

Provocations from #vanlife

Investigating Life and Work in a Community Extensively Using Technology Not Designed for Them

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Figure 1: Sun down at the “pop-up”: Sunset over a temporary city of people living the #vanlife on public land in Arizona.

ABSTRACT

Research on how lived experiences with technology intersect with home and work are core themes within HCI. Prior work has primarily focused on conventional life and work in Western countries. However, the unconventional is becoming conventional—several rising subcultures are coming into prominence due to socio-economic pressures, aided by social media. One example—#vanlife—is now practised by an estimated three million people in North America. #vanlife combines travel, home, and work by their occupants (vanlifers) living full-time in cargo vans that they usually convert themselves into living spaces. We present a portrait of vanlifers’ current technology practices gleaned through ~200 hours of fieldwork and interviews. Following a thematic analysis of our data, we identified unique opportunities for integrating technology across culture, design, homesteading, offline organization, and gaming. We have distilled these opportunities into eleven provocations to inspire critical design and informed inquiry for technological interventions for #vanlife.

CCS CONCEPTS

• **Human-centered computing** → *Field studies*; **Collaborative interaction**; *Empirical studies in HCI*.

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KEYWORDS

field study, domesticity, vanlife, domestic technology, work technology

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1 INTRODUCTION

The traditional definition of the ‘home’ in North America is undergoing a number of changes, primarily driven by socio-economic factors that make home affordability challenging. For example, in the United States, median home prices increased 121 percent nationwide since 1960, but the median household income increased only 29 percent [37]. Other drivers include new technologies (such as online collaboration and work tools), the widespread availability of the internet in remote areas, and increased remote work opportunities. Together, these factors are resulting in the growth of a number of alternate living situations—of which co-living and living in alternate residences (earthships, tiny homes, etc.) are some examples. #vanlife—a modern nomadic movement where members of the community live and work in converted commercial vans—is one of the most prominent alternate living solutions. While there is no official count of the number of vanlifers, informal numbers from news reports estimate around three million vanlifers in the United

States [20]. Community building and gathering in vanlife is driven by social media (specifically, Facebook and Instagram), which in part leads to its prominence. Currently, vanlife has been tagged over 8.1 million times on Instagram [24] and has numerous groups on the topic on Facebook (we noted 79,000 people talking about the topic across over 300 local and global groups on Facebook [14]).

The nomadic nature of vanlife has necessitated the expansion of how everyday technology is used, from jobs, to interactions with friends and family, to religious gatherings. Paradoxically, this technology is designed with expectations of traditional homes and workplaces—potentially leading to a sub-par user experience in non-traditional settings. This compromised experience is evident in the case of commonly used technology, such as smart home technology (which assumes fixed location of objects), voice assistants (which usually assume constant connectivity and low background noise), and gaming consoles (which assume fixed and large living room spaces).

Previous work in HCI has investigated non-traditional homes, either as new areas for design [10, 11, 43] or to look at the motivations and implications of nomadic homes or work practices [8, 15, 33, 34, 39]. For example, Rossitto et al. [35] investigated literature around nomadic cultures, and noted a requirement for more diverse papers beyond just nomadic work. In the only other work from the HCI community exclusively considering people living in mobile homes, Rossitto and Eklundh [34] looked at retired persons living in recreational vehicles and noted a domestication of the vehicle, making it a home. Thus, previous work has identified persons living in vans and recreational vehicles as non-traditional homes; however, the implications of that home also being a workplace and a means to establish community remain unclear.

In this paper, we present the results of an investigation into the current technological practices of vanlifters and the gaps that exist in their interaction with technology. We conducted ~200 hours of field work, which included in-person interviews, the researchers themselves living in a van, and observations of gatherings of vanlifters, called vanlife meetups. Through a thematic analysis process, we garnered an understanding of vanlife as a techno-centric community that is constantly facing challenges in their technology use. In parallel, we built a visual cultural portrait (as defined in Creswell and Poth [7]) to showcase vanlife in the manner most vanlifters portray themselves (through visual media). We distill our findings into eleven provocations for technology research and design. We present these provocations to the HCI community, generate research questions, design inspirations, prototypes, and critical thought to positively impact the happiness and well-being of vanlifters. While answering the call for more diverse papers in nomadic culture [35], in this paper, we also:

- (1) Present the HCI community with eleven provocations to inspire both critical design and further research to enhance the subjective well-being of vanlifters, and
- (2) Present the cultural and societal norms that drive technology use in the vanlife community.

We conclude with a discussion on the implications of potential new technologies, not just for vanlifters, but also for other communities that could be mobile, have small living spaces, or variable internet connectivity.

2 BACKGROUND AND RELATED WORK

In this section, we first provide some background about who vanlifters are, then discuss related literature in research in the home and mobile technology. We also discuss the use of provocations in HCI research to frame our method.

2.1 Who is a #vanlifer?

A vanlifer is a person who lives in a home on wheels. The majority of vanlifters live in converted cargo vans, but there are others living in converted school buses (skoolies) or cargo trailers. Some vanlifters also live in bespoke camper-vans. Prior work in the fields of social sciences [13, 22], and tourism research [21] has studied the vanlife community. Primarily, these researchers have examined the cultural context within which vanlifters live. The resulting portrait painted of vanlife adds significant knowledge to the mobility and online consumer tribe literature [21]. However, the exact number of vanlifters is unknown. Determining the exact number and demographic characteristics of vanlifters is difficult for a number of reasons, the primary one being that nomadic persons are counted as residents of states or provinces where they get their driving licence. This means that vanlifters may be living the #vanlife, but are listed as living stationary lives at the address they provide to their regional government. Previous estimates have placed the total number of vanlifters in North America around 3 million [20]. Vanlifters are primarily found in North America, with other communities in Europe and Australia. For a vanlifer, their van is their home, and usually their workplace. They typically live alone or in pairs (as a couple). For a place to stay, vanlifters will often seek public land, campgrounds, or, in more urban settings, parking lots and street-side parking. Previous research [31] has found digital nomads work at the intersection of: (1) digital work, (2) gig work, (3) nomadic work, and (4) adventure and global travel (careers that are also reflected in vanlife). In addition to these careers, a large number of vanlifters are retired. Most vanlifters choose to convert their van themselves, as opposed to purchasing an outfitted van or hiring a professional to do it for them. The motivations for vanlife seem to be driven by economic factors, ready availability of nomadic work, and a romanticizing of the lifestyle on social media [13, 20].

2.2 Research on the Home

Research on the home is a central theme in HCI research. In a recent review, Desjardins et al. [11] considered 121 works of HCI in the home and identified 7 different research trends about the home. They note that HCI research usually considers the North American definition of a home: a detached single family home inhabited by a family. One of the trends in the work was titled “contested values of a home”, which seeks to challenge the common assumptions made about homes and gain insight into previously overlooked aspects of domestic life. This research trend includes work on “mobile ways of living”, which refers to the practice of moving and living in different places on a regular basis. A lot of this work considers brick-and-mortar structures as the basis for homes, and mobility comes about in a number of ways—either through people living between multiple homes, or being mobile for fieldwork.

Three papers have studied topics analogous to vanlife [9, 10, 43]. Zafiroglu and Chang [43] conducted a study on the specific case

of retirees living in recreational vehicles in Western United States. They observed that the RV represented a merging between home and vehicle, and noted that, “While people are using technologies that generally meet their needs, there is a great deal of room to tailor for a more comfortable fit” [43, p. 401]. The authors attributed this need to the inherent tensions of a home on wheels. Using booklets of conceptual sketches, Desjardins et al. [10] engaged in co-speculation about new possible avenues of Internet of Things (IoT) system design with 16 participants living in non-conventional homes. Two lived together in a van. The study focused on new realms to explore in IoT design, rather than considerations for adapting existing technology to better suit non-stereotypical homes. Desjardins and Ball [9] built a van for themselves, and laid out the inherent challenges and tensions while building the space. This autobiographical account helped us understand the process of building one unit of the community that forms #vanlife.

The first two papers [10, 43] consider mobility in a mobile home, but the questions of work in the home, community based on home style, and organizing are not considered. The third paper [9] provides insight into the building and living in a van, a valuable perspective that helped shape our inquiry, especially as we interviewed other people in the community.

2.3 Technology in Mobility

Technology in mobility has been the theme for a lot of recent studies and workshops in HCI [15, 18, 26, 27, 38, 38]. The term “mobility” is used to discuss several topics. For the purpose of our study, the most relevant have to do with work, home, and technological mobility with reference to a single mobile entity (in the case of our study, the vanlifers). Petersen et al.’s ethnographic study described how a variety of people with mobile lifestyles use different tactics to create home-like spaces for themselves [33], suggesting that the concept of “home” does not exclude a highly mobile lifestyle. Although the paper did not include any people who lived in a home that moves, if people are able to feel at home in multiple locations, then vanlifers may use similar techniques in their vehicles, as well as at locations they visit.

Similar studies on mobility have been done in relation to jobs and technologies that allow mobile work. In De Carvalho et al.’s study [8], academics and their transient work tendencies were the main focus of exploring the motivation for nomadism in the workplace. They used ethnographic methods to observe the motivation of sixteen academics to engage in a nomadic work lifestyle, and a spectrum of motivational forces was identified by the authors. Cohen [6] discusses the lack of diversity when studying mobile work, observing that most mobile work studies look at disciplines that are driven by information and communications technology or predominantly “white collar”, “working while mobile” jobs, and identifies a concerning lack of representation for research around “mobility for work” and “mobility as work” type jobs.

Despite an array of mobile work and home studies, there has been little research done on individuals with a combined mobile home and nomadic work lifestyle. Ferreira et al. [15] addressed the combined mobility of home and work in a study looking at the organization of long distance cycling with the use of technology, where cyclists engaged in long tours, often for leisure as a means

to disengage from their work. A few similarities between the cyclists and vanlifers are that both activities involve long commutes (cycling or driving) from one location to another, using technology to facilitate community and plan meetups, and planning where to spend the night.

In a recent workshop, Tellioglu et al. [38] treat technology as a service that helps to form and support the development of different communities, where the goal of the workshop was to discuss and define mobility so it applies to the present and the future. The emergence of various technologies over time has expanded the scope of what mobility is, including the emergence of vanlife as being a home and workplace, or what can be described as a mobile lifestyle. Nomadic work has also been studied in the context of developing small, mobile, physical hardware that can be used on the go [e.g., 30, 31]. However, these studies do not touch on the question of persons living and working in a space as nomads, as done by vanlifers.

2.4 Provocations in Previous HCI Research

Provocations have previously been used to stimulate discussions and critical thought among the HCI community, usually for large groups who historically have been overlooked by the community [1, 29, 32, 40]. Previous research using provocations includes a study articulating social relations and transnational engagements through an African standpoint in HCI [1], “un-useless” playful and provocative suggestions to enhance digital TV [32], and the design of future intimate technologies for women during menopause [40].

Bardzell et al. [3] describe three categories of provocations: *conceptual*—a provocation that concerns an idea, belief, or concept that we want to challenge or critique through a design; *functional*—a provocation that deals with how far a design is from the norm of the way it works or operates; and *aesthetic*—a provocation that deals with how far a design is from the mainstream in its visual look and materials used for crafting it. In addition to their utility in provoking critical thought, provocations have been used to create prototypes [e.g., 40]—futuristic concepts or speculations on technology that could answer the call posed by the provocation. In our work, we seek to direct our provocations to enhance the well being of vanlifers. Through this approach, we articulate technology gaps, design inspirations, and directions for future research.

3 METHOD

Our study began with a literature review of vanlife across disciplines by searching for prior literature using multiple keywords (digital nomads, vanlife, recreational vehicles, travel HCI, nomadic work, remote work, etc.) across various libraries (ACM DL, Google Scholar, Scopus). We found limited research that considered vanlife. Consequently, we needed to understand the practical realities of conducting research with vanlifers. None of us had previous experience with vanlife, so we familiarized ourselves with the verbiage used in vanlife through blog posts, social media postings, and YouTube videos. We noted that the community gathered through two primary modes, and we planned our study around these modes:

- (1) Online gathering through Facebook groups.
- (2) Physical gathering through vanlife meetups: vanlifers meet at locations that are either scenic, have a pleasant climate,

or are convenient for a large number of people in the community. These meetups are primarily organized through Facebook groups.

For our study, we planned on attending physical vanlife meetups. We wanted to collect video and photographs of the vans and their surroundings, conduct interviews, and to rent a van to live in ourselves. Our approach was realized through field work at three meetups. We collected data from nine interviews, over 12GB of digital data, and numerous researcher notes. We distilled themes from these data sources and presented them as provocations [3].

3.1 Location & Meetup Selection

Our selection criteria for the meetups was geographical proximity to us, date of the meetup (November 2019), and the expected number of attendees. Following university ethics approval, we selected four meetups: two smaller social meetups, both expecting between 10 to 30 attendees, and two larger ones focused on building and renovating vans with 500 to 1000 expected attendees. We identified the gatekeeper for each of these meetups, then requested permission to recruit and conduct research in these areas. To identify the gatekeeper we messaged the person setting up the event on Facebook, the administrator of the group, and the moderator of the group to ask them about the person from whom to request permission. We were pointed in the direction of the organizers of the large event. For the smaller event, the administrator of the group was also the organizer. We heard back from the gatekeepers of only three meetups, who allowed us to conduct research there (Table 1).

For the social meetups, vanlifers from across the province attended to get together. Most vanlifers at these gatherings knew each other either from previous meetups or from the Facebook group. In contrast, the larger meetup was an organized event for individuals to work on their own van, or volunteer to work on others' vans. For this meetup, we rented and lived in a van while we were at the meetup.

3.2 Interviews

We conducted interviews with participants using an interview guide for our semi-structured interview. The interview guide covered topics including technology use, barriers to technology, living conditions, and ended with general demographic questions. Participants were recruited verbally at two vanlife meetups (M1, M2) in the common areas. Participants who expressed interest were asked to read an information and consent letter. Those who agreed were interviewed, and the interviews were recorded. Most participants immediately (eight out of nine) offered van tours, where they gave us a tour of their home. For the person who did not provide the tour, the interview was conducted outside their van in their living room space (the outdoor living room space is discussed in Provocation 4). Demographics are noted in Table 2. Participants were then debriefed, thanked for their time, and paid \$10 (US Dollars or Canadian Dollars, depending on the location of the meetup). The interviews were conducted by two researchers who both attended the meetups (M1 and M2). No interviews were conducted at M3.

3.3 Public Spaces

Public spaces reflect gathering areas in the meetups that were not otherwise claimed by neighbourhoods (Table 3, also see Provocation 7). These pop-up spaces were used by vanlifers to socialize and exchange ideas, and provided a rich tapestry of thoughts that we recorded in hand-written journals. All public spaces, except one, were attended by two researchers. The final public space (PS5) was attended by only one researcher. On entering a public space, we identified ourselves as researchers, and listened to the conversation. In one public space (PS1), we asked a few questions which may have changed the direction of the conversation. In the following meetups, we did not interject to allow the conversations to run their natural course. We then independently took notes on our recollections and reflections of the conversations, which we then compared for accuracy. We noted a difference in our reflections that could be attributed to our backgrounds (one researcher has a background in engineering management, while the other has a psychology background).

3.4 Data Collection

We used documentary tools to collect data at the three meetups: voice recorders, pen and paper, a drone, and a 360° camera (Figure 2). For the visual portraits, we used a drone (with appropriate licenses and flight permissions). For the interviews and van-tours, we used 360° cameras to more accurately capture the environment and context of the interview and the tours. We selected these tools as they are commonly used to document vanlife on social media.



Figure 2: Our tools—pens and notebooks for journaling, drones, and 360 degree cameras as documentary tools, and voice recorders to aid in memorializing voice interviews

3.4.1 Drones. We used a drone (DJI Mavic Mini) to document the spatial setup and van setups for one of the meetups (M2). We took several pictures and recorded about 6 hours of video using the drone. The pictures of the large areas were annotated (e.g., Figure 8), and the pictures of vans were used to understand homesteading. We have stylized one picture to show the interior, and presented it as

Meetup ID	Meetup Location	# Vans	# Attendees	Time Spent (hrs)	Gatekeeper
M1	Ontario, Canada	3	5	9	Facebook group moderator
M2	Arizona, USA	>300	~600	192	Meetup organizer
M3	Ontario, Canada	9	20	5	Facebook group moderator

Table 1: List of Meetups Attended

Participant	Meetup	Age	Gender	Time Vanlifying	Profession	Annual Income (USD)
P1	M1	30–40	M	2 years	Web Marketing	Variable
P2	M1	30–40	F	2 years	Web Marketing	Variable
P3	M1	50–60	M	6 months	Project Manager	>100,000
P4	M1	40–50	F	1 year	Customer Support	25,000
P5	M2	30–40	M	6 months	Online Professor	50,000
P6	M2	30–40	F	6 months	Therapist and Life Coach	35,000
P7	M2	30–40	M	2 years	Customer Service	25,000
P8	M2	60–70	M	2 years	Retired	40,000
P9	M2	20–30	M	1 year	Technical Writer	40,000

Table 2: Demographics of interviewed participants. P1 and P2 were living in the van together, as were P5 and P6. While all of the participants lived on the road full time, P3 owned a house they no longer lived in.

Space ID	Meetup ID	Number of Persons	Time at the Space	Description of Space
PS1	M1	5	2 hours	An area formed by three vans parked around it
PS2	M2	15	5 hours	Public space in the desert near the meetup organizers' vans
PS3	M2	30	2 hours	A space formed for making furniture for the vans
PS4	M2	10	3 hours	A space formed for helping vans with solar issues
PS5	M3	20	5 hours	Vanlifers standing and sitting around a campfire

Table 3: Public spaces documented at the three meetups

a view into the living area of one vanlifer in Figure 7. We did not utilize the video data collected for this paper.

3.4.2 360° Cameras. We used two GoPro Fusion cameras to document the van tours and interviews with participants who consented to video recording in their vans in 3D (5 participants). When we went to analyze the data, we were not aware of any tools that would allow coding or thematic analysis of 360° video. We identified three strategies by analyzing 22 minutes of one video:

- (1) Using raw footage: This had the richest data due to the depth of information present in each frame. The analysis of this video took close to twenty times the length of each video.
- (2) Follow the interviewer: This method relied on watching one part of each frame. To do this, we tried to follow either the gestures or the language used by the interviewer, but it returned inconsistent results, often missing key points on video. The advantage of this approach is that if researchers knew they needed to convert the video to a different frame of vision, they could draw attention to points in space without

needing to disturb their camera setup. For this method, areas of the video were selected in a narrower field of view on a continuous timeline, and then rendered into a new video. It took around seven times the length of the video to transform, and around twelve times the length of the video to analyze.

- (3) Follow the participant: As in the previous method, this relied on watching one part of each frame. For this method, we followed either the gestures or the language used by the participant. This method took approximately four times the length of the video to transform the video, and around twelve times the length of the video to analyze.

For the test video, we found that method 1 and 3 provided the richest data granularity. Both had an 85 percent overlap in themes identified. Based on the time taken and the richness of information output, we decided to use method 3 (follow the participant) for the remainder of the videos. The videos were edited using the GoPro Studio software [19], and themes were analyzed using ELAN video annotation software [16]. The time taken to edit does not include

the time taken to render a final video once areas in specific frames were selected.



Figure 3: Image from the 3D camera, zoomed out and cropped for clarity

3.5 Data Analysis

Both data types (researcher reflections and participant interviews) were transcribed. They were then analyzed using inductive thematic analysis [5]. We presented the initial themes to a group of HCI researchers and received feedback on the themes and the structure. We then further refined the themes based on the feedback we received.

3.6 Converting Themes to Provocations

Through our analysis, we identified 13 themes across 3 categories. Of these, ten showcased the need for technological interventions. We wanted to present these in a manner that added context while allowing practitioners to reflect and critically think about them. In order to do that, each theme was presented with representative quotes and findings from public spaces (with IDs noted next to the quotes) in section 5 and section 6. Some quotes were edited to remove identifying information or for clarity. This resulted in ten provocations. The final provocation (Provocation 11) was based on our observations while we were recruiting for the study. The remaining three themes were presented as “Other Insights” (subsection 7.1).

The first category of themes reflected how vanlifers perceive their vans. Within this category, the themes were:

- **Features:** Do-it-yourself (DIY) features that vanlifers had built into the vans (Provocation 1),
- **Technology:** Fixed technology that vanlifers placed in their vans, and the gaps therein (Provocation 2),
- **Wishlist:** Their wish list for the next iteration of their van (Provocation 6), and
- **Security:** Their feelings of security of safety in their vans (Other Insight 1).

Similarly, vanlifers reflected deeply on their life:

- **Work:** How vanlifers were able to sustain and provide for themselves while on the road (Provocation 3),
- **Homesteading:** How vanlifers set up their homes every time they moved (Provocation 4),

- **Recreation:** How vanlifers spent time on non-game recreational activities (Provocation 5),
- **Gaming:** How vanlifers spent time playing games (Provocation 8),
- **Planning:** How vanlifers planned their current and future stops (Provocation 10), and
- **Motivations:** What motivated and continues to motivate vanlifers to live this lifestyle (Other Insight 2).

Finally, vanlifers become part of a community by virtue of their living situation, leading to three themes:

- **Organization:** How vanlifers organize and connect within their community (Provocation 7),
- **Religion:** How vanlifers experience religion and religious gatherings (Provocation 9), and
- **Belonging:** What vanlifers do to build social structures and support systems to aid in belonging (Other Insight 3).

Our provocations were drafted as statements that reflect technology as an agent for positive design [12] in the lives of vanlifers. Further, the provocations were drafted with a goal of evoking a sense of temporal harmony directed at the future [23], that is, we balanced the present-hedonistic and future time perspectives. For presentation in this paper, we then segmented the provocations based on vanlifers’ beliefs and expectations of what technology ought to afford them into two categories :

- (1) **Vanlifers’ relationship with their spaces**—not just their vans, but also the physical environment in which their van is present.
- (2) **Vanlifers’ relationship with their communities**—this includes vanlifers’ communities outside their vans: other vanlifers, people living in brick and mortar homes, their schools, or their workplaces.

Through our analysis, we also identified four core pillars underlying all the provocations. These form the Design Space of Vanlife (section 4). We recommend considering this design space when developing or adapting technology for vanlifers.

4 THE DESIGN SPACE OF VANLIFE

Through our thematic analysis, we have identified the design space for technology in vanlife as consisting for four pillars:

4.1 Limited Power

Unlike the functionally limitless capacity of the electrical grid found in conventional homes, vans use automobile (or marine) batteries. Furthermore, vehicle batteries are rated at 12 V, while most household technology is rated for 110 V in North America. While power converters and additional batteries can reduce these barriers, these solutions are often costly and take up space in an already small home. With such a limited electrical budget, power consumption becomes a constant concern for many. All of our participants had some way to constantly measure electricity consumption, and could tell their persistent (e.g., fridge, lights) and peak consumption (e.g., laptop/phone charging, electric kitchen appliances). When choosing technology to include in their van, all our participants considered the impact on both persistent and peak consumption. Additionally, electricity usage was the only track for discussion among people at

PS2 and PS5. Technology designers should endeavour to match the electricity consciousness of vanlifters.

4.2 Variable Internet Connectivity

Internet connectivity changes according to where a van is parked. Consequently, vanlifters try to park where “good” internet is available and avoid areas with poor connection, which sometimes defeats their desire to travel more with their vans (P1,P2,P4–P7,P9). Since much of modern technology is designed with the assumption that the device would have constant access to the internet, vanlifters are limited when it comes to what they can include in their van. Designing technology to cope with changing connectivity—either by eliminating the constant connection requirement, or by including a “limited internet” mode—would increase the technological selection available to vanlifters and allow them to add more of what they may desire in their van.

4.3 Limited Space

Vans have limited space, and any technology should physically fit in the space. For instance, six of our participants lived in less than 7.5 m² of space. When one considers the spatial requirements of sleeping arrangements, seating, storage, and food (among others), the available space for technology shrinks even further. Design concepts such as miniaturization, and multi-functionality would provide vanlifters with more freedom when it comes to creating and arranging their living space. In addition to living in a relatively small space, vanlifters often rearrange the interior of their van when switching between aspects of their life (e.g., work, leisure, driving), only bringing things out when they are needed and stowing them away otherwise. To account for these regular changes, any non-stationary technology within the van should be fairly easy to disconnect, move, and reconnect.

4.4 Limited Disposable Income

While vanlife may appear to be a frugal lifestyle, vanlifters still have to spend to maintain their lifestyle. Expenses such as gas, repairs, renovations, and access to utilities, in addition to the limited career options for vanlifters, result in a financial situation with limited disposable income. Currently, vanlifters spend around 50% of their van build budget on technology (P1–P6,P9)—focused primarily on high quality batteries, solar panels, and fridges. Any additional technology, however, is generally considered superfluous, and would be thoroughly considered to determine whether it is “worth it”. The consistent factor to determine worth among our participants was how multi-functional the device is, how it operates in different environments, and the potential ability of the vanlifter to fix the technology in case it breaks down. It would be beneficial for technology designers to consider the impact of a device in comparison to its cost and how to increase its “impact-per-dollar” value.

5 #VANLIFE - A COMMUNITY AT THE CROSS ROADS OF TECHNOLOGY AND INGENUITY

Our first set of provocations concern vanlifters and their relationships with their space.

Provocation 1: Allow users to express themselves through physical technology. One common theme our participants highlighted was the DIY nature of their van. A handshake was replaced with a van tour. Each of our 40 van tours (including those of our participants) was short, practised, and included some personal highlights of their inhabitants’ conversion process. P5 and P6 had a memorable highlight:

We stripped out burgundy carpeting that was all around the van, helped by my 87 year old grandfather who is a jack of all trades—electrical, woodworking, plumbing. He had tools that we didn't even know the names of!
(P6)

P5 and P6’s pride and emotion in their van-build (“build”) is a theme repeated in all our van tours. Some of our participants’ DIY homes are shown in Figure 4. During these tours, the appliances and technology were often hidden, at times impacting their usability. This technology currently includes (but is not limited to): refrigerators, AC-to-DC converters, battery packs and sockets, vent fans, and induction cook-tops.

The fridge is under there (pointing, seen in Figure 5)
(P6)

Technology was hidden in ingenious ways: fridges hidden in drawers, sockets concealed behind panels, even removable wall pieces to cover the vent fans (PS3). This phenomenon occurs because the technology takes away from expressing individuality and the sense of pride in craftsmanship (PS3,PS5), despite vanlifters spending a large percentage of their van build budget and time on domestic technology (PS1, PS3, PS4, PS5). Technology should add to people’s individuality, not take away from it, especially in small spaces where every inch is a canvas for self-expression.

Provocation 2: Visualize and monitor data to control for root causes of temperature related issues. P4 lives within 100 miles of a heavily urban area where winter temperatures can be as low as –20 °C. His job requires him to take calls and have phone conversations from within the van without getting disturbed by traffic and other sounds. He built his home on wheels to be heavily insulated to withstand the cold in an old cargo van.

There’s two layers of insulation here, and the diesel heater, which keeps it warm in the winter. I also have Reflectix on the back windows. It sometimes gets too hot in the winter (P4)

This insulation has a negative effect on the van as well. In response to a question on how technology could make their lives better,

If you can control condensation, man. I have to strip the van because of mould and condensation, and the condensation in the winter loosens the glue. (P4)

Like P4, most vanlifters design their van around what temperature the van will be used in. Without technology to help them accurately control the internal environment, they are subject to the negative effects of temperature. Currently, there are technologies to actively monitor temperature and humidity states in vans. There are thermostats available to control air conditioners, but these do not monitor or visualize internal environmental conditions.



Figure 4: *Homemade homes, Hidden Technology.* Clockwise from upper left: P1 and P2 live in a self converted high roof, long wheelbase Dodge Sprinter Van, P8 lives in a trailer he used to share with his daughter as a two bedroom vehicle, but has now converted it to one bedroom, P4 lives in a converted low roof, short wheelbase cargo van, and P7 lives in a converted passenger minivan.

I am stripping my trailer's insulation every time the season changes or I move to a place with different temperatures, my fans and thermostat can't help with the condensation. Condensation builds between the (outer

metal) skin and the insulation, which creates (mould) spots. (P8)

This is a problem that has been solved in conventional homes through smart thermostats. With much smaller spaces compared to



Figure 5: Hide and Seek. The fridge, tucked away between the front seats. Note how it doubles for use as a table in this case, necessitating the removal of everything on the table to open the fridge.

the conventional home, it should be easier for vanlifters to monitor their internal environment. However, technology is not designed to fit in a home like a van. Technology should help visualize and monitor environmental variables, even in spaces with limited power and variable internet.

Provocation 3: Computing peripherals should be multifunctional and go beyond their intended use. P1 and P2 work in web marketing, and they are also the admins for a local #vanlife Facebook group that they started—consequently using both their laptops extensively. As they designed their new home, they started with:

[...]everything has to kind of do multiple things[...]
(P1)

This multi-function layout is designed around the peripherals for their technology.

I have a laptop and I have a tablet and a bunch of notebooks and some external hard drives and we run everything ready (to) work through (in our space). (P2)

Peripherals, specifically chargers and cords, also determined one piece of furniture that they thoughtfully installed and used in a variety of ways:

This is a marine table, and we pull it in to be a dining table or it can be inside and be [P1]’s workplace. (P2)



Figure 6: Worse mouse traps? P7 is working in his van, and P9 has set up a dedicated work space. In both cases, though, the table size is built to accommodate the laptop and a portable mouse.

The “inside” position reflects the length of a charging cord. This theme is repeated across other users who design their vans around the peripherals for their technology. All participants used laptops and cellphones for their work. P2 noted using a tablet in addition to her laptop. Some participants used external mice, and designed tables in their vans to allow them to easily place their laptops and mice. (P7, P9) (6).

The table is very large so it can fit my mouse when I need to work [...] I also try to work on the front seat and have (a little folding table) for the mouse. (P7)

Another component of peripherals was that they often determine technology purchase choices, often leading to unintended negative consequences:

I am not on iMessage so I’m removed from my family groups. I got an android because I already had a USB-C setup. (P8)

Vanlifters are stuck using technology peripherals designed with a conventional homes and workplace in mind, thus forcing them to design around it. Technology design encompasses everything that makes the technology usable: whether it is a charger, caster wheels (e.g., Apple Mac Pro Wheels [2]), and mice among others. Designers should design peripherals that work in limited space, are multi-functional, and need limited power.

Provocation 4: Technology should enable dynamic homesteading. A unique aspect of vanlife is the dynamic creation of homesteads. Homesteads are an extension of the van’s space into nature. These can range from not homesteading (“stealth” parking)

in urban parking lots, to large rural homesteads. Although there is no official ownership of land, small areas around individual vehicles are considered as being a homestead or the vehicle owner's living area. One of the researchers, while walking through a space in M2, was told to: "keep off my backyard", as that space had been claimed by a vanlifer due to the proximity to their van. In Figure 7, the shrubs and clothesline form the bounds of the homestead, and the lifted tailgate forms the gate. In this configuration, the area behind the van (near the tailgate) is the living room, the backseats are the bedroom, and the left side of the van is the kitchen.

I park to get good internet [...] and some spots get better internet than others [...] My van always faces away from the sun so that there is no glare on my laptop. (P9)

P7 sits in the front, despite building a dedicated work space in the back (which is for city use only) because his displays cannot be seen in the light. There are other concerns as well:

I don't work, but I need power. My panels don't work when I put them on the ground in this way (points out a specific orientation). (P8)

As the homesteads grow, they cause concerns. As they contract, they again cause concerns:

No vent fan because I live in a large city and take this van to work. I don't want them knowing I live in it, I use a USB fan when I'm travelling. (P3)

Homesteading in vanlife today is a process of trial and error. In addition to its practical aspects, we noted that when vanlifters set up homesteads, technology artifacts aided the process of homing [33]. Technology should remove the error and allow vanlifters to move between different homesteads and homestead rapidly, based on their personal preferences.

Provocation 5: Exergames should expand/contract with the space/internet connectivity they inhabit. P9 works remotely with an international team. He travels extensively to spaces with nature.

I like to follow people on either Facebook or Instagram. This summer I went to Pacific Northwest, so I hung on Oregon and Washington. Well, mostly in Oregon, Bend. I went to descend on Bend. I plan to spend a lot of time in BLM [Bureau of Land Management land, which is free of cost for camping] in Nevada and Arizona. (P9)

However, he feels that he got a better workout while living in an apartment.

I had more equipment in my apartment [...] I would like to get a bike [...] I'm not sure like what but I like to go have a kayak. That'd be great. (P9)

Vanlifters may seem like they are more active by virtue of being in nature or outdoors, but they feel like they work out less or are less fit after moving into a van. In a number of public spaces (PS1, PS2, PS5), vanlifters felt that this was because of limited access to indoor gym-like spaces.

We hike a little more, but don't get any other type of exercise. (P2) does some yoga here. We want to workout more inside the van. (P1)

Exergames could be a space efficient solution to this challenge. These have already been tried with drones on streets [36]. There is space to expand the concept to exergames inside a van and outside. Currently, popular commercially available technologies, such as Microsoft Kinect, do not meet the power or space requirements of a van.

Not all our participants shared the opinion of being more unfit after moving into a van. P7 felt that he was more active on account of hiking compared with before living in a van, when he did not go to the gym. Technology should be created to enrich the lives and health of people living in variable sized spaces, with variable internet bandwidth.

Provocation 6: We should be able to realize our yearnings for our incomplete spaces. P8 had been living in his cargo trailer alone for six months. Before that his daughter used to travel with him.

I had two bedrooms that we would enter through windows, and my daughter would have space to practice her Japanese. I've converted the trailer now to a single bedroom with the bathroom up front. (P8)

The trailer construction was complete. However, there was a sense that once the redesign was finished, there is something missing:

I wish the trailer was either a little larger [...] I may switch to a high top van next. (P8)

This sense of yearning is also reflected in other participants. All our participants built their dream vans, and wanted their "next build" to be a little different regarding features, size, layout, or even colour scheme.

I would get a larger van next. (P9)

We are redoing our van next year—we will change the layout a little bit, but change the aesthetics. (P1, P2)

Vanlifters are constantly looking at the next evolution of their space, but have no way to conceptualize this new space. While 3D home planning programs have helped in planning spaces, they do not allow for personal conceptualizing (through personal artifacts, or reflecting their DIY skill), or need extensive knowledge to make architectural renderings. An app has been developed to cater to the specific needs of vanlifters [41], but this app also helps people plan van layouts and not conceptualize their spaces. Technology should be able to help novices conceptualize alternate realities of their small spaces without needing to know how to code.

6 SOCIAL MEDIA & CONNECTIVITY TOOLS

This section contains themes that reflect on vanlifters and their relationships with others in their communities. We use #vanlife with the hashtag in this paper to reflect the community's roots in social media, a tool that continues to drive a majority of vanlifters' community building and relationships. Due to limited internet connectivity at most meetup sites, a number of alternative ways of connection have grown.

Provocation 7: Technology should create a sense of belonging whilst aiding in self-organization. As vanlifters begin to gather and homestead at vanlife meetups, people in similar life situations (young professionals, affluent older adults, families with



Figure 7: Homesteading in the wild. A stylized image of P7’s van. They have been living in this van for over two years while carrying out a customer support job.

kids, etc.) gather in similar parts of the venue (M2). This can be seen in Figure 8, where distinct “neighborhoods” are formed by like-minded people. This phenomenon existed despite vanlifters arriving at the meetup at different times—sometimes early in the morning, at other times late in the night when they could not ask for directions or go to a site with “their people”. Picking a spot gets tougher when the attendees do not already know, or heavily interact with, other vanlifters going to the same meetup. When coming to the meetup they seek out familiar looking vans, identified by their colour, body style, or unique elements (PS4), or visit the area where the organizers are located. The organization of the meetups was driven primarily by strong online relationships, formed when they either comment on the same posts online (PS2, PS3, PS4) or by membership of shared Facebook groups (PS2). When these did not exist, people defaulted to what felt familiar. However, this was not always what vanlifters wanted.

I needed to get some furniture work done, so I’ve had to move twice now. I am currently parked here waiting for a space to become available to modify my bed. (P8)

One vanlifer parked next to vans with antennas, assuming they had good internet:

I wanted to sleep before tomorrow and saw these people who would have good internet [they did not]. They had campfires every night, and I don’t want to park with them next time. I can’t move now because I will run into them again and they are active [on a shared common Facebook group]. (P9)

There is no current tool to help real-time spatial organization. There is a need for technology that helps vanlifters self-organize and create more meaningful temporary neighborhoods while maintaining their sense of identity and belonging.

Provocation 8: Allow the reduction and reuse of physical gaming artifacts across multiple games while enriching gameplay. One element that was constant in the lives of vanlifters was their affinity to games and gaming, both digital and physical (board or card games). Games for some vanlifters go beyond recreation, reflecting their work as well:

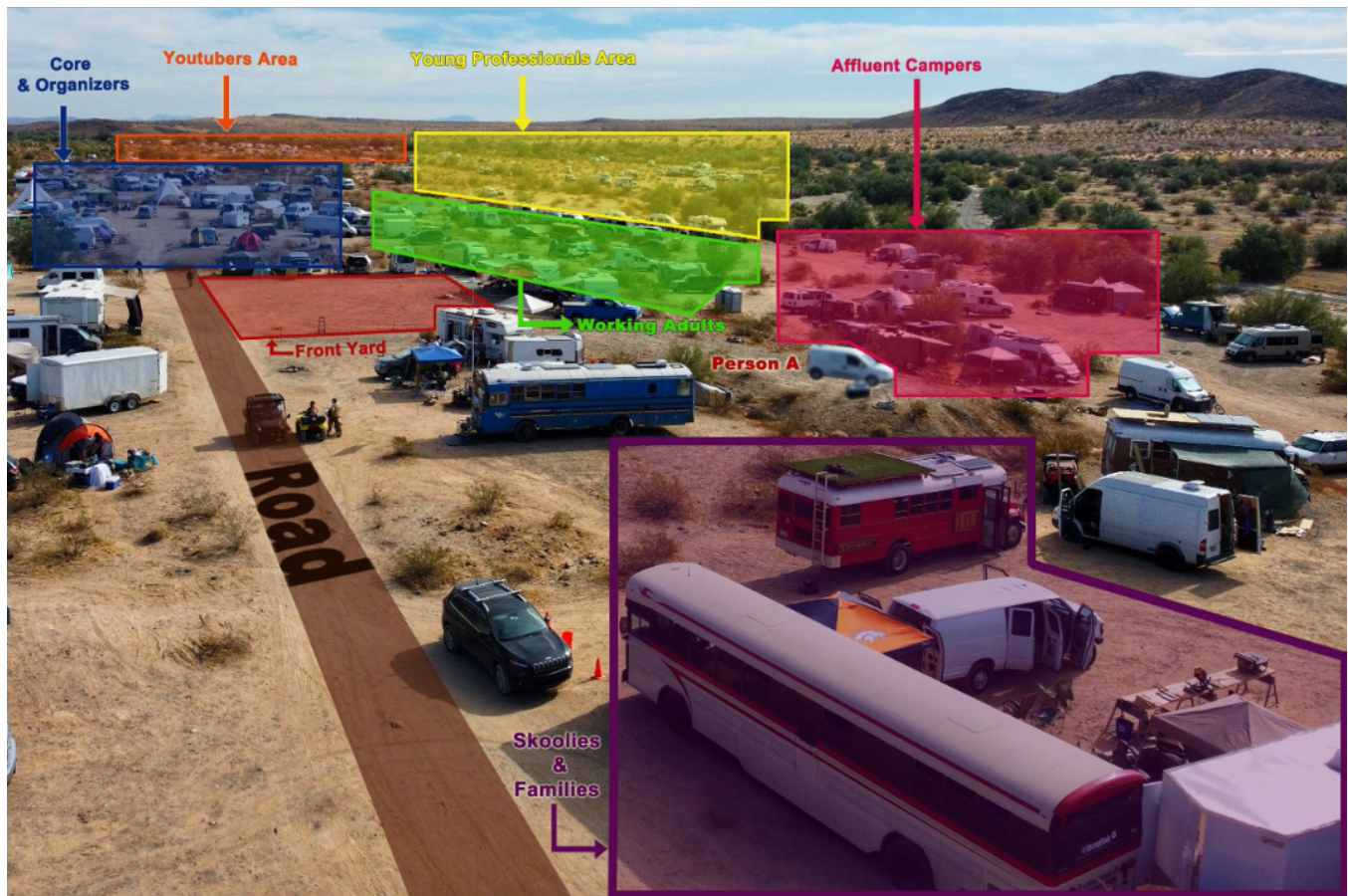


Figure 8: The newest subdivision: Distinct neighbourhoods formed on free government camping land at vanlife meetup M2.

Nothing really makes it [work in #vanlife] easy... I guess working with games? I did it for three years and never really felt like I was doing work because I was playing games. (P4)

Out of our participants, seven stored and played board games and eight played digital games of some form in their van. The primary deciding factor in type of games selected was storage space. One participant wanted to play games, but had limited space:

[I] have like an emulator on my phone for like, old console games or something but no, no PlayStation or anything. (P9)

P1 and P2 have taken travel versions of games and further shrunk them down by replacing playing pieces with smaller versions to allow the games to fit in their van. The primary reason for vanlifters carrying board games was to connect with new people and reconnect with old acquaintances (PS1,PS3); while electronic games were usually for the vanlifters' own use (P4,P7,PS3). Additionally, it was noted at PS1 and PS5 that vanlifters would want to carry more games if they could fit them in their van. Together, this represents an opportunity for technology solutions that allow:

- (1) Reducing the number of physical artifacts across different games;

- (2) Reducing the size of assets required for gameplay; and
- (3) Assets that can be used across multiple games to reduce storage space.

Provocation 9: Technology should enable dispersed collective effervescence. Vanlifters have built community on the road and plan their lives to ensure they are present for important activities at specific locations. Vanlifters report missing out on the sense of connection and meaning that comes from collective events. They especially miss that connection from their chosen places of worship or religious service. Previous literature has identified this phenomenon as “Collective Effervescence” [17].

I miss out on going to my hometown church that I visited for almost 30 years. Videos and live-streaming just don't do it for me. A lot of time, I can't live-stream because it keeps [buffering]. (P7)

A combination of lack of access to their favourite churches or sports arenas leave vanlifters missing the collective effervescence they felt living in traditional homes. At M2, a number of attendees went to church on Sunday, but felt like they would have preferred to go to “their” church (PS2, PS3, PS5). This lack of connection

was not alleviated by live-streams, Virtual Reality, or other similar technologies (PS5).

Watching a game (on the phone) isn't like real life, you can't feel the energy! My school football game was on, and I wanted to fly back for it! (P5)

Technology should be able to create and sustain dispersed collective effervescence, whether for religion, sports, or other collective events.

Provocation 10: Technology should allow location-based planning and reminiscing about the future. Vanlifers are constantly on the move as a community, but they find ways to reconnect at different events or venues, with some venues being of particular importance to individual vanlifers. P7 goes to the Vanbuild fest every year.

I've never volunteered for anything before, and this is my second year volunteering for the Vanbuild fest. I like meeting all kinds of people, I'm usually not very outgoing. (P7)

Other vanlifers also have blocks in their calendars where they expect to be on specific weeks and days, and they organize their travel and relationships around these calendars. There is an issue through this planning, where some vanlifers feel that they are not making the most of their time and space.

I wanted to go to [a meetup in Oregon] and [a meetup in Texas] but I thought I couldn't. [Other vanlifer] was able to do it and he was also able to spend some time in Utah at a national park. (P9)

Vanlifers report that while planning and anticipation is a pleasant process, it is also stress-inducing. The current mode of planning uses a combination of spreadsheets, Google maps, and pen and paper. They find that the reminiscing helps them plan with less stress (PS2,PS3,PS5). Reminiscing could be through pictures tagged to specific locations, journals, other people's YouTube videos, etc. Vanlifers also plan their travel collaboratively, oftentimes with clients (P1,P2), spouses (P5,P6), siblings (P7,P4,P9), or children (P8). This planning is done through collaborative documentation tools, email, or phone calls. Vanlifers do not want to lose the collaborative and reminiscing-driven nature of their planning, but want to lose the stress of missing an email or sense of FOMO (fear of missing out) on missing an important event. Technology should bring together reminiscing for the future and spatial planning in a way that helps people plan their travel collaboratively while in variable internet situations.

Provocation 11: Online, everyone is a gatekeeper, and researchers are strangers at the gate While not a direct result of our thematic analysis, this provocation is a reflection on our attempts at recruitment before attending vanlife meetups. The research team originally intended to use Facebook to recruit participants for a diary study. The members of the research team, using their personal Facebook pages, were granted membership into a number of Facebook groups for vanlife. We then explained the nature of our studies to the admins and moderators of the groups (the gatekeepers for Facebook groups). Of the five groups we joined, four allowed us to post our recruitment message. We posted our recruitment post in these four groups, and received predominantly

positive feedback. The negative feedback was primarily concerned with where the data was being shared:

Huh, Sooo you want to build a database of every ones personal info and pics of everything they do and give all that to who?

Why would anyone volunteer all that info, expose themselves to spam

It is also worth noting that the negative posts were just from a very small set of individuals who clearly misread our intentions, but there were many who came to our defence and did not see it as problematic.

[...] you only need to provide data you are comfortable with. Nothing close to what you share about yourself on the internet everyday.

While not based on in-person observations of vanlife, we believe this provocation is important for people studying and participating in online communities. Technology has created a space where anyone belonging to a group could now be a gatekeeper for that online space, and that could either be to the betterment and detriment of the group. This experience is related to other research in HCI [25] that highlights how, when entering a new, unknown community with the intention of understanding and designing technology for them, it is important to recognize that the researcher may not be welcome (i.e., a “stranger at the gate”), and that work needs to be done up front to gain trust in that community.

7 DISCUSSION AND IMPLICATIONS

We have consolidated our provocations in Table 4. These provocations are noted with the type of provocations [3] and the themes they represent. Most of our provocations were functional, reflecting an overarching issue that technology does not exist for a number of use cases central to vanlife.

7.1 Other Insights

At the end of our thematic analysis, there were three themes that did not result in provocations. These are listed below:

- (1) Security: With constant movement and oft repeated incidents, we assumed that security of the vans would be a concern of vanlifers. However, our participants reported feeling safe and confident in their vans and surroundings. There were some concerns about leaving valuables in the van (PS3, PS4)—and some vanlifers had created hidden compartments to store valuables. Some persons used IP cameras or motion sensing household cameras, and found that those worked well for their needs (PS4).
- (2) Living Situation: In each interview we asked participants if they would go to another living situation, and the answer was overwhelmingly negative. In public spaces, one older adult stated that they may buy “some land” and start a co-living space, others (mostly older adults) said that they would “come visit”, but would continue living in their vans.
- (3) Community: With their mobile lifestyle, we planned to ask questions about a sense of lack of community. We heard the opposite in the public spaces, with vanlifers expressing that they felt more at home in the vanlife community than their

ID	Provocation	Category	Theme	Type
1	Allow users to express themselves through physical technology	Van	Features	Aesthetic
2	Visualize and monitor data to control for root causes of temperature related issues	Van	Technology	Functional
3	Computing peripherals should be multi-functional and go beyond their intended use	Life	Work	Aesthetic
4	Technology should enable dynamic homesteading	Life	Homesteading	Functional
5	Exergames should expand/contract with the space/internet connectivity they inhabit	Life	Recreation	Functional
6	We should be able to realize our yearnings for our incomplete spaces	Van	Wishlist	Conceptual
7	Technology should create a sense of belonging whilst aiding in self-organization	Community	Organization	Functional
8	Allow the reduction and reuse of physical gaming artifacts across multiple games while enriching gameplay	Life	Gaming	Functional
9	Technology should enable dispersed collective effervescence	Community	Religion	Functional
10	Technology should allow location-based planning and reminiscing about the future	Life	Planning	Functional
11	Online, everyone is a gatekeeper, and researchers are strangers at the gate	—	—	Conceptual

Table 4: Consolidated list of provocations

previous situations, which included apartments, elder care facilities, and detached single family homes (PS1, PS2, PS4, PS5, P1, P2, P3, P5, P9).

7.2 Drivers of Vanlife

Vanlifers are a diverse community of people in various life stages. The vans that they travel in have a total cost of anywhere between 5000 USD to 200,000 USD, with monthly living costs between 800 USD to over 4,000 USD (including fuel, food, insurance, etc.). We noted a few primary demographics during our interactions at the vanlife meetups:

- (1) **Working-age adults:** The first demographic, and also the one that garners most attention, is working-age adults. We noticed a variety of careers being represented that reflect on the descriptions of mobile work made by Cohen [6]. Some people who were not interviewed but the researchers interacted with did seasonal work, or contract construction work and travel around the country for job opportunities. Another large group of working adults usually work in knowledge jobs that are location-independent, and travel as couples. These people could afford apartments or other living situations, but usually pick vanlife to live a life of travel and adventure. #vanlife as a social media phenomenon is romanticized by this demographic. Their vans are usually converted vans that are made to look “glamorous” while being functional.
- (2) **Families with young children:** A number of families with young children (sometimes up to four) are embracing vanlife as a way to reduce housing costs. The children are usually home-schooled, and such families will convert larger vans and old school buses (a sub-culture of vanlife called “skoolies”).
- (3) **Retirees:** Retirees, who usually receive a fixed pension each month, form one of the larger groups within vanlife. These

persons usually travel alone. While they do not work, they volunteer and spend a majority of their time building up the vanlife community. Their motivations are split between being economic and maintaining a sense of community. Their vans range from the cheapest to the most expensive.

7.3 Laws, Legality, & Glorifying Homelessness

Laws and legality of their lifestyle are an important concern among vanlifers. During the course of this study, we were also made aware of a concern among our laboratory group—that studying and creating solutions for vanlife could have the effect of glorifying homelessness. We thought deeply about the ethics of this study and we believe that this study is important for a number of reasons:

- (1) Vanlifers usually choose this lifestyle of their own volition (PS1, PS2, PS3, PS4). Even with that choice, some vanlifers (PS3) do believe they are homeless, though that is not a reason to exclude them in technology design considerations. To further that point, Woelfer and Hendry [42] and Markwei and Rasmussen [28] among others have investigated how technology can improve the lives of homeless people (none of the previous investigations included vanlifers).
- (2) The four core concerns noted above manifest themselves in other populations as well. For instance; first nations and indigenous reservations, military bases, and cities and settlements outside of major populated centres show some combination of these factors.

Beyond interactive technology, we believe there is a requirement for additional research around the economic foundations and day to day realities of vanlifers—research that we did not find during our extensive literature review process.

7.4 Limitations

Our research seeks to expand currently existing understanding of nomadic lifestyle, specifically the technical challenges that people in the #vanlife community face in hopes that considerations for designing technology and tools will include groups of people that live outside typical spaces. One limitation to our study is the lack of diversity of participants (predominantly Caucasian, knowledge workers) that were recruited to participate in our interviews. This limitation is due to the nature of recruitment, which was volunteer based. In M2 primary recruitment was done in the central area of the camp, where very social people homesteaded. Another limitation lies in our teams lack of experience with #vanlife and limited rapport among the #vanlife community. The combination of the two resulted in a large amount of time being spent scouting the location during M2 and establishing connection with people. This also resulted in fewer people being interviewed. We tried to alleviate the impact of location by conducting fieldwork in two countries, the US and Canada, but this would still limit our findings to a North American perspective.

7.5 A note about COVID-19

When we completed our fieldwork, we realized that a lot of the concerns raised in vanlife were also present in other communities like indigenous communities in Canada's north, military bases, etc. From March, all the researchers were in a lockdown due to the COVID-19 pandemic. We starting seeing parallels with vanlifers use of space issues. Provocations around computing peripherals (which were not designed for our home offices), to our own yearnings for our previously finished spaces. While this data is anecdotal, we believe that there will be a curb cut effect [4] of following up on our provocations even on the lives of people living in conventional homes.

8 CONCLUSION

#vanlife is a growing community of people who have integrated technology into every aspect of their lives on the road. Through meeting with vanlifers at meetups, we understood how they currently use and adapt technology that was not designed to be used in this non-traditional space. We collected interview data, notes from public spaces, drone images, and 3D videos, all of which we analyzed through an inductive thematic analysis. We distilled our themes into eleven provocations and presented them along with a portrait of technology use in #vanlife. These provocations have implications for design, such as ubiquitous computing, gaming, asymmetric technology for families, and work tools for communities with space, bandwidth, and cost limitations. The socio-economic factors that drove the growth of #vanlife suggest future expansion of this community, along with growth of other groups that live and work in geographically mobile homes. By being inquisitive and designing critically with these provocations in mind, we hope the HCI community will work to enhance the personal well-being of people whose life and work reflects the unconventional realities of an increasingly mobile, interconnected world.

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