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“I Am Most Grateful.” Using Gratitude to Improve the Sense of Relatedness and Motivation for Online Volunteerism

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ABSTRACT

Volunteering benefits those who receive and those who provide help. Yet barriers can inhibit engagement with and motivation for volunteering activities. Online environments on one hand help to lower some of these barriers, but on the other hand they can introduce new obstacles specially when the medium transforms the social interactions important to volunteers. We study the motivational drivers of online volunteering, and how those are affected by design. Specifically, we focus on relatedness as a source of motivation. We describe two studies with volunteers that help medical students to learn and improve their communication skills through mock interviews in an educational program. The volunteers can participate in the program face-to-face or through an online platform. 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. In the second study, we added a feature to the online platform to display personal gratitude messages from student beneficiaries to the volunteers in order to improve the experience of relatedness between them. In total, $n = 30$ volunteers completed 196 sessions. We used survey and system data to assess the impact of gratitude on perceived relatedness, motivation, and behavior (immediate, booked, and completed appointments). Results showed that the expression of gratitude by the beneficiary significantly affected the volunteer's experience of relatedness which then correlated with immediate appointments booking behavior by each volunteer. The implications for design of online volunteering systems are discussed.

1. Introduction

Volunteerism is an important characteristic of healthy functioning societies and an important ‘renewable resource for social problem-solving’ (International Labour Organization, 2011). In 2015, the United Nations urged more research to deepen our understanding of volunteerism and inform policies globally (United Nations Volunteers, 2015) (International Federation of Red Cross, 2015). In Australia as of 2014, 31% of adult population were involved in formal organization-led volunteering totaling 43 AUDbn worth of national economic value (Australian Bureau of Statistics, 2017). Besides the societal benefits, volunteering is associated with many physical and psychological health and wellbeing outcomes for the individuals (Ayalon, 2008; Musick & Wilson, 2003).

Volunteers do not seek any material compensation for their efforts. Given the individual and societal benefits of volunteering, it becomes important to understand how we can design systems, processes, policies, and environments that motivate people to volunteer. Determinants of volunteer motivation have been studied in many contexts (Allen & Shaw, 2009; Clary & Snyder, 1999; Cnaan & Goldberg-Glen, 1991; Xu et al., 2009) to understand

why and how people volunteer. Gaining an understanding of such determinants as well as desired volunteer experiences can inform the design of effective systems that facilitate volunteering.

One theory of motivation with a considerable influence on many areas of technology design (Dupuy et al., 2016; Peters et al., 2018; Wang & Li, 2016) is the Self-Determination Theory (SDT) (Ryan & Deci, 2017). However, research on the impact of design on the motivation and engagement of volunteers in Human-Computer Interaction (HCI) currently lacks a theoretical link to SDT. We use this theory in the studies presented in this article. This is important because digital technologies are being increasingly used to enable volunteerism in a phenomenon called online or digital volunteerism (Amichai-Hamburger, 2008). Similar to physical environments, online environments need to be designed in a way that engage and motivate volunteers while fulfilling the needs of those at the receiving end of the volunteers' services.

Volunteering in online contexts (Feng & Leong, 2017; 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 article, we address such 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.

A literature search on online volunteering reveals that online volunteering platforms can be classified into two groups based on the time commitment and efforts required for the volunteering tasks. The first group of platforms can be described as micro-volunteering platforms (Bernstein et al., 2013) which require minimal volunteer time commitment in form of microtasks. For instance, volunteers add or manage content individually or as a part of communities such as Wikipedia (Kuznetsov, 2006) and Reddit (Hsieh et al., 2013). The second group of platforms is macro-volunteering platforms with significant time demands in terms of the volunteering tasks. For instance, United Nations Volunteers have 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.

Research on 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, categorization, or curating of data (Jennett et al., 2016; Rotman et al., 2012) in domains such as astronomy, history, biology, medicine (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 our research, we 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. We conduct two studies to examine volunteer experiences, motivations, and how their psychological needs are fulfilled as they engage with students in online and physical modules of an educational volunteering program for teaching medical communication skills. The first study is exploratory and examines the nature and determinants of volunteer experiences and motivation in both physical and online environments. Based on the findings in the first study, we manipulate the design of the online platform and include a design feature that allows students to express their gratitude toward volunteers in personalized messages. We then test the impact of this design feature on volunteer motivation and behavior.

In section 2, we describe the background on motivational theories used in our research. The online platform is described in section 3, and the two studies are outlined in sections 4 and 5.

2. Background – motivation and self-determination theory (SDT)

Motivation for volunteering is a complex phenomenon that can be used to examine the use of digital technologies and provide valuable insight for designing future solutions that facilitate volunteering. In this section, we provide a brief survey of a few motivational theories used in HCI particularly

in relation to systems that support volunteerism. We then outline a motivational framework we used in our research.

In order to understand why people volunteer, Nov et al. (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 focuses 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 *collectivism* 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 *principlism* motive is the belief 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.

Furthermore, many motivational factors such as norms, social learning (Zhu et al., 2012), generalized reciprocity (Hsieh et al., 2013), and recognition (Wald et al., 2016) have been put forward to explain the behavior of voluntary contributors on online platforms. Table 1 provides a brief overview of some of the prominent motivational frameworks and theories for online volunteers.

While these and many other theories and frameworks have been used in HCI for designing motivating technology for volunteers, to our knowledge, the Self-Determination Theory (SDT) (Ryan & Deci, 2017), one of the few prominent motivational theories, is underutilized in research on motivations and experiences of online volunteers. The advantage of using SDT is that it is a comprehensive theoretical framework consisting of many sub-theories which have been successfully applied to designing user tasks in many disciplines such as education (Park, 2013), sports (Allen & Shaw, 2009), games (Gee, 2012), organizational management (Tranfield et al., 2000), health (Balaam et al., 2011) amongst many others. SDT can help explain why some technology designs work and others do not. Peters et al. (2018) suggest SDT can

Table 1. Summarized literature review findings of motivational background in online volunteering and voluntary contribution platforms.

Theoretical background for volunteer motivation	Author/s	Online platforms
Model of volunteer participation	Nov et al., 2011	Online citizen science platforms
Batson’s model of prosociality	Rotman et al., 2012	Online citizen science platforms
Social modeling	Zhu et al., 2012	Wikipedia
Generalized reciprocity	Hsieh et al., 2013	Reddit
Recognition mechanisms	Wald et al., 2016	Online citizen science platforms
Goal setting	Zhu et al., 2012	Wikipedia
Group identification	Zhu et al., 2012	Wikipedia

support HCI research on the impact of technology design on motivation, engagement, and wellbeing.

SDT postulates that motivation associated with an activity is contingent upon the degree to which that activity satisfies the self-determining aspects of 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 and achieves a sense of wellbeing as a result. 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 SDT is the extent of regulation or 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 and 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 1).

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 organizations; (ii) introjected regulation, which is partly internalized 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. One type of integrated regulation can be prosocial (Grant, 2007), which is a person's desire to do good for others. 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 study, we explore a unique application of the theory in volunteering in the online environment. We use standard scales to measure SDT constructs and the motivation type (based on the spectrum) relevant to the psychological needs and motivation levels of volunteers in a medical communications program. The details of the online module of the program follow.

3. OSPIA- an online volunteering platform

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

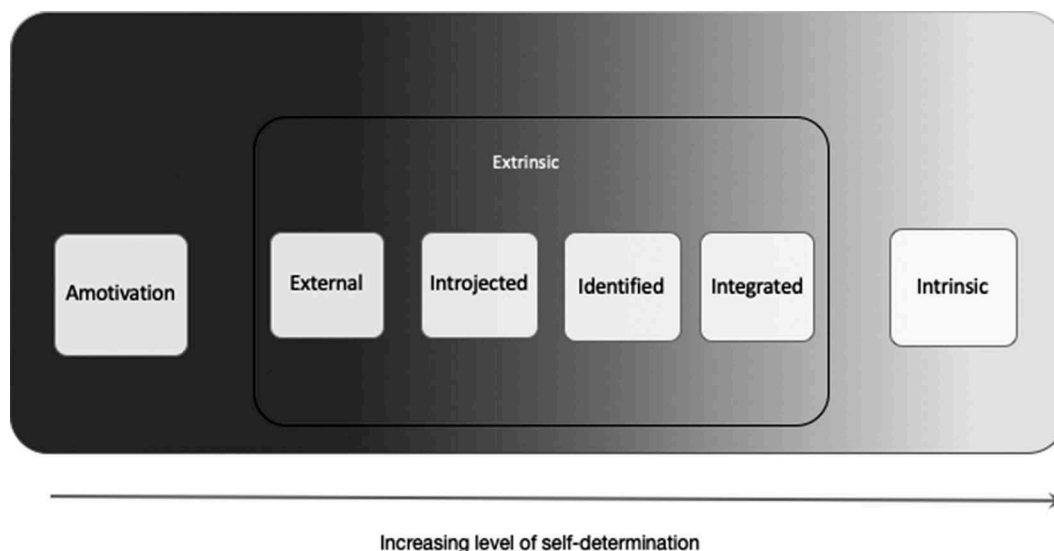


Figure 1. Motivation spectrum showing various types of motivations in an increasing degree of self-determination and varying source of regulation.

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. Multimodal feedback and assessments are included on the online platform and aid student learning. Many of similar training programs 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 and undergo a compulsory training session. This is a labor-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. The SP then logs into OSPIA, to access a calendar where they can create appointments. 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. Every Monday following completed OSPIA sessions, the SP receives an automated generic e-mail 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 2). The SP then assesses the student performance using a standardized 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. Volunteer SPs play a vital role in the sustainability of OSPIA in long term. Their availability and engagement ensure the

ongoing OSPIA sessions and therefore it is important that the system is designed to respond to their needs.

There is a physical, face-to-face counterpart to the online OSPIA volunteering program. 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 programs (campus SPs). We use this unique opportunity of parallel online and physical volunteering modules in the same program to capture the similarity and differences between the experiences and motivations of the online and campus SPs and generate design recommendations for OSPIA. Our first study is presented in section 4.

4. Study 1: Studying SP motivations, psychological needs and experiences

4.1. Methodology

A mixed methods study explored 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 program. 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.

4.1.1. Online survey

The link to an online survey was sent via e-mail to all SPs registered in the online and face-to-face campus programs. 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-

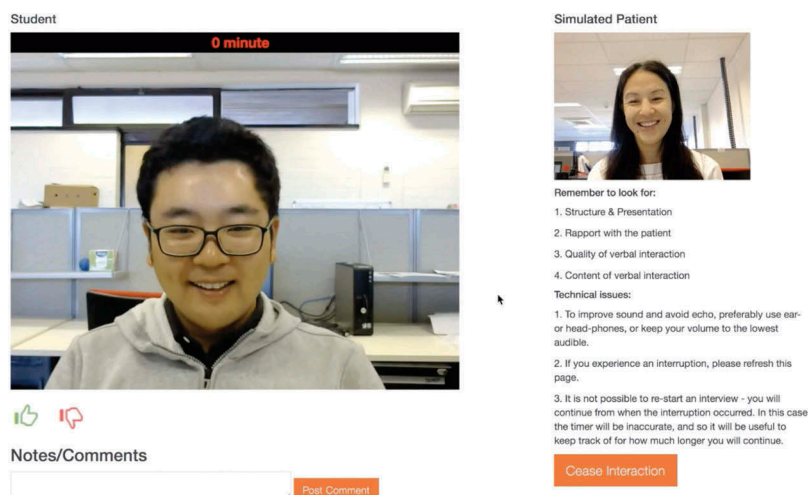


Figure 2. OSPIA interview interface from the perspective of the simulated patient.

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 (Grant, 2008). Additionally, we 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 program. 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).

4.1.2. Workshops and interviews

Following the survey, two workshops were organized. The first workshop involved 7 campus SPs and lasted for 1 hr and 47 min. The second workshop was with 4 participants (3 online SPs and one SP who participated in both face-to-face campus and online programs) and lasted 1 hr and 42 min. In the second workshop, one of the participants joined remotely via Skype. Lastly, one SP, who had participated in both forms of volunteering, was interviewed (44 min) separately because of her unavailability. The objectives of the workshops and the interview were to gain an understanding of volunteers' experiences. The topics discussed included perception of OSPIA platform, motivations for volunteering, volunteering history (campus/online volunteering, good/bad experiences, communication). The workshop conversations were interspersed with affinity diagramming activity (Tomitsch et al., 2018) in order to summarize and cluster information generated during the discussions (see Figure 3).

4.2. Results

For the quantitative questions from the survey, several summary outcomes and analyses are reported. Response to open-ended survey questions are combined with findings of the two workshops and the interview and analyzed 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.

4.2.1. Online survey

4.2.1.1. 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. Table 2 summarizes 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 (Table 3).

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

4.2.1.2. Experience of need satisfaction. To compare the experience of need satisfaction in the online and campus SPs,

Table 2. Demographics – attendance mode and gender distributions for participants in online survey.

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

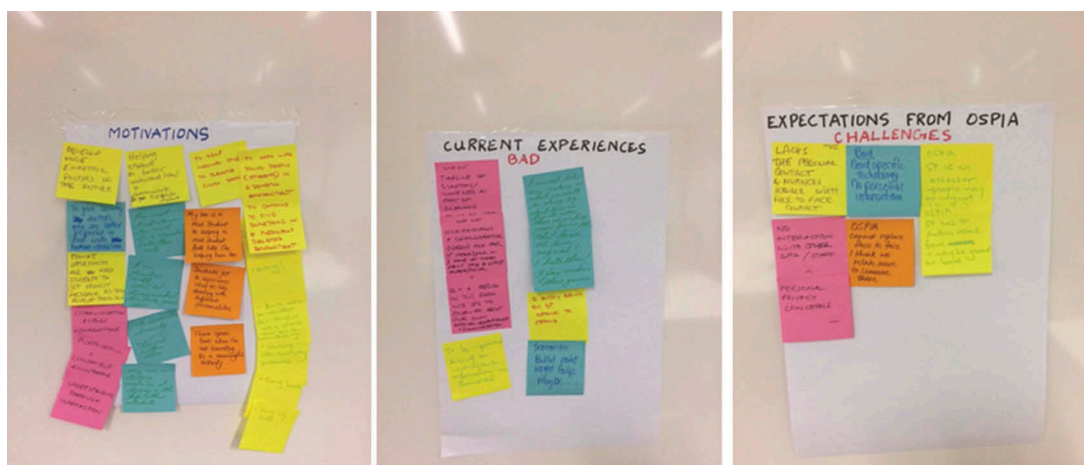


Figure 3. Artifacts from affinity diagramming with simulated patients in workshop 1.

Table 3. Demographics – employment status distribution.

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

we conducted Mann–Whitney tests. The test indicated a significant difference in the experience of autonomy between campus (Mdn = 7) and online (Mdn = 5.5) participants $U = 407, p = .0004, r = 0.55$. The test revealed no significant difference in the experience of competence between campus (Mdn = 6) and online (Mdn = 6) participants $U = 607, p = .13, r = 0.23$. Additionally, the test indicated a significant difference in the experience of relatedness between campus (Mdn = 5) and online (Mdn = 2) participants $U = 379, p = .0006, r = 0.56$.

4.2.1.3. 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 $U = 435.5, p = .01, r = -0.17$. There was a significant difference in intrinsic motivation between campus (Mdn = 7) and online (Mdn = 6) participants $U = 404.5, p = .02, r = -0.38$. 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 Table 4.

Additionally, Spearman correlations were calculated to understand the relationship between the six types of motivation and three constructs of SDT in online and campus SPs separately. The results are summarized in Tables 5 and 6.

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 ($r(14) = 0.731, p < .001$) and online SPs ($r(37) = 0.453, p = .005$). There is a significant correlation between competence and prosocial motivation ($r(34) = 0.354, p = .040$), and competence and intrinsic motivations in campus SPs ($r(34) = 0.369, p = .032$) but not in online SPs. There is also a significant correlation between autonomy and relatedness in campus SPs ($r(38) = 0.343, p = .035$), but not in online SPs. A significant correlation exists between relatedness and intrinsic motivation in campus SPs ($r(31) = 0.381, p = .035$) but not online SPs. A significant correlation also exists between autonomy and intrinsic motivation in online ($r(34) = 0.365, p = .034$) but not in campus SPs. A significant correlation exists between relatedness and intrinsic motivation in campus SPs ($r(34) = 0.369, p = .032$) but not in online SPs. There is a significant negative correlation between intrinsic motivation and amotivation in online SPs ($r(35) = 0.363, p < .32$), but not in campus SPs. There is also a strong significant correlation between external social and introjected motivations in online SPs ($r(37) = 0.644, p < .0001$), campus SPs

Table 4. Results comparing basic descriptive statistics and Mann–Whitney values of SDT constructs and motivation of online and campus SPs.

		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)

Table 5. Correlations for need satisfaction and motivations of the 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).

Table 6. Correlations for need satisfaction and motivations of the online 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).

($r(37) = 0.332, p = .045$). Strong significant correlation exists between identified motivation and prosocial motivation in campus SPs ($r(34) = 0.614, p < .0001$) and online SPs ($r(34) = 0.432, p = .01$). Significant correlation exists between identified motivation and intrinsic in campus SPs ($r(34) = 0.433, p = .01$) and online SPs ($r(35) = 0.660, p < .0001$). Finally, there is a significant correlation between prosocial and intrinsic motivation in campus SPs ($r(33) = 0.534, p = .001$) and in online SPs ($r(34) = 0.571, p < .0001$).

4.2.2. 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). 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 analyzed and integrated with the rest. A final set of five themes were identified, the details are as follows.

4.2.2.1. 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]

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

Familial 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 utilize 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 motive 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 practicing 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, 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 fulfillment – 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]

4.2.2.3. Volunteering history. – A total of 5 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].

4.2.2.4. Online/campus-volunteering experience. – All the workshop participants mentioned their experiences with other individuals involved in the program, such as the volunteer manager who was the main point of contact within the organization that ran both online (OSPPIA) 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]

4.2.2.5. Positive and negative aspects of online volunteering via the OSPIA platform. – A number of positive and negative aspects of online volunteering experience emerged during 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, organize 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 was suggested by the campus SPs as the reason for their disinterest in using 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 online experience lacks 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 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 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 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 4 for the next week. [BothSP2]

4.3. Discussion

Our first study generated a range of insights into the SP experiences and motivations and resulted in several themes that characterized those. Many of these findings can be discussed in light of the psychological need satisfaction and motivation theory.

The survey results indicate 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.

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 marginalized 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 occurred 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, we 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 suggest 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 our 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 offered by the remote online access, the experience seemed to lack a strong social aspect that strongly characterizes 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, we found better motivation outcome in campus SPs experience – higher identified and intrinsic motivations – which was significantly different from that of 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 are observed for prosocial motivation in both groups. 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 can improve their motivation. Our 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 telemedicine (Kaplan & Fitzpatrick, 1997) and telehealth (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 article 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 telemedicine 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 OSPIA platform (as we explore in this article) is very different from

those of the ‘real’ patients on telemedicine platforms. Therefore, there are substantial differences in design considerations and strategies for those platforms, which motivated the research presented in this article.

This study may be limited in terms of participant recruitment. There is a possibility that participants who are already engaged with both online and campus programs were more likely to respond to our survey. Thus, there could be a response bias in our survey data.

4.4. Recommendations for the next study

The default design of OSPIA experience for the SPs means they receive automated e-mails once a week that acknowledge their work in the preceding week. The e-mail is not personalized 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 can improve the interpersonal relatedness (Algoe, Haidt & Gable, 2008) and therefore online engagement. This is explored in study 2.

5. Study 2: The impact of dynamic, personal gratitude messages on the SPs

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, we 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 underexplored. In this study, we 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 the literature on relatedness in volunteer wellbeing, and the impact of gratitude on relatedness and motivation to help others.

5.1. Background

5.1.1. 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.

5.1.2. Gratitude to improve relatedness and prosocial behavior

Existing research suggests that there is a link between experience of gratitude and improved social bonding (Emmons & Mishra, 2011; Gordon et al., 2012). Gratitude is also strongly linked to prosocial behavior such as charitable donations and ‘pay it forward’ attitude (Shiraki & Igarashi, 2018). Prosocial behavior is defined as action(s) taken by individuals that benefits or helps others (Eisenberg & Mussen, 1989). Volunteering is a typical prosocial behavior (Piliavin & Charng, 1990) and therefore digital design strategies for online volunteerism could improve volunteer engagement in prosocial behavior by means of gratitude and 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 not effective in improving repeated contributions in returning volunteers (Cheshire & Antin, 2008). In a study about improving prosocial behavior, Grant and 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 innate obligation to return others’ favors, we changed the design of OSPIA platform and encouraged the beneficiary students in our research to generate personal messages of gratitude to volunteers. This is a unique intervention as to date, we have not seen similar evidence that compares the generic automated acknowledgment 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 (see section 3). Upon receiving the cue, the student writes a message to the SP with whom they had just performed the interview session. This personal message from the student was then sent to the SP in their weekly acknowledgment e-mail. As a result, we expected the relationship to be reframed as a beneficiary–benefactor relationship instead of a student–SP relationship. We hypothesize that the messages of gratitude improve the experience of relatedness, enhancing the SP’s intention to book more appointments and consequently their motivation to book more appointments immediately and in the long term.

5.2. Methodology

This study provided a design intervention on the OSPIA platform to the online SPs and follows a pretest/posttest experimental design with a baseline phase and intervention phase. The study commenced at 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 Table 7 and details of each phase are discussed next.

5.2.1. Baseline phase

In the baseline phase, all participating SPs received an automated e-mail every Monday that followed the appointment week. Only one e-mail was sent to acknowledge any number of sessions that were performed by the SP in the preceding week. The e-mail contained a generic short message acknowledging their contribution and a link to a short survey (Figure 4).

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 (Figure 5). 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 behavior of the SPs, which was one of the volunteering outputs. The other volunteering output and the final measure were the total number of appointments completed by each participating SP in the duration of this phase. All scales and hypotheses are presented in Table 6.

5.2.2. Intervention phase

The intervention phase followed the baseline phase. The students using OSPIA platform normally complete a compulsory post-session questionnaire in order to fulfil 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

Table 7. Hypotheses tested in study 2.

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 behavior 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.



Figure 4. Weekly acknowledgment e-mail received by the sp in the baseline phase.

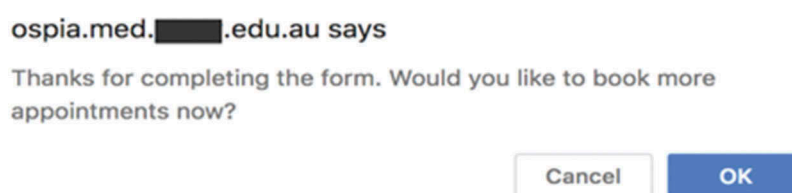


Figure 5. Prompt to book more appointments.

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, we theorized that prompting the students to 'return the favor' 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. We hypothesized that these organic acknowledgments 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 respond to the request, but the student messages were not shown to the SPs during that phase. We 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 assured us that we can commence the intervention phase. The behavior 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 e-mails, with each message corresponding to a specific OSPIA session. The participating SPs received the e-mail every Monday as per

usual. The e-mail 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 e-mail (Figure 6).

In each e-mail, we included one or more messages, depending on how many OSPIA sessions the SP had completed during the preceding week, and from one or multiple 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 scale, 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 e-mail 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 Figure 7.

5.3. 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 8 weeks duration. A total of 262 appointments were booked and 115 appointments were completed (44%). There were 21 survey submissions during the

OSPIA Week 10: Thanks for your participation

OSPIA Administrator

to me ▾

Dear [REDACTED]

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.

You have received personal message/s from the student/s who interacted with you during last week's OSPIA session. Please note that leaving personal messages is optional for the students, so you will receive messages from the students who chose to do so after the OSPIA session.

Please click the following link to see the personal message/s, followed by a short survey.

[Take the survey](#)

With best wishes.

OSPIA team

Figure 6. Weekly acknowledgment e-mail received by the sp in the intervention phase.

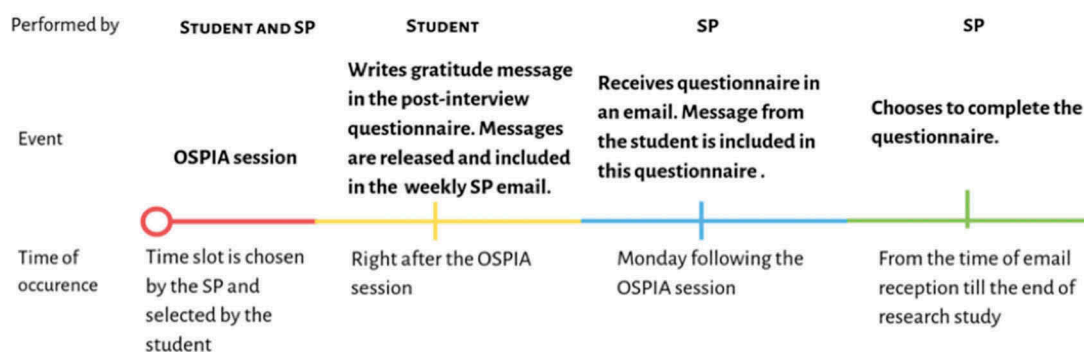


Figure 7. Chronology of intervention phase events.

baseline phase. The intervention phase ran for another 8 weeks during which 145 OSPIA appointments were booked and 81 appointments were completed (56%). There were 30 survey submissions from the intervention phase. Table 8 summarizes the information about number of appointments and survey responses.

The measures from booked and completed appointments and survey submissions were used for testing our hypotheses. For the relatedness and intention ratings, we used Mann–Whitney tests to test significant 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, we 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.

Table 8. Number of appointments booked, number of appointments completed, number of survey submissions by the SPs in the baseline and intervention phases.

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

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 that completed 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 behavior in the form of booking appointments, and the long-term volunteering output. Thus, the analysis also consisted of computing correlations of the measures for determining the associations between these measures.

5.3.1. Expression of gratitude impacts relatedness

We 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 $U = 117.5, p = .0006, r = 0.68$. Thus, our first hypothesis (H1) was confirmed.

5.3.2. 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 ($Mdn = 7$) $U = 251.5$, $p = .22$, $r = 0.22$. Thus, our second hypothesis (H2) was not confirmed.

5.3.3. Expression of gratitude impacts behavior for booking immediate appointments

A chi-square test was performed to compare the clicking behavior of SPs in the baseline (57.14%) and intervention phase (63.33%) and no significant difference was found; $\chi^2(1) = 0.04$, $p = .8$. Thus, our third hypothesis (H3) was not confirmed.

5.3.4. 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 8, there were 115 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 $p = .34$. The fourth hypothesis (H4) is, therefore, not confirmed.

In order to further examine the appointment behavior, 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 ($r(257) = 0.63$, $p < .0001$). The appointments booked per SP and appointments completed per SP during the intervention phase, also revealed a significant strong positive correlation ($r(257) = 0.91$, $p < .0001$). 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.

5.3.5. Reciprocation of gratitude messages

The request to submit messages of gratitude generated a high number of outputs from the students, during both baseline and intervention phases. However, we 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 favorable, $M = 6.88$, $SD = 0.44$ (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 follow.

"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 behavior during the intervention phase, we performed a correlation analysis. Results of a bivariate Spearman correlation indicated a significant positive correlation between relatedness and intention measures ($r(29) = 0.440$, $p = .007$), a significant positive correlation between intention to do more appointments and immediate appointment behavior ($r(29) = 0.420$, $p = .01$), and significant strong correlation between relatedness and immediate appointment behavior ($r(29) = 0.643$, $p < .0001$). A summary of the correlation matrix is presented in Table 9.

5.4. Discussion

Based on the finding in the two studies presented in this article, we 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.

5.4.1. Volunteer motivation and participation: A basic psychological needs perspective

The results from our 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 behavior as we found a strong

Table 9. Correlation summary for survey response variables of study 2 intervention phase.

	Gratitude	Relatedness	Intention	Immediate_ appointment_ behavior
Gratitude	1			
Relatedness	.127	1		
Intention	.106	.440*	1	
Immediate_ appointment_ behavior	.074	.643**	.420*	1

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

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

correlation between the SP sense of relatedness and their immediate volunteering behavior in the intervention phase. Observing that the immediate appointment behavior 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. Our 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 canceling appointments at the last minute (without disrupting 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 labor-intensive assessment task affects volunteer motivation for engagement. Research has also shown that the perceived labor-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 and 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 behavior. One way of resolving some of those issues on the OSPIA platform can be changed to volunteer's training module (e.g. through gamification strategies) to better engage them with the time-consuming assessment components.

Our 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. We 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.

5.4.2. Volunteer motivation and participation: Practical enablers and barriers

In our 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 parenting duties, while another participant noted her schedule was mostly divided between her job and caring for an aging mother. Thus, there is a possibility that the SP volunteers' appointment outcomes were 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 app. 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, our research in study 2 was limited because we did not compare the two conditions at the same time. This was due to not having control over who volunteers and when they volunteer. We also did not want to make any assumptions about whether and how frequently the students will send messages of gratitude to the SPs. We therefore designed a pretest/posttest study that allowed us to compare the average measures between baseline and intervention phases but limited us because the measures could have been influenced by temporal factors. Future studies should address that limitation.

6. Design implications

A number of design implications can be generated based on our research. These could be useful for developing digital platforms that aim to enhance volunteer motivation through cultivating relatedness and gratitude and reducing participation barriers for volunteering. We propose three groups of design recommendations, as discussed next.

Our 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 we 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, Ring, Barry, Sidner, & Bickmore, 2012) and online chat features (Naqshbandi et al., 2019) that enable additional social interactions. In the case of OSPIA, these break down the session into a diverse range of activities and may help volunteer SPs perceive the session as less lengthy.

Based on our second study, we propose a second design implication. We suggest design features to foster gratitude in online volunteering platforms as a way of supporting the beneficiary-volunteer relationship and experience. We showed receiving appreciation improves wellbeing and propensity of helping behaviors. 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 platforms such as Facebook and Twitter through user 'like' button or similar affordances (Bucher & Helmond, 2017). In 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, Hamman, & Thorson, 2006).

7. Conclusion

In this article, we described two studies. Study 1 is a mixed-methods exploratory study on face-to-face and online volunteers (called SPs) on OSPIA platform, an online program for training medical students in communication skills. Study 2 was experimental and compared volunteer motivation and behavior when they received a system-generated acknowledgment message in the baseline phase to an intervention phase where volunteers received personalized message of gratitude from the beneficiary. 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 we 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 we hoped to invoke in them an implicit sense of returning the volunteer favor. 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 behavior. However, the intervention did not result in an increased volunteering output during our 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.

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