

Harnessing Empathy To Scale A Healthtech Startup During The COVID-19 Pandemic:

A Case Study Of myICUvoice, A Communication Tool Designed For Critical Care

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This case study explores the scaling experience of an early-stage healthtech startup company called myICUvoice. During the Covid-19 pandemic, myICUvoice rapidly scaled from a single intensive care environment to being widely used nationally (UK) as well as globally. We explore why and how so many volunteers were motivated to donate their time and expertise to help scale this early stage startup. Specifically, we examine the roles that empathy played throughout the scaling process. There are three distinct types of empathy that we have identified in our story: em-pathos, empathetic understanding, and mass-empathy. These each had a distinct role in driving the startup forward. Importantly, we note that human-centered design (which often focuses almost exclusively on achieving empathetic understanding) will immensely benefit from considering the multiple types, and multi-faceted powers, of empathy.

Keywords: empathy, pandemic, startup, sustainable innovation, healthcare, volunteers, software

GENERAL INTRODUCTION

When it comes to ethnography, the enforced remote-working conditions due to the COVID-19 pandemic have caused many of us who conduct ethnographic fieldwork to contemplate, reconsider, and re-frame the notion of “being there” (Collier Jennings and Denny, 2020; Denny et. al 2020). Ethnography’s longstanding commitment to in-person fieldwork has, indeed, been challenged and is being re-explored as a result of global working conditions and what constitutes an appropriate social interaction. As such, it may seem that any paper focused on ethnography and COVID-19 would naturally focus on exploring what it means to (/not) “be there”. But our focus in this pandemic-related paper is notably elsewhere—or, at least, we are not directly focused on (/not) being there. Rather, we focus on the way that being *sensitively-attuned to the role that empathy plays*—regardless of whether one is physically *there* alongside others—can be of benefit to the process of scaling a startup, or of innovation more broadly. Suffice it to say, as much as the circumstances of COVID-19 have challenged the ethnographer’s notion of being there, the pandemic has *also* created opportunities for the rapid formulation and implementation of ethnography-driven human-centred innovation for certain COVID-19 related startups.

This paper details the particulars of myICUvoice’s journey, focusing specifically on how it spent nearly 7 years without any significant scale-up, and then underwent rapid national and global scale-up during the pandemic. As we detail our own journey, we highlight and explore more broadly relevant questions. We ask, for example: are the conditions of this pandemic providing a new scaling model

for startups? Can the experience of COVID-19-related startups be used to inspire new strategies for scaling human-centred innovation that will be of value beyond the pandemic? How can a startup scale when the traditional measures which tend to propel a company forward—investment funds, for example—are absent? What role did multiple stakeholders have in agreeing to be a part of myICUvoice’s journey towards scaling? How can volunteers be mobilised in order to allow for rapid scaling? In this paper we explore these questions in a way that resonates with one of anthropology’s well-established goals: to use the particular to say something about the general (Tambiah 1985). The particular details of the myICUvoice case study can shed light, more broadly, on some general ways in which ethnographers and startups can pay attention to empathy—we return to some general “lessons learned” in our conclusion. Notably, our own exploration of these above-mentioned questions continually returns us back to empathy; three distinct but complementary types of empathy (we define these below) have been crucial in propelling myICUvoice forward.

In order to explore this annual conference’s focus on topic of scale, we offer a model of four phases of scaling that we have identified in the myICUvoice case study. These each present different conditions and opportunities for scaling impact through human-centred innovation. They are:

1. Moving from the defined initial problem to a design; a clinical/technological concept must embrace the complexities of the broader human context in which it can bring impact
2. Moving beyond human value to organisational/institutional value
3. Wide-scale empathy (triggered and amplified by COVID-19) transforms the conditions for scaling human-centred innovations
4. Empathy-driven networks drive a rapid global scaling

The first two of these phases are familiar territory for human-centred design initiatives. But COVID-19 has brought unusual conditions for scaling a startup; whereas the first two phases were driven by individual empathy, the latter two phases in our model hinge upon the “mass-empathy” phenomenon which has been a characteristic of the COVID-19 crisis.

We consider how empathy manifested in three different ways at three different stages. First we consider the ways in which empathy was leveraged by Tim and others from the very beginning stages of this startup. Then, we consider how Nadya’s ethnographic work with nurses in the ICU furthered our empathetic understanding of how to reach the startup’s objectives. Lastly, we consider how wide-scale empathy of the general public was crucial in the scaling process of our startup; importantly, we consider how this empathy first had to be understood. These three manifestations and stages of empathy are rather distinct, and we define our terms in more detail below.

While we are, of course, fully aware that a global crisis itself is not something that should ever be desired or intentionally replicated, we wonder whether what this pandemic has enabled us to recognise and identify something that startups could seek to replicate. Empathy, when recognised and harnessed by somebody capable of empathetically-understanding multiple viewpoints, is a very powerful resource. As was evident here, if “mass-empathy” is to fuel the accelerated commercial growth of a new startup, the innovators would need to identify ways to trigger and leverage it appropriately.

Our mention of “post-COVID” prompts us to explicitly note that we are working with four rough temporal periods in our present discussion: (1) *pre-pandemic* (which we date to anything up until February 2020, since it was around that time that COVID-19 began to be recognised as a state of wide global concern); (2) *acute pandemic* (characterised by an unexpected and unprecedented rapidly spreading global event in which treatment options were limited and individuals’ lives were rapidly lost in the midst of overburdened healthcare systems, which we date from March 2020-June 2020); (3) *chronic pandemic* (in which disturbances to health, social order, and economy were a constant threat and a present possibility in the minds of many individuals and governments, which we date from July 2020-ongoing), and *post-pandemic* (when either a cure is available or herd immunity is gained, a time marker which remains unknown.) These four periods are not clear-cut distinctions; rather we view our

delineations as a heuristic device meant to enable our present discussion and consequently promote further dialogues and explorations on the topic of startup growth.

Above, we wrote that we focus on three distinct but complementary iterations of empathy. (1) There is the kind of empathetic understanding (“*verstehen*,” to invoke the German term common to anthropological discourses) in which an individual seeks to gain an understanding of another’s viewpoint. In human-centered design conversations, this empathy is often spoken of as being a crucial step in the design process: one has to figuratively step into someone else’s shoes if one wants to design an effective and useful product for them. This iteration of empathy can indeed be heartfelt and have an emotional component to it, but, in the case of human-centered design, it is notably task-driven and goal-oriented: the reason for attaining this empathetic understanding is to design a viable and useful product.

(2) The second iteration of empathy that we explore is one that is likely more familiar to the way the word is commonly-understood: it is the uncontrollable surge of emotions—often connected to heartache, loss, grief, sadness, etc. —which prompts one to imaginatively experience what it is like to live, breathe, and operate in the world from another perspective; consequently, one feels an empathetically driven desire to improve that person’s situation. While this sounds, at first glance, similar to the first iteration of empathy detailed above, this second iteration of empathy hinges upon the emotions and deeply held feelings. Etymologically, the word’s Greek origins are *em* (in) and *pathos* (feeling), and they suggest a sort of *feeling with/ alongside/ for* someone else, especially when that person is struggling or suffering. While, at times, an empathy for the suffering of others can in fact cause us to stand still in our tracks as our brains try to process the seemingly overwhelming obstacles involved, empathy often compels us to some degree of compassionate action. That is, when we empathetically-resonate with the sufferings of others, many of us are inclined to do *something* to help.

‘Empathy’, then, can be *either* strategic or spontaneous; premeditated or unprompted; it can be a skillset which is trained and fine-tuned for optimal execution and maximum efficacy, or it can be a surge of unanticipated emotions which render one’s heart so full that it cannot help but begin to spill over. In this paper, we will distinguish between these first two types as *empathetic understanding* and *em-pathos*, respectively.

(3) We also refer to a third type, which we call ‘mass-empathy’, and by which we mean a large-scale, collective experience of *em-pathos* for the same phenomenon. In this particular case, it was the COVID-19 pandemic which fueled mass-empathy for ICU patients, and for healthcare more broadly.

For their part, ethnographers have often spent years training in empathetic understanding and it is often so deeply embedded in their ways of seeing the world that they cannot help but adopt and actively cultivate a posture of empathetic understanding even outside their official role as ethnographer. It is interesting to note, though, that applied ethnography and the anthropological tradition from which it emerged has a strong bias towards rational, reflexive *empathetic understanding*. This paper explores what can be gained from opening up our awareness of the role of *em-pathos*, the dimension of empathy we might otherwise suppress or exclude.

In myICUvoice’s journey, we experienced multiple distinct and sometimes overlapping layers of *em-pathos* and empathetic understanding. As individuals, we are driven towards ever-deepening our own abilities to draw upon both of these types of empathy as we interact with the world. Indeed, as we hope will remain clear throughout this paper, we firmly believe that these kinds of empathy are key in building a kinder world. Regardless of these personal convictions, our present exploration is focused on scaling and, thus, our crucial point is this: individuals who are tuned-in to recognise, cultivate, and harness the *em-pathos* that compels individuals towards generous action in themselves and others not only offer a helpful vantage point and sounding board in what we could broadly define as business endeavours, but they are in fact *also* vitally-placed to drive forward projects which have historically struggled to pass through the inevitable obstacles involved in scaling. That is, an individual who has

the ability to empathetically-understand and wield *em-pathos* itself can be wondrously helpful in driving startups. Because, as we will show, *em-pathos* can be a powerful driving force which, when properly harnessed, can pull along a startup into a rapid scaling process, it is important for individuals to be able to recognise and successfully harness it.

While it is not necessary for such individuals to be anthropologically-trained, it is this ability to focus on and contextualise small and seemingly-mundane details—that is, the sort of stuff greatly emphasised by cultural anthropologists and others who conduct long-term ethnographic fieldwork—that can powerfully drive forward a startup’s vision, and enable it to scale even when the features which have traditionally helped startups to scale (new defensible IP, financial investors, etc.) are insufficient.

INTRODUCTION TO MYICUVOICE AND CRITICAL CARE

Before returning to articulate precise moments of the four-part model that we offer for scaling, let us start with an introduction to the case study itself: a Cambridge (UK) based startup (SympTech) developed a product called myICUvoice. We will walk you through the journey of this particular startup, highlighting both the types of hurdles it encountered as a software startup in a healthcare setting, as well as its engagement with an ethnographer and human-centered design and the way that this collaboration, at various times, either challenged, changed, or strengthened the startup’s visions and processes. Additionally, we will offer specific and detailed examples of the role that empathy played throughout the process.

So, what is myICUvoice? One way to succinctly summarise myICUvoice is that it is a specially-designed communication tool for mechanically-ventilated ICU patients and their nurses in the form of an iPad app. Mechanically-ventilated patients cannot use their vocal chords to speak, and this inability—combined with patients’ frail physical states and other factors which inhibit more standard forms of communication—impairs the patients’ ability to communicate with their clinicians and family members. This lack of communication, of course, also means that clinicians are not able to fully understand their patients’ wants and needs. Research shows that, while all patients in the ICU naturally experience some fear, stress, and uncertainty during their time in critical care, over 25% of patients who leave the ICU experience some degree of anxiety, post-traumatic stress disorder, and depression (Wade et. al 2018).

The driving energy behind the creation of myICUvoice can be simplified to a set of linked presuppositions: (1) Patients, like all individuals, need to communicate about their basic needs and wants as well as the types of interactions (humour, gratitude, a request for more information, etc.) which improve their overall quality of life. (2) Due to inadequate communication, the suffering that many patients experience during critical illness goes unrecognised, and hence untreated. (3) An inability to communicate has other long-lasting undesirable effects for patients. (Even though explicit recall of these events is often compromised by illness and drugs, patients report these problems after recovery from critical illness. In reality, such symptoms are likely to be pervasive and the implicit memories they encode may contribute to the increasingly recognised problems of acute post-ICU delirium and late psychological problems such as post-traumatic stress disorder.) (4) When communication is restored, the ICU experience is better for all involved; the earlier that communication is restored for patients, the less severe their PTSD will be upon leaving the hospital environment.

TIMELINE OF THE MYICUVOICE CASE STUDY

With that overview in mind, let us move to the timeline of myICUvoice. myICUvoice as a communication app was first conceived in 2013 by Dr Timothy Baker, a specialist registrar in anaesthesia and critical care medicine, while he was working in the ICU of Addenbrookes Hospital, a

major teaching hospital in the UK. Along with his ward boss Dr. Vilas Navapurkar, Tim started a patient focus group—the first of its kind in the UK—in which seven former ICU patients were invited to share what it was like to be a patient in the ICU.¹ The doctors had realised that, although their ICU was one of the most successful in the country in terms of medical metrics (namely, their standardised morbidity rate was notably low), they could likely still be doing *something* better, and they wanted to learn from their patients what this *something* was. We can see empathetic understanding within this desire to understand the viewpoint of others.

This patient focus group revealed to Tim and Vilas that, while patients rationally understood that they had been cared for by talented doctors, and while they often possessed an immense gratitude for the doctors who had managed to keep them alive, they *also* did not feel that they had been treated (in both the medical and non-medical senses of the term) as *individuals*. They were, first and foremost, *patients*. And an intrinsic part of being an ICU *patient*, it seemed to them, was to not have a voice. A clear spectrum of voicelessness was described; some patients were in the ICU ventilated whilst awake via an artificial airway (physically preventing speech) for weeks or even months, others were too weak to have the cerebral ability to find the words or physically phonate, others felt oxygen masks prohibited being heard and some felt that the complexity of critical illness meant they had no say in their treatments. These experiences of voicelessness also extended to not being able to express even their simplest needs such as “I am thirsty, can I have another drink please.” Not feeling able to fully communicate led many patients to ultimately conclude that the doctors really did not understand their experiences (see also Alasad et al 2015; Lykkegaard and Delmar 2015; Moen and Nåden 2015; Samuelson 2011; Topçu et al 2017).

Through the 2013 focus group, we see both the effort to gain an *empathetic understanding* of the patients’ experiences, and, upon gaining this, we see a deep sense of *em-pathos* emerge: Tim concluded that something must be done in order to better understand the thoughts and feelings of his patients and, crucially, to enable them to have a *voice* while in the ICU. Moving from empathetic understanding to *em-pathos*, Tim felt compelled to create a communication tool for patients as a way of restoring their voice. He wanted them to be able to communicate their physical states, but also to be able to express other elements which are basic to human interaction: humour, gratitude, questions, and the like. In other words, this empathetic (*em-pathos*) drive planted the seed for myICUvoice. Because startup innovations come out of the solvable problems, rather than the intractable ones, recognising a solvable problem must necessarily predate any efforts to scale that solution.

i. Phase One: Moving From Initial Problem To Design

In 2014, because of a lack of available funding, Tim approached his cousin (a student with no prior software development skills), who, from a place of *em-pathos*, agreed to develop a simple prototype to be trialled in the Addenbrooke’s ICU. This cousin then relayed the story of myICUvoice to a graphic designer, highlighting, as Tim had done, the reality of mechanically-ventilated patients and the severe effects of not being able to communicate. The graphic designer responded with *em-pathos* and created tiles, thus providing images to match the app’s text statements. Version 1.0 of myICUvoice was created: with the press of a button, patients could use the purposefully-simplistic tiles to select from pre-written statements to express communications about their physical and emotional needs, and also ask questions (“where am I?”, “when is my family coming back?”) that are typical to ICU contexts.



Figure 1 (Left). An image featuring the myICUvoice homepage. ©SympTech, used with permission.

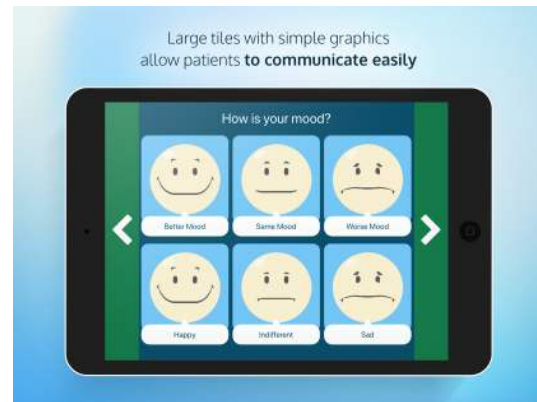


Figure 2. (Right). An image featuring the "How is Your Mood?" page of the myICUvoice app. ©SympTech, used with permission.

A study comparing patients with and without the provision of the tool demonstrated enormous benefit for patients. Nurses, doctors, patients and their relatives provided a continuous stream of positive feedback. Despite this, patients that were deemed clinically suitable for the tool were often found not to have been given access to it. Some explanations offered for limited provision included nurses not realising the patient would be able to communicate, iPads not being available, having been lost or without charge and the fact that it was clearly a prototype rather than a polished solution.

Percentage of the patient and staff groups who strongly agreed or agreed with each survey question					
Response Group		Patients			Staff
		Control	Conventional Communication	myICUvoice	myICUvoice
Question					
Patients often felt	Stressed	40.4%	83.5%	71%	51.3%
	frightened	36.5%	83.5%	71%	32.5%
Staff Understood	Physical needs	75%	83.3%	100%	87%
	Emotional needs	67.3%	33.3%	85.7%	71%
	Levels of discomfort	63.5%	50%	85.7%	85.9%
Communication was effective		41%	33.3%	57.2%	87%

Figure 3. Numerical data showing the percentage of the patient and staff groups who 'strongly agreed' or 'agreed' with each survey question (Baker et. al 2017). Reproduced with permission.

This initial work was used to demonstrate feasibility of the project and to highlight the technical areas that needed to be improved or established. In 2016 a grant for development was provided by Addenbrooke's Charitable Trust (ACT) to build a prototype that included additional features. This was introduced onto the ICU in 2017 and included a database to catalogue the symptoms reported and the extent of use, and measure usage patterns. Patients who had the appropriate dexterity and muscle control could also use a new keyboard function that supported free-communication allowing

expression of anything desired. Despite the technical enhancements in the software, there was no improvement in the rate of use of the application in the Addenbrooke's ICU.

We have retrospectively suspected that this lack of uptake is directly linked, as we will return to below, to the fact that myICUvoice had been designed with ICU *patients* in mind, but it was in fact ICU *nurses* whose role as end-users needed to also be considered. Up until this point in the myICUvoice journey, it was ICU patients who were the key focus as the end-user whose needs had to be met and whose preferences had to be catered to.

But, by the nature of healthcare and the subsequent interpersonal relations that occur in critical care contexts, the patient was in fact a vulnerable dependent who relied on the nurse to introduce, and continue to use, the myICUvoice tool with them. Like so many other communication devices, we had designed our tool for one set of end-users while there were in fact multiple end-users whose needs had to be considered if we wanted to stimulate uptake. Indeed, healthcare startups must understand the dynamics and decision-making processes of the healthcare systems (which differ by country) and ensure that they can explain tangible benefits to the gatekeepers *while also* offering a helpful therapeutic solution to patients—we return to this in more detail when we explore the role that ethnography and human-centered design played in the journey.

By 2018, several presentations given by Tim and colleagues piqued the interest of some charitable donors, including more donations from ACT, which resulted in accruing additional iPads so that myICUvoice was available to all Addenbrooke's ICU patients 24 hours a day. In addition to the provision of hardware, to ensure that the tool was always available for the physically voiceless patients but also so that a better understanding of the symptoms of all patients could be gained, myICUvoice was used to survey all patients in the ICU on a daily basis. Nurses were trained to use the system, and the rationale for allowing improved communication was explained. At this point in time, the main methods of training nurses included emails (reminding them to use the tool with every patient and with a link to an explanatory video of why the tool should be used), study day presentations, and peer to peer learning (five dedicated nurses were first given additional training to teach and encourage other nurses of the same grades.)

Interestingly (or, frustratingly, depending on your own experiences with this sort of thing) although Tim and colleagues felt that they had clearly explained to all nurses how, when, and why to use the myICUvoice prototype, ethnographic observation and interviews conducted in late 2018 suggested that very few nurses felt that any of these topics had indeed been explained to them. Rather, many expressed a desire to receive more training about how to use the device. A number of nurses, even those who had been on the receiving end of educational material about some of the broader reasons for using myICUvoice, still had not fully comprehended what Tim and others felt they had made crystal clear. This striking incongruity between what (on the side of the startup) was thought to be clear and what (on the side of one group of end users—the nurses) was felt to be clear is important to note. Indeed, one of the struggles with startups that hinge upon creating and providing educational training to any group of their end-users is that one cannot always be certain that the training has been adequately received. Training must be designed and delivered in a way that is relevant to its end users and which highlights their areas of interest. (Again, we return to this below when myICUvoice's timeline interacts with ethnography.)

As the prototype remained in use in Addenbrooke's ICU, nurses were encouraged to incorporate it into their standard care routines and to use it with every patient at least one time each day. Despite positive feedback received from the medical staff and patients who used it, the data that the app produces demonstrated that it was not being used with all patients who would benefit from it, and some nurses rarely used it at all.

myICUvoice wanted to use data visualisation tools as a way of addressing this apparent gap between who *could* be using it and who *was* using it. Consequently, Phil and Mary-Ann Claridge, of

Mandrel Systems (a software consultancy firm), were introduced to the project: they were told about the need for mechanically-ventilated patients to communicate, and they wanted to offer their time and expertise to help the myICUvoice project. *Em-pathos* was central here: having seen his own father undergo medical care which required a tracheostomy, Phil directly resonated with the aim to provide better communication for ventilated patients. On the other hand, Mary-Ann had a family connection to Florence Nightingale (a statistician and founder of modern nursing), and she was keen to be a part of using data to improve patient experiences. Consequently, Mandrel Systems volunteered their time in order to design and create the necessary data visualisation.

The live data visualisation tool allowed for further exploration of myICUvoice's efficacy. It demonstrated symptom patterns not previously recognised and new treatment strategies to be trialled. It also meant that usage data could be collected on a daily basis. When we were able to review the data collected by myICUvoice every day, it became clear that the level of usage reported by the nurses didn't align to the data extracted. It also suggested that the tool wasn't being used in the way we had intended. What we found was that only on days when nurses were actively and repeatedly asked to ask their patients to use myICUvoice did we see a level of use close to that intended. This was when Tim first started to see fully the impact of the views of the nurses in determining whether the software was being used appropriately.

Realising the need for sustainable funding and investment in the technology to make a Minimum Viable Product (MVP), Tim engaged 8 MBA candidates from the Judge Business School (University of Cambridge) in 2017. The question asked was, 'We know myICUvoice creates value, but making patients feel better doesn't save money for hospitals. How can we make a viable business model for myICUvoice?' They conducted market research, demonstrated the clear need for the tool, understood the value proposition but found no route to market without a multi-centre randomised control-trial to demonstrate benefit and therefore cost benefit to healthcare (this is the classic medical business model) This is to say: myICUvoice faced major hurdles to achieve buy-in from hospital and wider national health service authorities. The resounding conclusions of the MBA candidates was that there was no compelling way for myICUvoice to proceed as a regular startup (i.e. one that is financially self-sustaining, let alone profitable) and it would only become operable on charitable funds.

While the progress thus far had been a long labour of love by Tim and other individuals who had joined his *em-pathos driven* vision for the app, the other three authors of this paper were each introduced to myICUvoice in 2018, when it participated in a Cambridge University technology commercialisation program called i-Teams (Pulman-Jones and Weatherup 2019).³ Nadya Pohran, who at the time was a postgraduate student participant of i-Teams working specifically on the myICUvoice project; Amy Weatherup, the founder and director of the i-Teams program; and Simon Pulman-Jones, an instructor and mentor on the program. The i-Teams program, which was presented at EPIC 2019 as a model for the human-centred design community to engage earlier with scientist innovators, worked with myICUvoice in early 2018. i-Teams takes teams of post-graduate scientists through a kind of participant-ethnography simulation of the startup experience, with a strong human-centred design ethos, with the aim of supporting and accelerating the commercialisation path of new university-developed innovations. The student i-Team included 4 life scientists working towards their PhDs, a Chemist studying for a Masters degree, a postdoctoral clinical scientist and Nadya, who was working towards her PhD in Theology and Religious studies while using anthropological methods. During the project the team talked directly with doctors and nurses who worked with ICU patients, and to some patients' families, to increase the empathic understanding of the benefits that myICUvoice could bring to them. They also investigated possible sources of funding and routes to market for the application. The project highlighted the potential for improving the value and relevance of myICUvoice through a deeper understanding of the different stakeholders in the ICU experience. The team recommended forming a relationship with another ICU to try the application there, and then investigating whether

it would be possible to gather data to demonstrate its effectiveness in an objective way, through some type of formal trial.

When the i-Teams program had finished, Nadya continued working with myICUvoice over a 14-month period, deploying elements of ethnography and human-centered design to inform a significant redesign of the myICUvoice app. Nadya conducted several half-days of observation in the ICU where she was able to interact with, and observe, nurses as they cared for their patients. This totalled to ~20 hours of observation. She also conducted semi-structured interviews with 25 nurses, and she was undeniably interested in finding out why some nurses were not using the app, as well as gaining a more general understanding of how the app was perceived by the nurses. However, she made a point of not posing her questions directly to nurses, but instead she mentioned her affiliation with the myICUvoice project by means of introducing herself, and then went on to explain that she simply wanted to understand more about nurse and patient interactions in the ICU more broadly. This choice of intentionally allowing the nurses to direct the subsequent topics of conversation resulted in her assuming the posture of a student who nurses often seemed to view as someone in need of teaching and training. This methodological posture of “open-student”, certainly familiar to Nadya’s background in cultural anthropology, is also familiar to medical settings, where nurses (depending on their expertise and training) are often in the position of training more junior nurses or medical students. All this to say, it was a methodological posture which worked strikingly well in the ICU setting.

Typically, Nadya would arrive at the ICU, put on scrubs, and enter one of the three wards of the ICU, allthewhile wearing her hospital ID card which stated “Ethnographer and Usability Auditor” as her job title. (Many people didn’t read past the word “Ethnographer” before asking something along the lines of ‘Ethnographer? What’s that?!’) In ICU contexts, each nurse is assigned to one specific patient during their shift, and so, while it was relatively easy to locate nurses to (hopefully) speak with, it took a certain combination of courage and luck to approach a nurse who deemed that they had time and willingness to speak. Some of the nurses had been introduced to Nadya by Tim or the Matron during her first couple of times in the ICU, but many of the nurses had no idea who she was until she approached them with her line, “Hi, I’m Nadya. I’m working on the myICUvoice project with Tim. Right now I’m just trying to learn more about the ins and outs of the ICU, do you have any time to chat with me?”

While there were several varied human-centered insights that we do not have the scope to explore here, there are a couple that are worth noting, as they have had a direct impact on the technology of myICUvoice. Midway through her time conducting ethnographic observation in the ICU, Nadya began to notice the varied ways that nurses, either directly or indirectly, offered explanations pertaining to why they did not use the myICUvoice app as often as it might have been used. One crucial insight that was eventually brought to light was that nurses often thought of a very particular “ideal” patient with whom they would use the app, and they were not naturally inclined to use it with patients who did not have those particular characteristics.

This idea of an “ideal” patient with whom to use myICUvoice was significant and seemed ubiquitously held amongst nurses, even those who had shown themselves to be somewhat of a myICUvoice ambassador with their vigilant and keen use of the app. Of the 25 nurses who Nadya interviewed, 22 of them either explicitly (by which we mean some used the word itself) or implicitly referred to an “ideal” patient with whom to use myICUvoice. The 3 nurses who did not do this were ones who self-described as not using the app at all.

This nurse-held belief that there was a particular kind of patient with whom they should use the app, and thus, many other cohorts of patient who did not need to use the app, is particularly significant because, for months, Tim had been instructing nurses to use myICUvoice “with every patient, every day.” The “ideal” patient who the nurses conceptualised had defining characteristics: was understood to be mechanically-ventilated, a “slow wean” (that is, that they were expected to spend substantial

more time in the ICU before being discharged) and sufficiently alert/awake/oriented (described in nurse terms as Level 2 or Level 3.)

Similar views were expressed when, months after the interviews, Nadya conducted an anonymous survey with the nursing staff. She asked the question “Below is a list of words which could describe a random patient. Please select all that you would try to use myICUvoice with.” The words were: irritated, sedated, semi-conscious, tracheostomy, mechanically-ventilated, lonely, confused, happy, can speak verbally, nervous or anxious, Level 1, Level 2, Level 3, spaced out, elderly, middle-aged, young, hallucinating, ward-able. Nurses were instructed to check off all adjectives that they would be willing to try to use myICUvoice with, and a space was given for them to add any other adjectives or comments. Of the 40+ nurses who filled out the survey, 80.6% selected “Level 3”, 90.3% selected “mechanically ventilated”, 90.3% selected “Level 2”, and 96.7% selected “Tracheostomy”—these kinds of answers were to be expected. But, significantly, only 41.6% indicated that they would try to use myICUvoice with a patient who could speak verbally. The fact that less than half of nurses were inclined to use myICUvoice with a patient who could speak verbally is a stark contrast to the way that Tim wanted myICUvoice to be used with *all* patients. As mentioned above, Tim understood that the communication needs of *all* patients were not being adequately met and thus, even for those who could speak, communication had to be improved. The fact that nurses were only inclined to use it with a certain patient cohort meant that a mere fraction—about 10%—of patients who could be benefiting from myICUvoice were being introduced to the tool.

This ethnographic insight caused us to reconsider the reality that different end users would inevitably have different reasons for wanting to use the app or not. While it can be tempting to present an apparently well-thought through technical solution and assume that it will be seamlessly integrated and implemented by the various individuals who need to use it, ethnography shows time and time again that the process is not nearly so clean-cut. The reality, certainly in the context of healthcare, is that there is not a single end-user. Consequently, designing the product with the patient in mind (the result of both *empathetic-understanding* and *em-pathos*) needs to *also* consider the needs of the other end users. In the case of myICUvoice, we came to identify several different primary end-users, including: patients, nurses, health-care assistants, doctors, and the relatives of patients. We also knew that our software had to also speak to the priorities of those in positions of power who made decisions about whether or not to implement a particular tool across the hospital setting, and the medical researchers who could potentially use the data contained in the app (we return to this below).

This reality was combined with the fact that the very category of “nurses” (easily spoken of as if the shared title and training necessarily entailed a monolithic and homogenous group of individuals) quickly proved to be not singular but multiple. To use human-centered design vocabulary, there were multiple *personas* of nurses: the level of initiative that nurses took in order to excel in their work environment, the intensity with which they wanted to understand the needs and desires of their patients, the extent to which they believed that communication would indeed improve ICU experiences, and their comfort with new tools and technologies on which they had not been extensively trained, are just a few examples of the various defining of features of nurses.

So, while some nurses did not use myICUvoice due to feeling that they did not have an appropriate patient with which to use it, others had different reasons for not using it. Some were not comfortable with the technology. Some seemed generally disinterested in adding more work into their days. Others preferred using alternative modes of communication, feeling that the technology was an inhibitory blockage in giving their patients the human-human interaction that they needed. As one nurse explained, “As soon as the patient can communicate otherwise, I prefer to stop using the iPad [myICUvoice]—[I instead want] to have them mouth words, to nod their head yes or no, whatever. It feels more like a human interactive than using technology...we need human elements of interaction.”

Another nurse, whom Nadya had interacted with on many occasions, including seeing him introduce myICUvoice to several patients who had never used it before and who overall seemed immensely on board with the values and mission of myICUvoice, often used alternative modes of communication when possible. One day, when his tracheostomised patient began to convey (through non-verbal means) the early signs of wanting something, this nurse could have easily used myICUvoice in order to figure out precisely what the patient wanted. Instead, the nurse chose to engage with the patient without using myICUvoice, and eventually learned that what the man wanted was a drink of water. (Something which, as it turns out, is one of the most frequently used statements communicated using myICUvoice.) The nurse quickly got water for the man, and the communication mystery was deemed settled. What is striking is that, in this instance, when Nadya eventually had the opportunity to ask the nurse about why he did not use myICUvoice in that instance, he simply shrugged and explained “he didn’t need it.”

This succinct statement is actually of utmost significance for human-centered design contexts. Who determines when a communication tool is needed or not needed? What if, as strongly suspected by Tim, using myICUvoice in such instances might have in fact lead to more in-depth communications? What if a patient, even when their need for thirst is met, has more complex—or even simple—needs which would benefit from the opportunity to communicate with more nuance and detail? What if, instead of waiting until ‘normal’ communication failed and using myICUvoice as a ‘last resort’ technical solution, it was used as the first and consistent means of communication throughout a patient’s stay, as Tim originally envisioned? Such considerations are ubiquitous and crucial in the context of human-centered design and especially in the implementation of new products in environments with existing protocols and practices.

ii. Phase Two: Moving Beyond Human Value To Organisational/Institutional Value

When Nadya spoke with Tim about the insights gained from observations such as these, she emphasised the need to clearly define the multiple end users and to recognise that each set of end users would have different reasons for using the product (or not using it) and that, even within a single set of ‘end users’ there would be significant diversity in that user group. She noted, for example, that even the end-user of ‘patient’, which was already diversified on account of different patient cohorts, was further diversified by whether or not we were considering the needs of *current* patients (in which communication was an obvious remedy) or *future* patients (in which the software’s ability to track and analyse frequently-reported symptoms, thereby enabling the possible pre-emptive treatment of symptoms for future patients, was most desirable). Furthermore, as mentioned above, the ‘nurses’ user group was particularly significant to the success of this app, and it was determined that the wide spectrum of ‘nurses’ had to be empathetically understood and their needs had to thus be accounted for and addressed.

These insights called for significant redesigning of the myICUvoice project: both the app’s software, but also the way it was presented to nurses (or, to these varying personas of nurses) had to be accounted for. It was at this point that myICUvoice concretely realised an aspect that, as we mentioned above, had previously been unarticulated but was still very significant to the app’s (lack of) scaling process: its end-users were not simply ICU patients; they were *also* ICU nurses.

Different uses, different users, different priorities								
	Health Care Assistant	Nurse	Consultant	Patient	Family Members	Funders	NHS/Implementation	Medical Research
Communicate practical needs	✓	✓		✓				✓
Communicate pain	✓	✓	✓	✓				✓
Communicate emotions	✓	✓		✓	✓	If linked to improving patient experience		✓
Communicate (no set purpose)				✓	✓	If linked to lessening PTSD	If linked to lessening PTSD	If linked to lessening PTSD
Speed up communication	✓	✓		✓	✓	✓	✓	
Decrease PICS and PICS-f				✓	✓	✓	✓	✓
Connect symptoms with conditions						✓	✓	✓

Figure 4. A chart showing the ways that different users were understood to have different reasons to use the app. ©SympTech, used with permission.

On the surface level, this can seem like a shockingly simple recognition: the sheer diversity of human experiences and the multiplicity of end users meant that a tidy technical solution, even if it were a perfectly functional as a technical solution to a known problem, risked being discarded by a significant number of our target users if their own user needs were not anticipated and accounted for. This recognition, which was nuanced and developed from numerous back and forth conversations between Nadya and Tim and other individuals who represent a host of disciplines, led to the need to re-brand the app in a way that ensured that nurses were also viewed and accounted for as end-users. This recognition from the ethnographic work eventually planted the seed for a substantive change to the software: myICUvoice had to be re-designed in order to cater to *nurses* just so much as it catered to *patients*. Unfortunately, a lack of funding meant that this change could not be immediately implemented.

Up until this point, the app's interface had only been explicitly designed for patient use; although we wanted nurses to use it and even had features within it that were there specifically for nurses, we had not made any tangible indicators that the app itself was designed for nurse use; everything was 'the Patient Zone' and thus myICUvoice, in many ways, seemed at risk of joining the fate of all other communication apps that had been designed for ICU patients: they were used by a small handful of nurses who were keen enough to want to use them, but, on the whole, they never became an integral part of the care plan or the healthcare system, and they were consequently never consistently and widely used by patients.

A lack of financial resources did not allow the team to substantially pivot the app in order to address this crucial insight. Despite interest being shown from others in healthcare settings, a consistent lack of funding prevented it from picking up the momentum it needed in order to scale larger than the ICU it first started in. Some software glitches eventually resulted in the app ceasing to function for about a 6-month period towards the end of 2019 and early 2020. Those of us who are familiar with the success rates of startups (roughly 1 in 7 startups do not continue beyond their second year) will not find it altogether surprising that a startup—even one which offered a relatively good solution to a relatively notable and prevalent social problem—struggled to scale.

iii. Phase Three: “Mass-Empathy” (triggered and amplified by COVID-19) Transforms The Conditions For Scaling Human-Centred Innovations

What is, however, surprising—and what makes this case of particular interest to our present discussion of scaling—is the sheer rapidity with which myICUvoice began to scale in late March 2020. If, in late 2019, myICUvoice seemed to be joining the metaphorical graveyard of communication apps, in March 2020 we were rapidly resurrected. Significantly, this was mere weeks after the COVID-19 virus was declared a global pandemic by the World Health Organization, and the fact that myICUvoice’s speed of scaling corresponded to increasing global media coverage about the pandemic and ICUs in particular is a crucial aspect for our consideration (World Health Organization, 2020.) While the *em-pathos* of several particular local individuals had driven the app forward thus far, the startup was now operating in a global context of ‘mass-empathy.’ Making use of the global *em-pathos*, by June 2020, myICUvoice underwent substantial changes and made substantial technical and market adoption progress in a mere two-month period. Having been in the works for nearly 7 years, this shift is notable.

In the middle of March, Tim contacted Nadya to see if she would be willing to act as Project Manager of myICUvoice as it resurrected itself and prepared for scaling; having witnessed her ethnographically-inclined ways of engaging with myICUvoice thus far, Tim sensed that she intuitively ‘got’ the human-centered vision that he had, and that she would bring a depth and helpful vantage point to the process on account of her anthropological background. For her part, given that unrelated international ethnographic fieldwork had been unexpectedly cut short due to the pandemic, and sensing that it would feel rewarding and uplifting to be a part of a project that promoted positive change in the midst of the chaos of the pandemic, she agreed to take on the role. Tim had already been joined by Phil and Mary-Ann Claridge who, yet again, crucially offered their time as software developers, as well as by Dr. Katy Surman who offered her time as a medical researcher and general assistant to the various tasks that required attention. These five individuals formed the ‘core team’ of myICUvoice, as the company (which didn’t even yet have a bank account) continued to have a working budget of \$0.00.

All individuals were working pro-bono, but they held weekly group meetings and exchanged various emails and messages each day in order to ensure that the tasks were being attended to. The hours were long, and the team furthermore had to work around Tim’s own schedule as a doctor attending to COVID-19 patients in the ICU. While this made scheduling challenging, it also meant that we had regular continual feedback from the rapidly changing situation when it came to hospital protocols related to COVID-19. Additionally, because COVID-19 meant that ICUs across many different countries were receiving a significant influx of patients who had to be mechanically-ventilated, it was clear that myICUvoice would be of real benefit to these patients if it could be made available. First and foremost, the software itself was resurrected and certain technical features were redesigned. Specifically, the aforementioned need to design the app for nurses was finally addressed, and the team designed, trialed, and re-designed a ‘Nurse Zone’ which was specifically designed to provide nurses with impetus for using the app in a way that had not previously existed. While the app’s interface had been thus far designed for patients (we call it the Patient Zone), the Nurse Zone had features that were specifically designed for Nurses. For example, it contained summary charts of their patients’ symptoms, and showed in a single glance how their symptoms and communications were changing over time.

It is important at this point to note that, while the core myICUvoice team was working (sometimes more than full-time hours) on this project out of their own *em-pathos* and desire to launch myICUvoice to the patients who would, they felt, immediately benefit from it, this in and of itself was not an altogether new scenario. As the previous sections have detailed, there had been a plethora of

individuals who had voluntarily donated their time and expertise to the project over the past several years.

But an obvious difference between those 6-7 years and these 2-3 months were the wider global context in which those 2-3 months occurred. The COVID-19 pandemic resulted in conditions that had not yet been previously experienced. As COVID-19 pushed ICU patients and patient experiences into the public eye, more attention of the public was directed towards the ICU. There was an urgent need to optimise efficient use of scarce ICU resources through and all means, as well as a need to support relationships with patients' families and carers remotely. Meanwhile, because the media coverage focused on the predicament of patients and health professionals (starting in Wuhan, then in northern Italy, and then in other milieus), individuals were being confronted with the *empathetic understanding* of the ICU experience in a way that many had not previously done; for many individuals, *em-pathos* ensued. With its human-centered, nurse and patient-focused design, myICUvoice was well-positioned to respond when conditions changed and new opportunities for scaling up arrived, allowing the team to take advantage of the new ground-swell of mass-empathy for ICU patients which the pandemic generated. It was at this point in myICUvoice's journey that *em-pathos*, empathetic understanding, and mass empathy collided.

iv. Phase Four: An Empathetic Understanding Of Empathy-Driven Networks Drive A Rapid Global Scaling

Just as a gust of wind will not propel a sailboat if the sails are not hoisted and ready, a time-sensitive global phenomenon of mass-empathy will do nothing to propel a startup to scale if the winds of *em-pathos* are not adequately harnessed. Empathy, as we have already outlined above, is often spoken of in one of two contexts: either the empathetic understanding of another's viewpoint or the heartfelt and often spontaneous *em-pathos* which compels individuals to act towards bettering another's circumstances. At this point of the four-phase model of scaling, we relied on an empathetic understanding of *em-pathos* itself, and we subsequently made use of the significant expressions of *em-pathos* felt by the broader society in order to drive forward our scaling.

How precisely did this happen? The story is woven together by a few distinct threads. In late March 2020, on day six of her quarantine following international travel, Nadya decided to launch an ethnographic diary study in order to learn more about individuals' COVID-19 experiences. Driven by a seemingly insatiable desire to empathetically-understand the world around her, she felt that a diary study might lead to interesting insights about human thought and behaviour. She wondered, broadly, what sorts of thoughts and actions were new, prevalent, or falling to the wayside during these unprecedented times. As she began to design the study and create the questions themselves, she contacted a handful of colleagues, some of whom worked in policy implementation and mental health fields, with the aim to see if there could be any way to use any insights that the diary study might bring to light as means of invoking some degree of positive change. Colleagues advised her that it was not likely that such a study (detached from any university or company) could be used to change any policies, but that perhaps she could find some insights within the study and eventually implement micro-changes at local levels.

By this time, the diary study had attracted ~100 participants, and Nadya was keen to see what might come of it, so she continued all the while knowing that 'nothing official' might ever come of it. Participants, who were first briefed about the point and purpose of these diaries, provided some basic sociodemographic data about themselves and their living situation and then, over the subsequent three-week period, they wrote an anonymous diary every day. The diaries followed a similar structure each day: participants were first asked to indicate the types of emotions that they had experienced throughout that day, and to provide a descriptive summary of their day including 3 specific details or

activities. They were then given three guided questions to reflect upon and answer—the questions had been mapped out in advance to cover a range of thematic topics. And finally, they were given a blank space to add anything else that they wanted. As she read through the entries, Nadya was struck by how many individuals expressed a desire to do something—anything—to feel both useful for, and connected to, the wider world. Much to her surprise, many participants indicated that they appreciated even participating in the diary study itself, as it made them feel as if they were being connected to something bigger than themselves and their confined home environments.

Through reflecting on individuals' diary entries, Nadya built an additional understanding of what can motivate and engage people during this COVID-19 period. Specifically, the diaries gave Nadya an empathetic-understanding of, and insight into, the ways that a wide spectrum of people (importantly: most of whom were neither medical doctors nor software specialists nor ethnographers) were reacting to the pandemic. It was undeniably clear that individuals felt *em-pathos* and yet, importantly, they also felt a deep fatigue and a sense of being overwhelmed. Many individuals also skipped a day (or more) of the 3-weeks of diaries, and often commented on this in a later entry, writing something along the lines of “I’m sorry I didn’t write anything yesterday. Honestly I was just too emotionally exhausted.” At other times, when participants were asked to reflect on a particular moment of their day during which they had experienced a particular emotion like gratitude, irritation, or happiness, some individuals answered with concise phrases like “too tired. Can’t think.” On still other days, participants who had formerly expressed utter fatigue and emotional exhaustion, filled their pages with lengthy reflections, suggesting that their energy levels varied substantially from day to day.

Reading ~100 of such entries every night before going to bed (and often consequently resonating with the “too tired, can’t think” feeling), Nadya began to see patterns of behaviour emerge. While these patterns did not revolutionise the way she currently thought about human nature, they were nonetheless striking: (1) lots of individuals experienced alternating intensities of boredom, stress, hope, fear, anxiety, and gratitude; (2) many individuals' routines had been disrupted; (3) many voluntarily expressed a desire to do something ‘valuable’ and ‘meaningful’ with their newly-acquired spare time; (4) importantly: individuals had shifting, often-unpredictable levels of energy. While it would not have felt ethical to approach these participants with an offer to use their time to volunteer on the myICUvoice project, Nadya began to realise the strong likelihood that there were potentially countless individuals sitting at home who would gladly offer a few hours of their time to contribute to something they deemed meaningful. Perhaps these individuals, like so many others had along the last several years, would indeed deem myICUvoice to be worthy of their *em-pathos* offerings.

Consequently, Nadya encouraged the five members of the myICUvoice team to reach out to their personal networks for tasks that did not require sustained periods of time commitment. While the medical doctors (Tim and Katy) and software engineers (Mary-Ann and Phil) of myICUvoice were primarily occupied with medical and software needs, Nadya began to reach out to her networks to see if there would be any significant uptake of people willing to volunteer for other tasks. She intuitively understood that the tasks would have to be something that could ideally be completed in a single session at the computer, as there was no guarantee that people's shifting energy levels would allow them to take up the same task the next day. A summary of the groups who were reached out to in the first week (the end of March 2020) include:

- A LinkedIn Post asking specifically for graphic designers: received 25 emails of designers, animators, and illustrators offering their time
- A group message sent to the Cambridge University Women's Basketball team (of which Nadya is an alumni) : received offers to translate into Spanish, French, Italian, Polish, Turkish, and Mandarin. Team members were also responsible for recruiting native speakers who could translate into Arabic and Hindi

- A Facebook post to Hughes Hall College (of which Nadya is an alumni) : offers to translate into Portuguese
- A Facebook post to Canterbury High School Alumni (of which Nadya is an alumni) : offers to translate into German and Dutch
- A personal request to two friends: collaborated to write/edit the script, make the animated video, and do the voiceover for myICUvoice's App Release video²
- A personal request to three friends: to collaboratively take care of myICUvoice's social media outputs

As the weeks of various stages of local, national, and global lockdown went on, each of the core myICUvoice team members experienced their friends and personal networks responding to their candid requests for help with various tasks (mostly in the vein of language translation and/or verifying former translations.) Free legal advice was provided by Howes and Percival law firm, and, once we reached the point of gaining traction with public media, Cofinitive agreed to handle all of our press release communications. Hearing about us from our social media outputs, phonesForPatients and iComms for ICUs Project (who were both donating repurposed business iPads to ICUs in response to COVID-19) offered to pre-install myICUvoice on the iPads before they donated the iPads to ICUs.

Collectively, over 40 volunteers from several different countries had been mobilised and were crucial in bringing myICUvoice to the point that it is at now. They made animated videos, infographics, and social media posts which were then used to bring awareness to members of the public and nursing staff about myICUvoice. They also translated the app into 12+ different languages and tested it to provide feedback on how the app's content came across to a native speaker when the app was used in a non-English language. The multilingual features drew the attention of medical workers from different cultural and linguistic backgrounds, and ICU workers from several different countries including Canada, Ireland, France, India, and Australia contacted the company to request to use the app in their own care contexts. Upon being freely available on the UK app store, it was trialed by senior doctors from several different ICUs in the UK who were interested in implementing it in their own units. This interest from different medical spheres across the UK and the globe obviously did not materialise out of thin air: it corresponded to the work of 40+ volunteers from several different countries whose volunteer efforts enabled not only the software of the app to be made ready for release on the App Store, but who were also crucial in marketing the app and letting medical professionals know that myICUvoice was freely available for their use.

While, as we mentioned above, we attribute this rapid scaling to mass-*em-pathos* generated by the pandemic, we further suggest that this *em-pathos* had to, in fact, be empathetically understood. In order for the surge of *em-pathos* to become tangibly useful to the startup's scaling process, it required careful and insightful recognition, cultivation, and harnessing of it—an ethnographically-inclined vantage point and disposition was well-placed for doing this. Volunteers' *em-pathos* driven desire to volunteer had to be first and foremost 'harnessed' in a respectful manner so that no one's goodwill was abused. In this way, our volunteers became similar to the end-user of myICUvoice—not in the sense that they would end up using the finished product, but because we had to intimately understand their needs and ensure that we 'designed' a system in which they felt cared for and understood.

We did this in a number of ways. In some of the more practical ways, we broke down the tasks into relatively small tasks that could be completed within an hour or so. For example, when individuals worked on translating the app into their native language, we divided the translations into small portions so that no singular individual would feel overwhelmed. Often, we had multiple translators working on any given language, and we used a system where they could communicate with each other (often to debate a particular translation) and with us as they translated. Understanding from her diary study that many individuals wanted to volunteer, in part, due to their own isolation, Nadya also

arranged group video calls where individuals who were volunteering their time had the option of speaking live with people who were working on similar projects. During these calls, individuals sometimes exchanged ideas and advice about how they were adjusting to life at home, and there was even a time where a more senior animator and illustrator gave some free advice and training to a more junior illustrator. These conversations, often sporadically veering away from the specifics of myICUvoice to more general forms of human connection before returning to the work at hand, played a key role in ensuring that individuals felt that they were meaningfully connected to an interesting project, rather than being an anonymous cog in a wheel. There were even moments, in the midst of discussing the infographics that were being made to explain myICUvoice to nurses, that the conversations about myICUvoice shifted to offering gardening advice; and when one of the volunteer illustrators sent off a short video to Nadya to use as educational material; Nadya responded with a home-made video clip about how and where to plant snap peas. These details may seem so small that they could easily be brushed aside as meaningless, but anthropologists have been trained to deeply pay attention to the seemingly mundane and particular; it is often in the mundane that integral moments play out. Indeed, various volunteers were brought together, and sustained, not *just* because they wanted to contribute to a meaningful project, but also because they wanted to connect to others in meaningful ways during these unprecedented and often stressful times. A fine-tuned and finely trained empathetic understanding of this situation enabled the *em-pathos* of volunteers to be harnessed.

CONCLUSIONS AND LESSONS LEARNED

Having now walked through the journey of myICUvoice in its pre-pandemic, acute-pandemic, and chronic-pandemic phases, there are some broader questions that we can return to and explore regarding the role of ethnography. We see, in the pre-pandemic timeline, during phase one and two of scaling, that ethnographic insights played an important role in understanding the nurses as a diverse set of end-users whose needs had to be understood and designed for in order for myICUvoice to gain uptake. These phases demonstrate the importance and value of involving human-centred design and ethnographic approaches early on in the process of technology development, possibly even before initial prototypes are created, for example as is done in the i-Teams programme in which Nadya and myICUvoice participated. Tim used his own empathetic understanding to identify a problem for patients, used his knowledge and experience as an ICU doctor to suggest a technically-focused solution (a communication tool), built a working prototype and showed how it improved patient experiences. As is also common in startup case studies, this prototype enabled the ICU team to improve their treatment of patients, even without that being one of their initial goals, showing the importance of putting early-stage prototypes into the hands of real end-users to assess their potential impacts. By doing so, he discovered the critical importance of nurses in accepting (or blocking) the adoption of a new tool.

It is an interesting theoretical exercise to consider whether, had a formal ethnographic approach been involved from the start asking “what is it like to be in an ICU and where are there problems to resolve?”, it might have resulted in a broader early identification of the detailed dynamics of an ICU and the key gatekeepers —though it might consequently have resulted in the identification of a completely different set of problems and a different product altogether! Furthermore, although the original MVP was not based upon ethnographic insights, it was indeed a plausible solution to a known problem. And, by the very fact that it offered a solution to a certain set of end users, this meant that the early end-users could and did provide useful feedback based on their access to an early prototype product. Ethnographers who work alongside and with businesses must constantly negotiate and navigate these two options: (1) approaching and understanding end-users *before* a solution or product is designed and enacted and then attempting to design an ethnographically-informed solution (2)

bringing forth an existing solution or product and, based on ethnographic insights and feedback, learning how to pivot an existing solution to best meet the needs.

Crucially, we note that it was the experience gained from the first version of the software, together with carefully-gathered ethnographic understanding of nurses and of the app's wider goals, that allowed the myICUvoice core team to use the pandemic-inspired increase of volunteers in a way that would drive the product forward. Afterall, it was the early version of the software which provided us with an established technical base which met the complex landscape of medical technology (including data security) before the user interface could be adapted to meet specific end-user needs. Without this background, it would have been difficult to have a suitable product which could have entered a medical context—regardless of how well it catered to the human needs.

Additionally, we speculate that, had a surplus of volunteers come before having gained an understanding of the nuances of the healthcare system and the multiple end-users and internal stakeholders, we would not have been able to successfully harness this energy into something valuable for myICUvoice's scaling vision. Indeed, it took, first, having an in-depth understanding of what the nurses needed in order to design appropriate software changes (especially the Nurse Zone) and the marketing and educational material which served to attract and secure the attention of various health professionals. As is common in many startup case studies, our experience shows the importance of being in the right place at the right time with a relevant product and a solid understanding of our potential end-users' needs and motivations.

This meant that when the environment changed in an unpredictable way (a global pandemic increasing the need for ICU beds and widespread quarantines creating a large pool of potential volunteer labour), Tim was able to respond rapidly, and his former volunteers (including Nadya) had the time to help him do so. By using Nadya's diary study to give a thorough understanding of the likely motivations and realistic levels of contributions of the potential pool of additional volunteers, the team was successful and effective in mobilising that workforce to take myICUvoice rapidly to a growth phase. Although a volunteer workforce is unlikely to be available again in such a concentrated way, early-stage startups often use an unpaid or low-paid skilled workforce due to lack of funding, and usually do so in a very ad hoc way which can lead to later loss of goodwill. The myICUvoice experience shows that the value of this workforce (and potentially its size) can be maximally leveraged by taking the time to develop an empathetic understanding of their motivations and time capacity, and project managing the required work to fit with the workforce's needs, rather than adopting the more usual approach of insisting that the workforce fit with the 'ideal' needs of the project.

Fundamentally, having had a significant increase (however short lived it was) of extra resources in the form of multiple volunteers allowed myICUvoice to get over the hurdle of having what was, in effect, a non-working version; pre-pandemic we knew what we had to change, but we did not have the resources to do it. The acute-pandemic volunteer offerings allowed us to release a first version via the App store. It even gained us the spotlight in several local and global media coverages, including being broadcast via the BBC national and World news programs as well as in the health section of their website. The continued, but reduced interest/empathic response caused by the chronic-pandemic built on the media attention to ensure continued traction with multiple early trial sites.

Key Takeaways on Harnessing Empathy

In considering all of the particulars about the myICUvoice case study, we learned some key lessons about empathy which can be applied more broadly to human-centered design and startup initiatives.

1. Empathy doesn't exist only in research/design/innovation teams.

There is an urgent need for ethnographers to understand and design for how empathy engages, binds and motivates ALL participants and stakeholders in the problem-solution ecosystem that is being focused on.

2. The conditions for empathetic-understanding, *em-pathos*, and mass-empathy will ebb and flow.

Over the timeline of a project, an innovation initiative, or a longer innovation undertaking such as a startup, the levels of each three of these types of empathy that we have explored here will, no doubt, change. As ethnographers, we must become attuned to when and how different aspects of empathy can best be engaged.

3. Don't be blind to *em-pathos*.

Because so many of us in human-centered design have been carefully trained to focus on empathetic-understanding, and we thus go to great lengths to imaginatively experience and see the world from different vantage points, we must be careful to *also* train our eyes to recognise *em-pathos*. *Em-pathos* may feel like a warmer, messier cousin of the scrupulously even-handed empathetic understanding beloved by anthropologists and ethnographers: embraced by some with open arms, but (inadvertently) neglected by others. None of us cannot afford to miss out on *em-pathos*. As the boundary between 'for good' and 'for profit' becomes increasingly blurred across a range of innovation contexts—and as the burgeoning subdiscipline with anthropology, aptly called an Anthropology of the Good (Robbins 2013), continues to gain prominence—the role of *em-pathos* needs to be recognised.

And yet, as much as we are clearly advocating for the power of *em-pathos* to be recognised for what it is, it would be disingenuous to not also call attention to its inevitable limitations. While mass-empathy resulted in numerous volunteers whose efforts drove myICUvoice forward in many ways, the logistics and realities involved with volunteer labour simply did not provide us with the ability to continue to develop the app in a longer-term fashion. As mentioned above, many of our volunteers engaged with myICUvoice in specially designed short-term bursts; we could not have expected long-term commitment from such a range of volunteers, especially once individuals began to adjust into the pandemic routines, and the urgent desire to volunteer their time wore off. Even the five core team members of myICUvoice have had to step back in varying levels. For example, even after volunteering full time for one and a half months, and then being supplemented for another two months by funding from ACT, Nadya recently stepped down from her role as Project Manager due to the need to secure paid employment. In other words, as we have sometimes joked amongst ourselves: *em-pathos*, despite all the aforementioned power we have attributed to it, does not pay the bills. Even with this remarkable rapid scaling that has been driven by empathy, myICUvoice still faces the challenge that all startups face: it will need to be funded and resourced in the usual way, and it will need to do this in the near future so to not lose the new momentum it has acquired.

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NOTES

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1. For further information about the types of questions that were asked to patients in the early stage of myICUvoice, refer to “Communicating with mechanically-ventilated patients: can using technology help?” <http://www.myicuvoice.com/improving-communication.html>
2. To watch the full app release video, see: <https://www.youtube.com/watch?v=kHW2Osh0DiA&t=43s>
3. For further information about iTeams, refer to www.iteamsonline.org.

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