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Connecting Caregivers to Community Resources: A Mixed-Methods Evaluation of a Virtual Assistant for Childhood Cancer Survivorship

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Abstract

Purpose

Caregivers of childhood cancer survivors (CCS) may experience persistent challenges identifying and accessing supportive resources. We evaluated the usability and acceptability of a virtual assistant (VA) designed to connect caregivers with community resources and explored whether social context influenced perceptions of the tool.

Methods

This mixed-methods cross-sectional study evaluated caregivers of childhood cancer survivors who completed usability testing of a community resource VA, and then the System Usability Scale (SUS), caregiver satisfaction questionnaire, reaction cards and semi-structured interviews. Neighborhood and geographic social context were characterized using the Child Opportunity Index, Area Deprivation Index (ADI), Appalachian residence, and rurality. Quantitative analyses were exploratory, and interviews underwent qualitative content analysis.

Results

The VA demonstrated above-average usability (mean SUS = 77.09, *SD* = 18.04); all caregivers (n = 15; 86.7% female, 93.3% White) rated it as easy to use and not overly time-consuming. Common reactions included “accessible,” “connected,” and “useful.” Greater neighborhood deprivation was associated with higher satisfaction across several domains, including perceived ability to identify resources caregivers could not find independently. Appalachian caregivers similarly reported greater perceived benefit for resource identification. Qualitative analyses identified three themes: perceived value was greatest earlier in the cancer trajectory; caregivers prioritized convenient integration into familiar digital platforms; and an intuitive interface reduced burden and supported confident use.

Conclusions

A caregiver-facing VA for community resource navigation was usable and acceptable. Perceived value varied by social context and timing, suggesting particular utility for families experiencing greater structural barriers.

Implications for Cancer Survivors

Digital resource-navigation tools may provide scalable support across treatment and survivorship.

Introduction

Advances in pediatric oncology have transformed childhood cancer into an increasingly survivable condition, producing a growing population of survivors who require long-term follow-up for physical, psychosocial, and financial late effects[1, 2]. These demands extend beyond the survivor to caregivers, who often remain responsible for coordinating follow-up care, monitoring for late effects, and supporting reintegration into school, work, and family life well after treatment ends[3].

Importantly, caregiver needs do not end with treatment completion; rather, they evolve across the cancer trajectory[4, 5]. Prior work suggests that relatives of childhood cancer patients and survivors continue to report needs related to follow-up, late effects, coping, support, parenting, and everyday life, and preferences for the timing and format of information vary across phases of care [6–8]. Although many caregivers demonstrate resilience during the transition to survivorship, a subset continues to experience psychosocial risk, anxiety, and reduced mental health-related quality of life[9].

These survivorship challenges are also shaped by social context. Families may face transportation barriers, financial strain, limited local services, or reduced access to coordinated psychosocial support, particularly in rural, underserved, or socioeconomically deprived settings[10, 11]. Oncology literature increasingly recognizes that social-needs screening is feasible[12], but screening alone is insufficient; many programs identify needs without ensuring timely connection to relevant resources, and diverse populations remain underrepresented in this work[13].

Digital health tools may help address this gap by offering scalable, accessible ways to identify needs and connect families with support [14]. Recent work suggests that pediatric oncology-focused digital tools remain relatively scarce and are often stronger in functionality than in engagement, while caregivers of young childhood cancer survivors view virtual assistants as potentially useful when they are trustworthy, tailored, and easy to access [15, 16]. However, evidence remains limited regarding the usability and acceptability of a survivorship-focused virtual assistant designed specifically to support caregiver social needs and community resource navigation.

Accordingly, the present study evaluated the usability and acceptability of a virtual assistant (VA) developed to help caregivers of pediatric cancer survivors identify and access community resources. Using a cross-sectional mixed-methods design, we examined usability, satisfaction, desirability, and explored whether neighborhood-level social determinants of health (SDOH) were associated with caregiver perceptions of the tool. We also sought to understand which design features caregivers prefer and how a virtual assistant might best be integrated across the survivorship continuum.

Methods

Study Design

This study involved a cross-sectional mixed-methods evaluation of a social needs VA for caregivers of children in cancer survivorship care. Caregivers were recruited in person from a large Midwestern children's hospital between April 2025 and August 2025. Eligible caregivers were identified from the clinic schedule based on the following criteria: (1) 18 years or older, (2) English-speaking, (3) having a child aged 5–17, and (4) child completed cancer treatment ≥ 5 years prior to enrollment. Eighteen of 30 eligible caregivers approached consented, 5 considered participating but were lost to follow up, 7 declined. Reasons included; lack of interest, discomfort with technology, or increasing visit length with participation. After consenting, 3 were lost to follow up, resulting in a final cohort of 15 caregivers. Quantitative and qualitative data were collected in person or remotely via Microsoft Teams to obtain feedback on the VA's interface, usability, satisfaction, reactions, and content. VA engagement and understanding was evaluated through the following steps:

Step 1 – Unobtrusive observation to measure interface intuitiveness (10–15 minutes): Caregivers were briefly introduced to the VA and asked to start interacting with it. The study team observed and recorded participants' process while not intervening or providing instruction.

Step 2 – Interactive Observation (10–15 minutes): The study team would interrupt participants during their interaction with the VA by asking questions regarding observed cues that implied caregiver success or delay in program use. Caregivers were encouraged to verbalize VA criticisms. Since the discussion was based on evolving patterns of interaction, pre-prescribed questions were not possible.

Step 3 – Debriefing (15–20 minutes): Study team members then asked caregivers to reflect on the experience with the VA, its interface and contents, and share their opinions on strengths and weaknesses. At the conclusion of step 3, caregivers completed a semi-structured interview regarding the VA. Caregivers were asked about initial impressions, feature preferences, perceived helpfulness, missing elements, suggestions, and potential barriers or facilitators of use for their family. After the interview, caregivers completed the System Usability Scale (SUS, assessing functionality and acceptability), Caregiver Satisfaction survey (assessing satisfaction), and Reaction Card (assessing desirability).

Measures

Demographic Characteristics

Caregivers provided sociodemographic information on sex, race, ethnicity, relationship status, education, employment status, occupation and work setting, household composition, family income, and spouse's educational attainment, as well as additional information regarding their relationship to the child and the child's age, sex, race, ethnicity, educational status, and grade level. Information about child diagnosis and treatment were obtained from the Electronic Medical Record (EMR).

System Usability Scale (SUS)

Caregivers completed the SUS, a 10-item questionnaire aimed to assess the functionality and acceptability of digital health applications. Items are rated on a 5-point Likert scale, with scores ranging from 0 to 100. The scale's reliability (Cronbach's alpha = 0.91) and validity (Pearson correlation r = 0.81 with a 7-point scale of "user-friendliness") are well-established. A score exceeding 68 is considered above average[17].

Caregiver Satisfaction

Caregiver Satisfaction was evaluated utilizing a 9-item survey, developed by the investigators, to understand caregiver perspectives on the VA. This included perceived benefits, burdens, barriers, suggested modifications, and overall satisfaction. Items were scored on a 4-point Likert scale, with higher total scores indicative of greater satisfaction.

Reaction Card

To assess VA desirability based on user experience, a reaction card methodology was used. Developed by Microsoft as part of a "desirability toolkit," reaction cards are designed to elicit user reactions, thoughts, or opinions regarding a specific tool or technology[18]. Caregivers provided feedback on VA desirability by utilizing a reaction card featuring 55 pre-listed words. The frequency with which each word was selected was subsequently summarized to indicate the overall attitude toward the VA. A higher incidence of positive words suggests greater desirability, whereas a higher incidence of negative words indicates lower desirability[19].

Social Determinants of Health (SDOH)

Participant addresses were coded for SDOH to investigate whether non-medical factors associated with caregiver residency influence VA usability and acceptability. Measures analyzed included Child Opportunity Index (COI), National Area Deprivation Index (ADI), Medically Underserved Areas (MUA), Appalachian status, and rurality. The COI uses neighborhood data to measure access to resources like education, environment, and health for children. COI is scaled 0–5, with higher scores indicating areas with more opportunity [20]. National ADI uses U.S. census data to measure poverty by neighborhood. National ADI is scaled 0-100, with higher scores indicating higher deprivation [21]. Medically Underserved Area (MUA) designations are based on geographic location and used to identify access to healthcare services, where a 0 represents medically served, and 1 represents medically underserved [22]). Appalachian residency is determined by county, referencing lists established by the Appalachian Regional Commission (ARC)[23], an organization identifying and aiding the economic development in Appalachian areas. Addresses were coded as 0 for a non-Appalachian County and 1 for an Appalachian County. Finally, caregivers' addresses were categorized as rural or non-rural based on Rural-Urban Commuting Area (RUCA) codes[24]. These codes are derived from census tract and ZIP-code level data, and quantify population density, urbanization, and commuting patterns on a scale of 1 to 10. Rural

residency was defined by scores of 4–10 (micropolitan to rural), while non-rural residency encompassed scores of 1–3 (metropolitan).

Virtual Assistant

The framework for the VA was derived from previous work on a VA designed for caregivers of children in active cancer treatment [14, 25, 26](or using primary care services), serving as an exemplar for conversational architecture, organization, and subject matter. The VA was developed on a web platform utilizing a hybrid model (Artificial Intelligence and rule-based models using API accessed community resources) [26]. The VA comprised three main functionalities: (1) a community resource module (2) a history tab and (3) a feedback loop. The community resource module begins with an introduction from the VA, communicating how it can help the user to find resources. The VA then asks what the user is looking for and presents options (Fig. 1). After selecting a resource category, caregivers are prompted to input their ZIP-code. The VA then provides resources near their location that the caregiver can explore. Resource features included; review resource eligibility criteria, required documents, program options, guidance to apply for resources, and other additional information (i.e., address, business hours, cost, phone number, documents, eligibility, and which benefits they can use). Users can access resources and revisit them in the history tab. More resource details such as contact information and map and driving directions are also available.

Statistical analysis

Data were cleaned and analyzed using IBM SPSS, version 28 for Windows. Descriptive statistics, bivariate correlations, and *t*-tests examined quantitative data. Semi-structured interviews were transcribed verbatim and coded using NVivo software. Two study team members created a usability and acceptability codebook based on digital health usability and acceptability literature[27, 28]. Initial coding used a deductive framework and applied the preliminary codebook to an initial subset of transcripts (n = 5) to assess code applicability and completeness. During this process, the coders identified content not captured by the codes. The codebook was iteratively refined to incorporate additional inductive codes (e.g., “timing of intervention” and “preferred modality”) to better reflect caregivers’ perspectives. Following refinement, all transcripts were independently coded by both coders. Any discrepancies were resolved through discussion until consensus was achieved, after which the finalized codebook was applied consistently across the dataset. Once coding was complete, the coders jointly examined the coded data to identify recurring patterns and develop themes. These themes were subsequently reviewed with the broader study team to ensure alignment with the data and to strengthen analytic rigor. Final themes were confirmed through team consensus.

Ethics

The study was approved by the local Institutional Review Board (approval number STUDY00003766). All study data was kept confidential. The results are presented in a manner which ensures no individual

respondent can be identified. Caregivers were compensated with a $50 gift card for participation.

Results

Caregivers were primarily female (*n* = 13, 86.7%), White (*n* = 14, 93.3%), non-Hispanic, Latino, or Spanish (*n* = 13, 86.7%), married (*N* = 15, 100%), and had at least a college level education (*n* = 10, 66.7%). Caregivers were primarily working full time (*n* = 7, 46.7%) and most caregivers made over $75,001 a year (*n* = 13, 86.7%). Children were mostly female (*n* = 10, 66.7%), White (*N* = 15, 100%), not Hispanic, Latino, or of Spanish origin (*n* = 14, 93.3%), and regularly attend school (*n* = 13, 86.7%). Demographics are reported in Table 1.

Table 1
Caregiver and Child Demographic Characteristics.

	Caregiver (N = 15)	***Child (N = 15)***
Gender		
Male	2 (13.3%)	5 (33.3%)
Female	13 (86.7%)	10 (66.7%)
Race		
White	14 (93.3%)	14 (93.3%)
More than one race	1 (6.7%)	1 (6.7%)
Ethnicity		
Not of Hispanic, Latino, or Spanish origin	13 (86.7%)	14 (93.3%)
Mexican, Mexican American, Chicano	1 (6.7%)	1 (6.7%)
Caregiver relationship status		
Married	15 (100%)	-
Caregiver education		
High school	2 (13.3%)	-
Post high school (technical or trade school)	3 (20%)	-
College	5 (33.3%)	-
Graduate or professional school	5 (33.3%)	-
Caregiver occupation		
Employed, working full time	7 (46.7%)	-
Employed, working part time	5 (33.3%)	-
Employed, working more than one job	1 (6.7%)	-
Contract/temporary work	1 (6.7%)	-
Not employed, looking for work	1 (6.7%)	-
Caregiver work situation		
Primarily working at location outside of home	6 (40%)	-
Sometimes work outside home, sometimes inside home	5 (33.3%)	-

	Caregiver (N = 15)	*Child (N = 15)*
Gender		
Primarily working at home	2 (13.3%)	-
Not employed/not applicable	1 (6.7%)	-
Household income		
Under $25,000 per year	0	-
$25,001 - $50,000 per year	1 (6.7%)	-
$50,001 - $75,000 per year	1 (6.7%)	-
$75,001 - $100,000 per year	6 (40%)	-
$100,001 - $150,000 per year	4 (26.7%)	-
$150,001 or more per year	3 (20%)	-
How many people in household *M(SD)*	4.33 (1.14)	
How many children in household *M(SD)*	1.87 (0.72)	
Religious affiliation		
Christian	13 (86.7%)	-
Catholic	1 (6.7%)	-
None, no religion	1 (6.7%)	-
Child education status		
Regularly attends school	-	13 (86.7%)
Is home-schooled	-	2 (13.3%)
Child’s diagnosis		
Wilms tumor	-	5 (33.3%)
ALL	-	5 (33.3%)
Neuroblastoma	-	2 (13.3%)
Burkitt's lymphoma	-	1 (6.7%)
Ewings sarcoma	-	1 (6.7%)
Rhabdomyosarcoma	-	1 (6.7%)
Child’s years in survivorship	-	9.1 (2.91)

	Caregiver (N = 15)	***Child (N = 15)***
Gender		
Child Opportunity Index (COI) *M(SD)*	3.47 (1.13)	-
National Area Deprivation Index (ADI) *M(SD)*	52.20 (20.67)	-
Appalachian status	4 (26.7%)	-
Rural and Urban Commuting Area (RUCA) rurality	7 (46.7%)	-

Usability

The mean SUS score was 77.09 (*SD* = 18.04), with a median of 82.50, exceeding the benchmark of > 68[17]. Bivariate correlations and independent *t*-tests between SDOH characteristics, demographics, and usability ratings did not reveal significant findings. Given the small sample size (*N* = 15), these analyses were exploratory although non-significant medium effect sizes were observed for Appalachian residency and area deprivation, such that if participants were from an Appalachian area or a more deprived area, they were more likely to rate the VA usable ($r(15)=.369$, $p=.175$; $r(15)=.508$, $p=.053$). Additionally, caregivers reported lower usability ratings if they were from areas with increased childhood opportunity ($r(15) = -.375$, $p=.169$).

Caregiver Satisfaction

Caregivers rated the VA as easy to use (*N* = 15, 100%). Correlations between caregiver satisfaction individual items and SDOH items (i.e., COI, ADI, Appalachian status, and rurality) had multiple significant associations. When caregivers were from areas with higher ADI, they were more likely to find the VA "*good to use*" ($r(15)=.601$, $p=.018$), "*the time spent using the VA as acceptable*" ($r(15)=.570$, $p=.026$), that it "*helped them to find community resources in a way they could not have themselves*" ($r(15)=.662$, $p=.007$), and that it "*helped them stay motived while completing the screening"* ($r(15)=.601$, $p=.018$). If they were from a less deprived area, caregivers viewed the VA as "*boring to use*" ($r(15)$-.567, $p=.027$). Additionally, if caregivers were from an Appalachian area, they were more likely to say "*the VA helped them find resources in a way they could not have themselves*" ($r(15)=.533$, $p=.041$). Finally, if caregivers were from an area with more child opportunity, they saw the VA as " more "*boring to use*" ($r(15)=.548$, $p=.034$).

Reaction Card

Most caregivers had positive associations with the VA; "*accessible*" (*n* = 12, 80%), "*connected*" (*n* = 11, 73.3%), and "useful" (*n* = 10, 66.6%), represented the highest rated reactions (Fig. 2).

Qualitative Results

Qualitative analyses of interviews uncovered three primary themes, representative quotes are reported in Table 2. First, the *chatbot's value was time-sensitive, with caregivers of survivors recommending greatest relevance during active treatment*. When asked about the optimal timing for an intervention like the VA, caregivers overwhelmingly endorsed the importance of intervention after diagnosis and during treatment. Reasons for this included; families spend time in an unfamiliar area, receive an influx of information, which may be untrustworthy, and feelings of loneliness or anxiety regarding social needs during treatment. Second, *caregivers prioritized convenience and integration, preferring an in-app chatbot over other delivery formats*, such as a website or text-based service. Third, *an intuitive, user-friendly interface reduced burden and enabled confident use*. Caregivers praised the straightforward layout of the VA and reiterated the importance of the simple design to avoid feeling overwhelmed.

Table 2
Qualitative Themes and Exemplary Quotes.

Theme	Exemplar Quotations
The chatbot's value was time-sensitive, with caregivers of survivors recommending greatest relevance during active treatment	
	"I would say it-it's intermittent. Um, because we aren't always waist-deep in the, like, oncology treatment there- like- it's not a daily need" (Caregiver of Wilms tumor survivor)
	"I think it would have been really beneficial. Um, when we were in the beginning of our journey and not having a clue where we were, what we were doing." (Caregiver of Wilms tumor survivor)
	"This would be kind of- would have been cool for us, let's say 14 years ago, when [inaudible] first was going through stuff, because you're kind of, you-you feel like you're alone" (Caregiver of acute lymphoblastic leukemia survivor)
	"Oh man, if I would have had this 15 years ago, this would have really relieved the anxiety" (Caregiver of Burkitt's lymphoma survivor)
Caregivers prioritized convenience and integration, preferring an in-app chatbot over other delivery formats	
	"It seems like something, um, that would be a nice resource, especially if it was an app" (Caregiver of Wilms Tumor survivor)
	"Just make it very accessible for everybody. Everybody downloads apps." (804)
	"I love the idea of having a tool that's user friendly and something that people can find resources using." (Caregiver of neuroblastoma survivor)
	"It'd be cool that if I can search it on the app and it leads me to the websites… like if I go to the app, and type in what I'm looking for, and it searches it for me faster than me just googling" (Caregiver of acute lymphoblastic leukemia survivor)
An intuitive, user-friendly interface reduced burden and enabled confident use	
	"I appreciate the fact that things are very straightforward, especially technology. Um, so the simplicity of it, I think, as far as looks, it looks great!" (Caregiver of acute lymphoblastic leukemia survivor)

Theme	Exemplar Quotations
	“It's very easy to read, very easily, like, laid out. I feel like it's not overwhelming.” (Caregiver of Wilms Tumor survivor)
	“I thought it was very easy to use. So that was like the main thing, I guess, for me.” (Caregiver of Wilms Tumor survivor)
	“I think it's very user friendly to most people. With whatever background or education. Um, I think it's easy to use and follow.” (Caregiver of Burkitt’s lymphoma survivor)

Discussion

In this mixed-methods pilot usability study, caregivers of childhood cancer survivors rated the virtual assistant as highly usable and acceptable. The mean System Usability Scale score exceeded the conventional benchmark for above-average usability, all caregivers endorsed the tool as easy to use, none viewed it as time consuming, and reaction card responses were predominantly positive, particularly “accessible,” “connected,” and “useful.” Together, these findings suggest the digital tool’s core interface was intuitive and imposed minimal additional burden on caregivers.

However, a notable finding was the distinction between global usability and contextual value. Although overall usability did not differ by demographic or neighborhood characteristics, satisfaction did vary by social context. Caregivers residing in more deprived areas were more likely to view the VA as good to use, acceptable in time, motivating, and helpful for finding resources they may not have located independently. Similarly, caregivers from Appalachian areas were more likely to report that the VA helped them identify resources in ways they could not have otherwise. In contrast, caregivers from higher-opportunity areas were more likely to describe the tool as boring or somewhat more time-consuming. Rather than suggesting a weakness of the intervention, this pattern may indicate that the perceived value of a resource-navigation tool is greatest when structural barriers are highest. This interpretation is consistent with broader oncology and pediatric psycho-oncology literature showing that social context shapes caregiver strain, support needs, and access to helpful resources[16, 29, 30]. Perceived value, however, is bounded by what exists locally. A navigation tool improves discoverability but cannot expand supply, and service availability is lowest in the same counties where caregivers valued it most, a structural gap technology alone cannot close.

The qualitative findings add an important temporal nuance. Despite this sample being composed of caregivers whose children had completed treatment at least 5 years earlier, participants repeatedly described the VA as most valuable closer to diagnosis or during active treatment. This is clinically meaningful. Prior literature shows that caregiver information and support needs persist into survivorship, but their intensity and type shift over time[31–33]. In the current study, caregivers did not reject the value of the tool; rather, they located its highest value at moments of greatest uncertainty, burden, and isolation. These findings suggest that a social-needs VA may be best conceptualized as a longitudinal, on-demand resource introduced early and retained across treatment and survivorship, rather than as a

tool reserved exclusively for late survivorship care. It also suggests more specific survivorship needs are necessary to integrate into a VA intervention to support caregivers of childhood cancer survivors.

Caregivers also emphasized convenience and integration as important to optimization. Participants preferred a tool embedded within an app or familiar digital environment and consistently valued straightforward design, readability, and a low cognitive burden. This aligns with recent pediatric oncology digital health literature showing families benefit from accessible, stakeholder-informed tools, but many available apps remain fragmented, insufficiently integrated, and limited in engagement[16, 34, 35]. It also reflects prior work suggesting that caregivers are receptive to virtual assistants when the information is personalized, credible, and easy to access[16]. For implementation, these findings support embedding the VA within existing survivorship or institutional platforms, maintaining an updated resource directory, and pairing the tool with clinician or social work endorsement to strengthen trust and uptake. Framed this way, the VA extends finite social work capacity to routine resource lookups rather than replacing it, and should be paired with closed-loop follow-up (documentation of identified need and confirmation of connection) since perceived helpfulness is not evidence of realized linkage [13].

This study has several strengths, including its mixed-methods design, focus on an understudied population of caregivers in pediatric cancer survivorship, and integration of geocoded social-context measures such as area deprivation, child opportunity, Appalachian status, and rurality. At the same time, the findings should be interpreted in light of important limitations. The sample was small and recruited from a single Midwestern children's hospital, and participants were predominantly White, married, English-speaking, and relatively socioeconomically advantaged. The cross-sectional design also precludes conclusions regarding sustainability, actual resource uptake, or downstream effects on caregiver stress, unmet social needs, or survivorship outcomes. These limitations mirror broader gaps in the oncology social-needs and digital health literature, where studies are often single-site, small, and insufficiently representative of diverse populations[12, 36, 37].

Future research should test this approach in larger and more diverse samples, including non-English-speaking families and caregivers across rural and medically underserved settings. It will also be important to determine whether integrating the VA into clinical workflows or patient-facing apps improves actual linkage to community resources and reduces caregiver burden over time. Overall, the present findings support the promise of a caregiver-facing virtual assistant during cancer survivorship as a feasible, acceptable, and potentially equity-relevant strategy for resource navigation in pediatric oncology, while underscoring that timing, trust, and implementation context are central to its success.

Conclusions

Findings from this preliminary evaluation support the usability and acceptability of a caregiver-facing virtual assistant for social resource navigation in pediatric cancer survivorship. Although caregivers viewed the tool positively overall, perceived value appeared to depend on social context and stage of the cancer journey, with the strongest endorsement for use during earlier, more intensive phases of care.

Implications for Cancer Survivors

Families may benefit most from resource-navigation tools introduced at diagnosis and maintained across treatment and into survivorship. Caregivers valued a simple interface delivered through a familiar app and endorsed by their care team. For survivors and families in rural, Appalachian, or high-deprivation communities, such tools may carry the greatest perceived value, but only if the underlying resource directory is accurate and current where those families actually live, and if digital navigation is paired with human support.

Declarations

Conflicts of Interest

None.

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Author Contribution

All authors (M.A.S., A.M.B., L.M.W., E.C.D., R.O., and E.S.) contributed to the study conception and design. Material preparation, data collection, and analysis were performed by AMB, LMW, ECD. The first draft of the manuscript was written by M.A.S., and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data Availability

The data supporting the findings of this study are not publicly available because they contain potentially identifying information about participants and their families. De-identified data may be available from the corresponding author upon reasonable request, subject to institutional policies, applicable ethics approvals, and participant consent.

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Figures

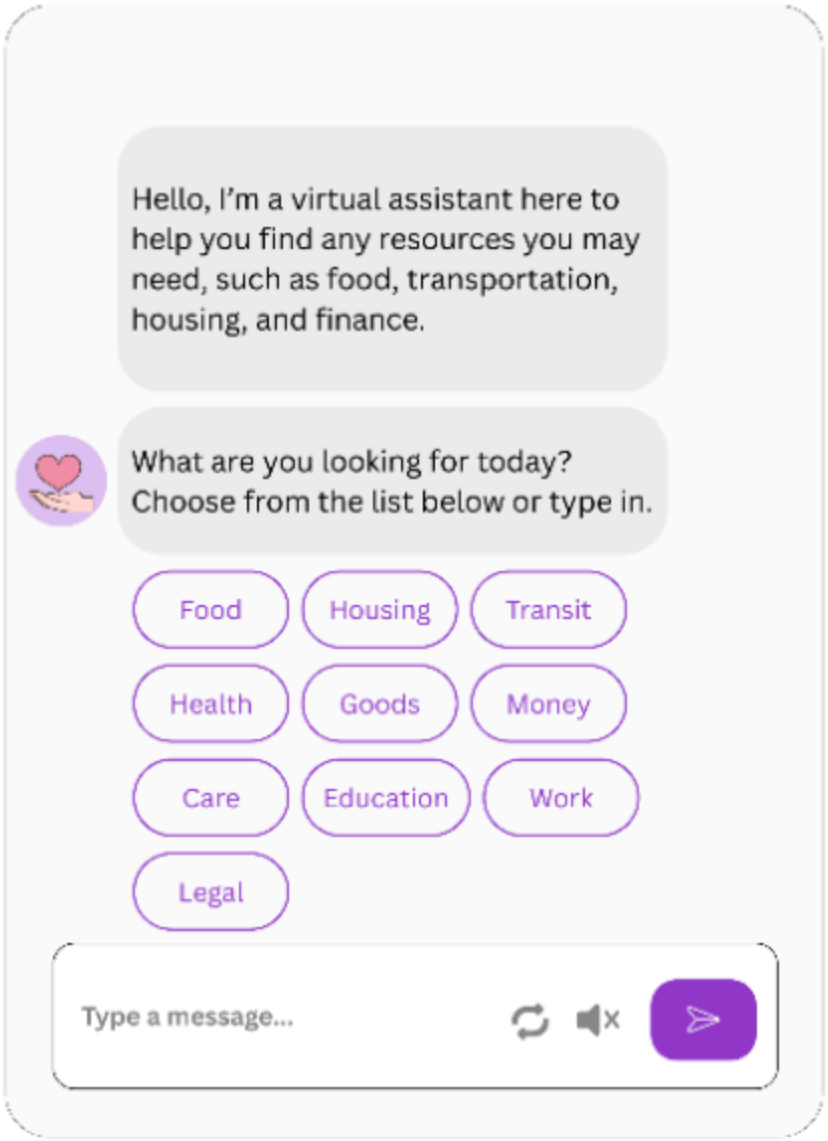


Figure 1

VA Starting Page.

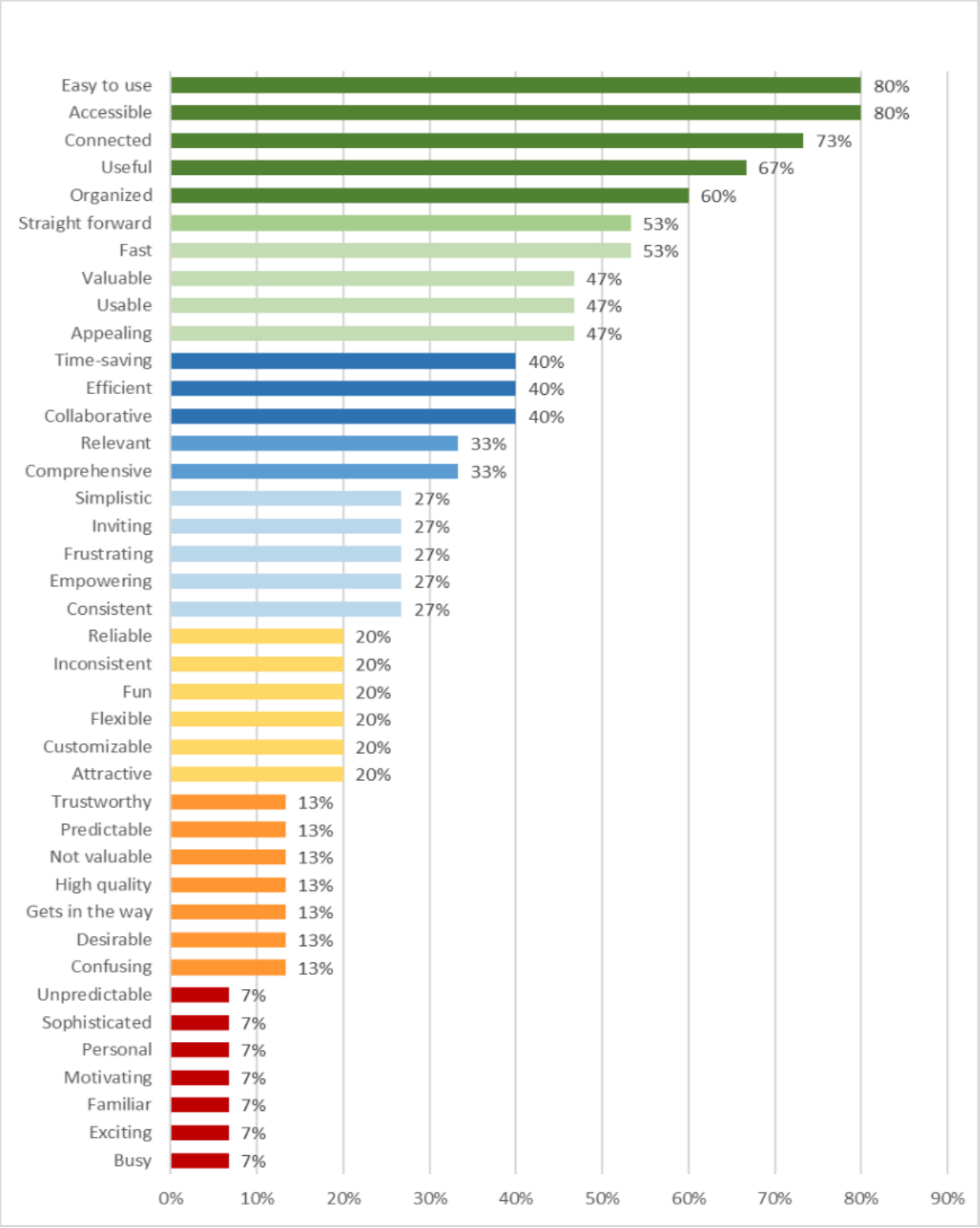


Figure 2

Reaction card results.