this research would be to consider including volunteer performance to provide more insights for volunteer-centric design. Thus, the impact of the differences in volunteer performance with regards to the amount of work completed could be further explored in future research, more specifically on macro-volunteering platforms such as OSPIA. Analysing performance and engagement data could possibly help refine design strategies, for instance, based on stratification resulting from performance, for volunteer engagement and wellbeing.

A possibility for further research could be to use this framework to assess the impact on equity, inclusiveness, diversity, and wellbeing of volunteers on digital volunteering platforms, more specifically for those on the *authority, competition and hierarchy* end of the care spectrum. This is all the more important for improving the participation of those who are socially marginalised, such as CALD and gender-diverse participants in Western, Anglo volunteering contexts. More research in this space would also provide more insights for the volunteer-centric design for digital volunteerism.

Another avenue of future work could involve looking at ways to integrate volunteer-centric design with existing organisation-centric design approaches in formal volunteering. This could include focusing on how volunteer engagement and wellbeing contribute to organisational sustainability, which could provide much needed information for the resource and funding constrained voluntary sector organisations.

Finally, future research could also focus on how digital volunteering could be impacted by the upcoming technologies and innovations. For instance, a few years ago, there were many research projects and ideas that used virtual reality (VR) for "creating compassion" and ultimately motivating people to engage in prosocial

behaviours towards others. Currently, there is a lot of speculation and ongoing research around how generative and other forms of Artificial Intelligence (AI) are disrupting the way people and societies work. It would be interesting to see how generative AI could be used directly to enhance the volunteering experiences and contribute towards their engagement and wellbeing. Additionally, given that digital volunteering platforms are socio-technical systems where society, community, and care form essential components, it would be prudent to assess the indirect impact of such a technology through its socio-technical ramifications on a social, political, legal, ethical, and other fronts .

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List of Figures

APPENDIX

<div style="text-align: right; font-size: 3em;">9</div>

.1 Simulated Patients Survey

The following questionnaire along with its instructions are exactly as found in the online survey. The text in italics is explanatory to explain the logic and instructions to the ethics committee.

The first part of this survey aims to gather details and opinions of simulated patients, which will help us to improve your experience. The second part of this survey will collect your consent for your further participation in this study. Please read the survey questions and additional instructions carefully before responding. The quality of this research and the subsequent improvements rely upon the accuracy of your answers, so please answers as honestly and informatively as possible.

.1.1 Details and Opinions

i) Email:

ii) Age:

iii) Gender (choose one)

o Male

o Female

o Other

iv) Occupation (choose one) o Student

o Employed

o Unemployed

o Self-employed

o Retired

o Homemaker

o Unable to work

o Other

o Prefer not to say

v) With regards to my cultural/ethnic identity, I identify as:

vi) I attended the sessions (choose one)

o as an online simulated patient (using OSPIA)

o on campus

o both of the above

If the participant chooses "as an online simulated patient (using OSPIA)" for (vi), the following questions will be shown:

vii) Volunteering as an online simulated patient is good because:

viii) Please rate the following statements to describe your personal reasons for volunteering where 1 denotes DISAGREE all the way to 7, which denotes AGREE. (Likert scale for each statement)

• I don't know why I'm doing this volunteer work, it's pointless.

• I like the recognition I get for doing this volunteer work.

• I have to prove to myself that I can do this volunteer work.

• Putting effort into this volunteer work aligns with my personal values.

• I care about benefiting others through my volunteer work.

• I volunteer because the volunteer work I do is interesting.

ix) Please recall your overall experience in sessions as an online simulated patient and rate the following statements to describe your experience where 1 denotes DISAGREE all the way to 7, which denotes AGREE. *(Likert scale for each statement)*
• I feel very capable and effective at using OSPIA.

• Learning how to use OSPIA was easy.

• The navigation and user interface are intuitive (The interface includes those items that you use to interact with the system like the screen, including its look and the use of graphics and language, and the way the system makes you use the screen).

• I found the interface and controls confusing.

• OSPIA provides me with useful options and choices.

• OSPIA lets me do things that are interesting or useful to me.

• I feel pressured by OSPIA.

• OSPIA helps me to form or sustain relationships that are fulfilling.

• OSPIA helps me to feel a sense of belonging to a larger community.

• I don't feel close to other users.

x) One year from now, I will probably be (choose one)

o volunteering at this organization

o volunteering at another organization

o not volunteering at all

o Prefer not to answer

o Other:

xi) I would recommend others to use OSPIA. (choose one)

o Yes

o No

If the participant chooses "as a campus patient" for (vi), the following questions will be shown:

vii) I volunteer as a campus simulated patient rather than volunteering as an online patient using OSPIA because:

viii) Please rate the following statements to describe your personal reasons for volunteering where 1 denotes DISAGREE all the way to 7, which denotes AGREE. *(Likert scale for each statement)*

• I don't know why I'm doing this volunteer work, it's pointless.

• I like the recognition I get for doing this volunteer work.

• I have to prove to myself that I can do this volunteer work.

• Putting effort into this volunteer work aligns with my personal values.

• I care about benefiting others through my volunteer work.

• I volunteer because the volunteer work I do is interesting.

ix) Please recall your overall experience in sessions as a campus simulated patient and rate the following statements to describe your experience where 1 denotes DIS-AGREE all the way to 7, which denotes AGREE. (Likert scale for each statement)

• I feel very capable and effective at being a simulated patient.

• Learning how to be a simulated patient was easy.

• I have options while acting as a campus simulated patient.

• Being a simulated patient is interesting or useful to me.

• I feel pressured as a simulated patient.

• Being a simulated patient helps me to form or sustain relationships that are fulfilling.

• Being a simulated patient helps me to feel a sense of belonging to a larger community.

• I don't feel close to other users.

x) One year from now, I will probably be (choose one)

o volunteering at this organization

o volunteering at another organization

o not volunteering at all

o Prefer not to answer

o Other:

If the participant chooses "both of the above" for (vi), the following questions will be shown:

vii) Volunteering as an online simulated patient is good because:

viii) Volunteering as a campus simulated patient is good because:

ix) Please rate the following statements to describe your personal reasons for volunteering where 1 denotes DISAGREE all the way to 7, which denotes AGREE. (Likert scale for each statement)

• I don't know why I'm doing this volunteer work, it's pointless.

• I like the recognition I get for doing this volunteer work.

• I have to prove to myself that I can do this volunteer work.

• Putting effort into this volunteer work aligns with my personal values.

• I care about benefiting others through my volunteer work.

• I volunteer because the volunteer work I do is interesting.

x) Please recall your overall experience in sessions as a campus simulated patient and rate the following statements to describe your experience where 1 denotes DISAGREE all the way to 7, which denotes AGREE. *(Likert scale for each statement)*

• I feel very capable and effective at being a simulated patient.

• Learning how to be a simulated patient was easy.

• I have options while acting as a campus simulated patient.

• Being a simulated patient is interesting or useful to me.

• I feel pressured as a simulated patient.

• Being a simulated patient helps me to form or sustain relationships that are fulfilling.

• Being a simulated patient helps me to feel a sense of belonging to a larger community.

• I don't feel close to other users.

xi) Please recall your overall experience in sessions as an online simulated patient and rate the following statements to describe your experience where 1 denotes DISAGREE all the way to 7, which denotes AGREE. *(Likert scale for each statement)*

• I feel very capable and effective at using OSPIA.

• Learning how to use OSPIA was easy.

• The navigation and user interface are intuitive. (The interface includes those items that you use to interact with the system like the screen, including its look and the use of graphics and language, and the way the system makes you use the screen).

• I found the interface and controls confusing.

• OSPIA provides me with useful options and choices.

• OSPIA lets me do things that are interesting or useful to me.

- I feel pressured by OSPIA.

- OSPIA helps me to form or sustain relationships that are fulfilling.

- OSPIA helps me to feel a sense of belonging to a larger community.

- I don't feel close to other users.

xii) One year from now, I will probably be (choose one)

o volunteering at this organization

o volunteering at another organization

o not volunteering at all

o Prefer not to answer

o Other:

xiii) I would recommend others to use OSPIA. (choose one)

o Yes

o No

At the end of this block of questions for each of the above-mentioned choices for (vi), the participant will proceed to the next page by clicking on the NEXT button.

.1.2 Further participation

i) I would like to participate in further research into my volunteering experiences via (choose one)

o an in-person group discussion with other volunteers and a researcher (focus group)

o an online interview with a researcher

o I'd prefer not to participate further

ii) Please write down any other concerns, comments or feedback:

If the participant selects 'an in-person focus group' or 'an online interview' for (i), and then clicks SUBMIT button, the following message appears Thanks for filling out the form! We really appreciate your interest in further participation in this study. You will be contacted regarding your further participation soon.

If the participant selects 'I'd prefer not to participate further' for (i), and then clicks SUBMIT button, the following message appears

Great! Thanks for filling out the form.

.2 StepUp for Dementia Research Online Survey

.2.1 Demographics

1. Age: (required)

2. Gender: (required)

Male

Female

Other - Please specify

3. Postcode: (required)

4. Cultural background (you can choose multiple options): (required)

Australian Aboriginal and Torres Strait Islander

Chinese

Dutch

English

Fijian

Filipino

German

Greek

Hong Kongese

Indian

Indonesian

Irish

Iranian

Iraqi

Italian

Lebanese

Malaysian

Nepalese

North American

Pakistani

Scottish

South African

South Korean

Singaporean

Thai

Vietnamese

Other - Please specify

5. Employment status (required)

Employed

Unemployed

Looking for work

Student

Unable to work

Retired

Other

6. Highest Level of Education Attainment (required)

High School

Diploma/ Advanced Diploma

Graduate certificate

Bachelors

Post graduate certificate/diploma, Master, PhD

Other

.2.2 Section B: Volunteering History and Experiences

7. Have you participated in any dementia research supported by an online platform such as StepUp for Dementia Research yet? (If answer is Yes to Q7, go to Q8 AND Q9 otherwise go to Q10)

-Yes

-No

7b. Please mention the name(s) of the platform(s)

8. Approximately how many hours did you devote to dementia research supported by an online dementia research platform in the past 12 months?

9. Please describe your most memorable experience using that online dementia research platform.

10. Have you participated in any volunteering activities other than the ones related to dementia research? (If answer is yes to 10, go to Q11 and Q12, otherwise go to Section C)

Yes

No

11. Approximately how many hours did you devote to other volunteering activities during the past 12 months?

12. Please describe your most memorable volunteering experience for other volunteering activities. Tell us what motivates you and what your experience is like.

13. Were any of your other volunteering activity/activities facilitated by technologies such as website or an app? (If answer is yes to Q13, answer Q14 and Q15, otherwise go to Section C)

Yes

No

14. Please tell us the reasons you have chosen to volunteer through online means.

15. Please tell us about the experience of using online technology for volunteering. Feel free to elaborate on your experience as much as possible (e.g. how easy/difficult it was, what features/services appealed to you, what made you leave or come back to the website/app, or how the experience compared to other types of volunteering)

.2.3 Section C: Volunteer Motivation

16. Please rate each of the following statements about your motivation for volunteering for dementia research. (On a 7-point Likert scale from Strongly Disagree to Strongly Agree)

-I volunteer because the volunteer work I do is interesting

-I volunteer because I care about benefiting others through my volunteer work

-I volunteer because putting efforts in this volunteer work aligns with my personal values

-I volunteer because I have to prove to myself that I can do this

-I volunteer for the recognition I get for doing this volunteer work

-I don't engage in volunteering work because I don't think this work is worth putting efforts into

17. Please describe your reasons for volunteering for dementia research in your own words. Feel free to elaborate on as many factors as you like

.2.4 Section D: Volunteer Wellbeing

18. The following statements allow us to capture your level of satisfaction with different aspects of your life. Please rate the following statements, indicating how satisfied are you with... (On a 7-point Likert scale from Strongly Dissatisfied to Strongly Satisfied)

-Your standard of living

-Your health

-What you are achieving in life

-Your personal relationships

-How safe you feel

-Feeling part of your community

-Your future security

.2.5 Section E: Perceived Psychological Needs Satisfaction

19. We understand that you are interested in participating in dementia research. Based on that, please rate the statements in this section. (On a 7-point Likert scale from Strongly Disagree to Strongly Agree)

-I am confident that I can perform challenging tasks related to dementia research in the future

-I feel good about my potential ability to perform tasks related to dementia research

-I have a say in choosing the research I do

-I am free to participate in my own way

-I share a common bond with others who volunteer for dementia research

-I can get along with researchers that I interact with

.2.6 Section F: Comments and Future Participation

20. What could help you in using dementia research platforms in the future and make your participation easier?

21. I am interested in participating in focus groups and interviews for this project.

Yes

No

22. Email (If Q21= Yes)

Your survey responses have been submitted and recorded. We appreciate the time you have taken and will actively use your responses to improve your dementia research experiences.

Have a nice day!