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How to Support Domestic Violence Survivors with Conversational Agents: Meta Requirements and Design Principles

Completed Research Paper

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Abstract

Domestic violence is a prevalent and complicated issue that can have detrimental effects on the survivors, their families, and communities. Survivors are often reluctant to divulge their experiences to others in person for social, emotional, privacy, or cultural reasons. Consequently, many are not actively seeking support that meets their needs. Conversational agents, a form of technology support, hold great promise for facilitating counseling and support by promoting self-disclosure and enhancing user engagement. To address the knowledge gaps in design principles for conversational agents for DV survivors, we conducted in-depth interviews with 11 professionals working with domestic violence survivors. After analyzing the interview transcripts and related literature, we identified several meta-requirements and categorized them into four categories — conversation, language, support, and trust. We further grouped these meta-requirements into several design principles. Our work lays the foundation for design science research in designing and developing conversational agents to support domestic violence survivors.

Keywords: conversational agents, domestic violence, domestic violence survivors, support, design principles

Introduction

Domestic Violence (DV) refers to the "physical violence, sexual violence, stalking, and psychological aggression (including coercive acts) by a current or former intimate partner" (Breiding et al., 2015, p.11). DV adversely affects the victim's health, safety, and quality of life. The prevalence of DV is associated with significant health, social, and economic costs. For example, intimate partner violence costs approximately \$9 billion annually in the United States (McLean & Bocinski, 2017). DV can be attributed to a wide range of factors, such as cultural and social norms, an absence of protection from law enforcement authorities, economic hardship, psychological issues, and alcohol or drug abuse, which all increase the probability of violence occurring (Lowenstein, 2005). By intervening in DV, it is possible to reduce its adverse consequences and minimize its costs.

Owing to the technological advancements in the past few decades, technology has become a viable tool for mitigating the risk of various social issues such as DV. Technology can be very beneficial in combating DV. The United Nations outlines Goal 5 of the Sustainable Development Goals, which proposes to "Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women" (United Nations, 2015). A variety of technologies, including mobile and wireless technologies (e.g., mobile apps) or web-based technologies (e.g., social media) have been employed in DV digital interventions. These technologies can help survivors gain access to necessary resources and services, assist them in reducing their feelings of isolation by ensuring that they can stay in touch with their social network and access supportive online communities, provide them with safety devices and assistance in

creating safety plans, document the abuse, and empower them (Al-Alosi, 2020). However, Conversational Agent (CA) remains under studied in the DV research.

CA is a promising technology partly because it offers many facilitators for user engagement (Nadarzynski et al., 2021), such as the availability of immediate assistance at anytime and anywhere. The presence of a CA enhances the participants' engagement and substantially helps them achieve their smoking cessation goals (Wang et al., 2018). Additionally, CAs could offer anonymity, which is viewed as an effective incentive for user engagement. Further, CAs are perceived as non-judgmental, which further promotes self-disclosure and enhances engagement. It has been found that CAs are effective in treating chronic health conditions and ameliorating patients' symptoms. For example, 'Wysa' users reported a decline in their stress and depression levels after using the CA (Inkster et al., 2018). Despite that researchers have started to explore using CAs for DV (Bauer et al., 2019; Hossain et al., 2020; Park & Lee, 2021), very little research has focused on developing design principles for CA-based DV intervention.

This study aims to fill the knowledge gaps by developing principles for the interaction features and design of CAs for DV intervention. To this end, we answer two research questions: 1) What are the meta requirements for CA design in support of DV survivors? and 2) How can we design a CA for DV intervention? We identify detailed meta requirements for CA design from interviewing professionals working with DV survivors. The resulting design principles were derived from the meta requirements of CA design as well as the related design principles from the Information Systems (IS) literature.

This study makes multifold contributions to the IS, Human Computing Interaction (HCI) and social work research. First, We extend the design science research to a new domain that has significant social and economic impacts while presenting significant challenges. Second, we identify meta-requirements for CA-based intervention of DV for the first time. Third, we develop a set of design principles based on the identified meta-requirements and the literature for CA-based intervention of DV.

The remainder of this article is organized as follows. First, we provide the background of DV, CA, and review related work. Then, we introduce our method, present our analysis results, and finally discuss major findings and future research issues.

Background and Related work

We review the literature concerning technology-based DV interventions, background in CAs and their application in DV.

Technology-based DV intervention

Technologies have the potential to offer a broad range of intervention solutions. In particular, technology-based interventions provide survivors with the opportunity to make their personalized safety plans, including a safer way to exit or manage an abusive relationship (Glass et al., 2017). As part of an intervention, they provide survivors with information regarding their level of risk through risk assessment (Koziol-McLain et al., 2018). In addition, to keep survivors better informed, technology-based interventions provide educational materials that can enhance survivors' knowledge about DV (Constantino et al., 2015). Technology-based interventions also assist survivors in setting priorities in terms of their safety and privacy (i.e., health, children, partner, resources) (Koziol-McLain et al., 2018). Moreover, as one of their key features, technology-based interventions can refer survivors to trusted care services (e.g., shelters, hotlines, and family agencies) which survivors can access if they so choose (Ragavan et al., 2020).

Conversational Agents (CAs)

CA is an intelligent interactive dialog system using natural language processing techniques and responding in a human-like manner. CA is a research topic in the field of human-computer interaction. CAs have been gaining traction in many other fields in recent years, to the point where as many as 1.4 billion people use them regularly (Rajpara, 2022). The interest in CA is further fueled by the widespread recognition and adoption of ChatGPT. Through the use of CAs, people can perform a wide variety of tasks, such as making appointments, searching for information, managing smart devices, or even shopping. Furthermore, they can be utilized for a variety of tasks to support healthcare professionals or vulnerable groups. It came to the attention of users that a CA was perceived as a reliable conversational partner when discussing sensitive

topics (e.g., mental health, sexual violence) (Lee et al., 2020; Park & Lee, 2021), as users believed that a CA could handle private information more securely, was less likely to tamper with it, and was perceived as being unbiased and nonjudgmental. Keeping responses anonymous and private encouraged users to participate in sensitive discussions (Joinson & Paine, 2012).

The design of effective CAs necessitates consideration of design principles that contribute to their functionality and usability. In their study, Gnewuch et al. (2018) highlighted the significance of incorporating social cues into CAs along with proactive energy feedback that includes personalized suggestions and practical advice aimed at encouraging energy-saving behavior. Similarly, Stieglitz et al. (2022) developed a number of design principles for CAs for emergency management agencies. Their research provides insights into design principles specific to this domain, including targeted communication, transparency, effective implementation of CAs, and interoperability of the CAs across different platforms. Further, Derrick et al. (2011) introduced Special Purpose, Embodied, Conversational Intelligence with Environmental Sensors (SPECIES). Specifically, their aim was to create agents that are capable of analyzing environmental data and providing contextually appropriate responses to users. These principles include engaging in special purpose communication, decoding human messages, and interpreting sensor data.

Application of CAs in DV

There are emerging applications of CAs to assist survivors of DV and other types of violence in the past few years. rAIinbow (AI for Good, 2018) provides tailored assistance to survivors who have suffered DV in South Africa. The CA provides survivors with a variety of services, such as offering advice and tips, educating them about the relationship, explaining what is and what is not normal, learning about their rights, and reading about what others have experienced. Similarly, Sophia is another CA that was developed by SpringAct (Kona Connect, 2022) to offer assistance to DV survivors; which allows survivors to submit evidence about abuse in their relationships, offers survivors legal assistance information, as well as provides resources such as contact information for local shelters and hotlines. Further, Hossain et al. (2020) proposed a mobile application including a CA that answered DV-related queries. Specifically, the CA served to provide immediate information such as the police station number, and instructions on how to react in case of violence. Overall, the CA-based intervention of DV would be implemented in circumstances where DV survivors need immediate or sustained support. The CA-based intervention of DV is designed to provide survivors with a secure and confidential environment to seek assistance, receive information about their rights, and access resources such as local shelters and hotlines.

Despite the previous efforts in building CAs to support DV survivors, they remain far from sufficient for several reasons. First, explicit discussion of design principles for CAs remains largely lacking, limiting their research and practical implications. Second, those CAs provide standardized information without giving adequate consideration to the specific needs of DV survivors. Despite that CAs hold great promise as a technological solution to supporting DV survivors, their design principles remain to be unexplored.

Research Methodology

This research aims to identify meta requirements and develop design principles for CAs in support of DV survivors following a design science research (DSR) framework (Kuechler & Vaishnavi 2008). DSR is focused on the generation of knowledge and enhancement of understanding of a problem by means of designing and applying an artifact (Hevner et al., 2004). In particular, the development of artifacts needs to draw on established kernel theories and design principles to address major issues (Walls et al., 1992). Prescriptive design knowledge is best conveyed through design principles (DPs) (Baskerville et al., 2018). DPs are essential components of design theory, since they comprise the key element that distinguishes design knowledge, namely the set of prescriptive statements that guide the design process (Gregor et al., 2020). They stressed the importance of integrating relevant actors during DP development and their anatomy to generate statements with the objective that DPs should be "prescriptive statements that indicate how to do something to achieve a goal" (Gregor et al., 2020, p.1622). Formulating DPs allows for the abstraction of prescriptive knowledge from singular situations, thereby facilitating the generalization of prescriptive knowledge (Gregor et al., 2020). However, given the lack of established DPs for CA in this area of DV research, this study treats DPs as the main artifacts for development, and goes through the following main phases in the current design cycle.

- **Problem of awareness.** This research is commenced with a comprehensive review of existing literature in the fields of IS and HCI to identify prevalent issues with current CAs. We summarize the literature review and highlight the research limitations in the background and related work section. Based on our review, there appears to be an absence of discussion of design principles specific to CAs for DV, indicating that the key factors influencing the development and implementation of these CAs are not adequately understood.
- **Suggestion.** In order to function appropriately, CAs should foster effective and extensive human-computer interaction. We derived design principles for the CA design from the related literature.
- **Development.** We conducted interviews with experts in the field. We identified the meta-requirements of CA design for DV survivors based on our analysis of emerging themes from the interview data using a bottom-up approach (Braun & Clarke, 2012). Our choice of this approach was due to the scarcity of related literature, particularly addressing the role of CAs in the context of DV. In order to identify and comprehend the specific requirements of CAs in DV settings, we relied on firsthand perspectives from participants. Meanwhile, we also draw on the meta requirements of CA collected from the suggestion phase to support our identification of meta-requirements. Based on the identified MRs, we developed a set of eight DPs that outline what considerations should be taken into account (design) and how (action) a CA can be designed to provide support to survivors of DV.
- **Evaluation.** We support our developed DPs with relevant quotations from participants, which provide additional information, DV context, and/or real scenarios. In addition, we further draw on the findings from the relevant literature to confirm our identified meta-requirements for CA-based design for DV survivors.
- **Conclusion.** In this study, we present novel observations and recommendations that contribute to the advancement of CAs' design principles and understanding. We discuss the importance of considering emotional support features when designing CAs for DV, as well as the possibility of incorporating DV tips and advice, referral resources, and safety planning within CAs, potentially leading to more effective DV interventions. We summarize our findings in the discussion section.

Interviews

A more effective technological design can be achieved by explicitly taking into account the needs of stakeholders in the DV setting (Freed et al., 2017). We employed a qualitative research method, specifically a semi-structured interview, because it allows us to explore the perspectives and experiences of stakeholders in assisting DV survivors and understand what survivors' needs are. The findings will further inform the development of principles for the interaction design and features of CAs for DV intervention.

Participants

We chose DV experts as participants because they are well-versed in the trauma experienced by survivors, and the resources that survivors might need. The inclusion criteria are: a) participants should be knowledgeable about DV and/or have experience working with DV survivors; and b) participants must be 18 years of age or older.

We recruited 11 participants from various DV organizations, and academic institutes from different cities in the U.S., all of whom have experience in the field of DV and survivors' support. Participants had a variety of work experience in this field, ranging from one to five years to more than twenty years, working as either advocates, program or executive directors, or academic researchers. All the participants worked with DV survivors, some of the participants also worked with sexual assault survivors, and some had experience in technology-based support.

Procedure and Interview Questions

Prior to the user study, we informed the participants of the study's objectives and procedures via email. We first obtained informed consent from the participants, including the permission of audio-recording the session. We explained to the participants that taking part in the study was voluntary, and they may start participating and change their mind and stop at any time. We then proceeded with semi-structured interviews with participants through online meetings. Each session took approximately 30 to 60 minutes.

Our interview questions were prepared based on the findings of previous studies and our understanding of the subject matter while encouraging participants to share comments or ask questions during the session. We collected data about the participants' job positions and the number of years they have been working in the field of DV. The majority of interview questions were open-ended questions to elicit more details and get a more comprehensive picture of the topic. The first five minutes of the interview were devoted to building rapport with the participants and explaining the objective of the interview and asking them to introduce themselves. The formal interview was composed of three main parts. The first part discussed the survivors' needs, concerns, and expected outcomes when they reach out to advocacy groups and seek support through formal means. In the second part, the participants were asked to respond to questions about the interaction design of the CA and the desirable features and support that the CA should provide. The last part was focused on self-disclosure behavior in light of different technological platforms and the expected challenges and benefits of using CAs for the survivors. We focus on reporting the findings of part 2 in this study. The protocol for the study was reviewed and approved by the Institutional Review Board of the authors' home institute.

Data Analysis

We transcribed all interviews. All identifiable information was omitted. We employed thematic analysis to analyze the data, which resulted in thematic connections between the interview transcripts. Specifically, we used an inductive approach that involves reading the interview transcripts and identifying emerging themes and patterns (Braun & Clarke, 2012). As a first step, samples of scripts were open-coded, then the coding schema was created and revised by including additional categories and themes. The process was repeated several times to have more refined and differentiated themes until we reached saturation. Finally, the entire data was coded based on the final coding schema.

Meta Requirements and Design Principles

In this section, we summarize our findings of meta requirements and design principles for CA in support of DV survivors from the interview study to answer the research questions.

Meta Requirements of CAs

We have identified four major themes that represent our meta requirements, namely, conversational design, language use, support provision, and trust building.

Conversational Design

This theme encompasses meta-requirements associated with designing the structure and fluidity of interactions between CAs and DV survivors, from the initiation to the conclusion of the conversation.

It has been suggested that the chat session might start with a welcome message. Following this step, it is important to introduce the CA and state the purpose of this chat session. Further, as a part of the conversation, it should ensure that all of the discussion will remain confidential. As P2 said, *"then introduce myself and I go over our confidentiality policies, standard confidentiality policies, have everything you share with me is confidential, I'm not going to share any of your information without your permission."*

MR1: The CA should welcome, introduce the session purpose and ensure confidentiality.

Another important requirement following the introduction and assuring confidentiality step is that the CA should determine whether the survivor is safe at the present moment. Confirmation of safety is essential before proceeding to the services (Menschner & Maul, 2016). P7 mentioned, *"First to make sure that the person is safe, if they are in immediate danger, then we want to initiate a call for emergency response."*

MR2: The CA should establish safety and inquiry about the emergency.

Flow occurs when responses and ideas are seamlessly integrated in a conversation. Our study highlighted several requirements in this regard. First, a conversation should be based on reciprocity, which entails the exchange of words between the CA and DV survivors, thereby enhancing engagement. This is in line with Cerekovic et al. (2016), which showed that when the agent reciprocated with the user, the user felt a stronger

sense of rapport with the agent. In addition, there might also be receptiveness in a conversation where to expect someone to ask a follow-up question or ask a question that will compel you to divulge more information about the topic. P11 said, *“there is a receptiveness in a conversation where you expect someone to ask you a thoughtful follow-up question or a question that will, would drive and motivate you to talk further or open up more about the details.”*

MR3: Conversations between the CA and the user should be reciprocated and receptive.

We also identified another requirement that enhances the flow of conversation, namely the CA should understand the context of the conversation. According to P11, *“I suppose more than anything, designing the Chatbot, to be really savvy, understanding the answers so that it knows when to ask a sensitive question.”* Understanding the answers (user’s intent) and determining when and how to ask questions are also key components of the conversation (Clark et al., 2019).

MR4: The CA should be trained to comprehend the user's input and the conversation context.

Conversing with a partner should feel natural, or what is more commonly known as organic conversation. P1 said, *“it's kind of organic to what's going on, as far as the flow of questions.”* A CA that maintains a natural conversation enhances users' experiences by providing a sense of authenticity (Mariciuc, 2022).

MR5: The CA should keep the conversation organic.

To wrap up the conversation with DV survivors, the CA would ensure that the survivor gets the appropriate information and services that meet their needs. This includes providing them with a safety plan, which serves as a guide to help them make the right decision and provide suggestions regarding how they may maintain their safety during their relationship (Wood et al., 2021). P9 said, *“At the end of our conversations, we always do a safety planning. Some people do have safety concerns, some people may not depend on their particular situation. But, to get a sense of what they've been doing to stay safe, and what tips or information they may need to consider a safety plan per day.”* It is also imperative that they are provided with necessary tangible assistance such as shelter, medical referrals, etc. P9 continued, saying, *“it might be that for coming into our various services, and we explain what those next steps are going to be, whether it's shelter or community-based services.”*

MR6: The CA should provide appropriate information and services at the end of a conversation.

At the conclusion of the chat session, the CA should express appreciation to the survivor for using the tool and service. The CA may also display some messages to survivors that highlight their strengths as a means of encouraging and empowering them. P2 said, *“I always wrap up my sessions by saying, thank you for coming in today. I am really sorry that it was the circumstances that brought you here today. But it takes incredible strength to walk through those doors and say, I need help.”* The CA's expression of appreciation will motivate and enhance survivors' satisfaction. (Gallagher & Updegraff, 2012).

MR7: The CA should show gratitude and empowerment to survivors.

Language Use

The language use theme describes meta requirements in which CAs interact with DV survivors through language, which involves understanding, selecting, and utilizing appropriate language to ensure effective interaction. Several aspects are involved, like the choice of phrases, the content of the questions, style, and cultural appropriateness, all intended to provide survivors with a sense of support and empowerment.

First, DV experts stressed the importance of providing survivors with trauma-informed language to address their concerns. The concept of trauma-informed practices involves recognizing the pervasive nature of trauma as well as preventing its unintentional recurrence through appropriate language use and communication (Buffalo Center for Social Research, 2021). All of the communication with the survivor should be built in a trauma-informed way. P6 explained, *“a trauma-informed is that idea of rather than saying, So I think that trauma-informed and survivor-centered should be the foundation for which all the communication is built.”* There are several trauma-informed practices to consider. For example, the word 'victim' would be replaced with the word 'client' or 'survivor'. Similarly, it may be better to ask the survivor what they want to be called, as some survivors may not be comfortable with having the abuser’s last name

in the conversation. As P2 described, *“For a necessity, I think just really using trauma-informed language, referring to them as survivors or clients instead of victims.”*

MR8: The CA should use trauma-informed language.

When conversing with the user effectively, the CA should be designed and trained to converse with the user in a simple, basic language. Many participants recommends that all written parts in the CA are at a lower grade reading level to avoid any sort of challenges in understanding the content. For example, P7 said, *“make sure that everything is at a sixth grade reading level or below to avoid any sort of challenges with individuals that might have lower education.”* Having complex metaphors, phrases, and long unclear sentences could hinder effective communication and impede the dialogue flow (Yang & Aurisicchio, 2021).

MR9: The CA should use simple and basic language.

We identified one requirement that emphasizes the CA should refrain from asking repetitive questions. P11 mentioned, *“in order for it to be trauma-informed, it would need to be trained to translate that information really savvy so that it doesn't repeat questions in a harmful way.”* By recalling traumatic events repeatedly, survivors may lose trust in the CA (Chen et al., 2022).

MR10: The CA should avoid asking repetitive questions or questions whose answers might imply repetitive details.

Besides, several participants indicated that both open-ended and close-ended questions are beneficial. They emphasized that closed questions may be helpful, especially for questions requiring rapid responses or regarding the survivor's safety. For instance, P2 mentioned, *“Probably a few closed-ended questions to begin with things like, Are you safe right now? Like, are you in immediate need?”* On the other hand, open-ended questions are also useful in this context. As P4 pointed out, *“we have to ask open-ended questions because we have to hear about their situation that may be different from somebody else's situation.”* It enable users to share their stories and convey their feelings more freely (Ahn et al., 2020).

MR11: The CA should use both closed-ended and open-ended questions.

The design of the CA should also avoid personal/invasive questions which answers may imply personal information, such as age, gender, and health information. Further, it was suggested to refrain from asking pushy questions in which respondents are forced to make a decision and conditioned to respond in a particular way. P11 said, *“you'd want to make sure that the questions are written in a really specific, empathetic way, and that there's never any, like, overly pushy questions.”* CAs should respect survivors' boundaries and avoid such questions for a safer and more user-centered environment (PLACINTA, 2021).

MR12: It should be ensured that the CA avoids personal information, and invasive and pushy questions.

A further aspect that we deduced through our analysis of the interview transcript is that the CA should avoid overpromising to solve the DV issue. The CA should avoid phrases such as “I will resolve your problem”, or “ your issue will be fixed”. P4 asserted, *“so we can't promise that we can make everything better for sure. I think that our program really tries not to make those promises that we can't keep.”* The CA must clearly describe their capabilities to avoid making unrealistic promises or making mistakes (GUIOT, 2020).

MR13: The CA should avoid overpromising to solve the DV issue.

Support Provision

This theme covers the meta requirements pertaining to the provision of various forms of support by CAs, including informational, emotional, and instrumental support. These requirements are formulated to cater to the distinct demands of survivors and facilitate improving their well-being holistically.

Informational Support: it refers to the CA's ability to deliver relevant and useful information to DV survivors. First, it is important to implement the CA as a means of educating survivors of DV and providing them with accurate information regarding the DV. A CA may, for instance, provide information about DV like connecting users to the power and control wheel framework (Pence & Paymar, 1993) to increase the user's knowledge about potential abuse. As P1 mentioned, *“I think education and safety planning. I think that linking them to that, because sometimes, what your friends are saying, or what your family is saying, can be their opinions. But that's power control wheel is what is true.”* Survivors sometimes are unaware

of what they have been through and do not realize the risks associated with such experiences. Thus, the CA might address this potential issue by providing them with education and awareness. P6 said, *“the need to provide education that maybe would have occurred, so I can imagine actually, chatbot being really strong for this, which is like, my boyfriend did this thing to me, or my girlfriend did this thing to me. my girlfriend called me names and put me down, is that abuse? What does this mean?”* CAs can be considered a promising avenue for delivering information and supporting individuals' well-being. (Ta et al., 2020).

MR14: The CA should provide education to the survivor.

In the same context, there is a consent among our participants that CA could explain the concept of safety planning and allow users to make a safe plan, or it could direct users to a credible source (e.g., the National hotline) that provides safety planning. P1 said, *“they could do some basic safety planning because just especially with technology and stuff like that, I think that's something that could basically go on to a chatbot.”* There has been a suggestion that survivors should be provided with safety strategies and concrete suggestions for a variety of situations (e.g., school, court, rural areas, internet, etc.) (Wood et al., 2021).

MR15: The CA should offer safety strategies.

Further, CAs were viewed as promising technological means to provide tips, advice, and guidance. P4 described how the CA could provide tips about legal processes, *“so maybe just being able to offer that piece of information, like here's five tips for you to be able to write your protective order, and just be able to provide some concrete information that we know to be true.”* CAs can provide tips regarding the survivor's relationship, their safety, signs of abuse, protection practices, and other related topics (Park & Lee, 2021).

MR16: The CA should offer relevant tips and advice.

Emotional Support: In developing a CA, one key factor for consideration is providing emotional support in such a way as to demonstrate empathy and genuine concern for the recipient (De Gennaro et al., 2020). Several requirements regarding the provision of emotional support were identified. First, the conversation should reflect empathy for the survivor. When they are telling their stories, survivors highly need respectful language and empathic and supportive responses. P2 stressed the importance of empathy, *“I think probably the most important one is empathy and respect for the person. I don't know what has happened in their life to lead them to be in this situation.”* Similarly, DV experts have emphasized the necessity of being in an active listening mode and demonstrating understanding. P5 mentioned, *“active listening to let them know, or to make them feel heard, and that you understand what they're talking about and needing.”* According to empirical evidence, teenagers hold the expectation that a CA with active listening capabilities could effectively address their emotional needs (Kim et al., 2018).

MR17: The CA should be an empathic, active listener, and patient when communicating with the survivor.

Communication with the survivor is primarily developed based on the idea of a survivor-centered approach (Wood et al., 2021). It is crucial to ensure that CA provides a supportive environment in which the survivors are treated respectfully, and their choices are respected. P4 mentioned, *“we also are trying to be respectful of their choices. And I think that their normalcy and choices may not be the same as ours.”* In existing recommendations, respect and empathy are qualities that should be prioritized when designing CAs, particularly when catering to individuals experiencing mental illnesses (Wahbeh et al., 2023). It is desirable that survivors have multiple options from the CA and can choose what suits them best.

MR18: The CA should respect the survivor's choice.

In the same vein, some participants suggest that the conversation with the survivor should be built around the concept of non-judgmental and open minded, as this would create a comfort zone for discussing their issues, and they are more likely to continue the conversation. For instance, P5 said, *“I think, being non-judgmental, open-minded, all that establishes a relationship with them.”* CAs should avoid victim-blaming and judgmental questions since the abuse is not initiated by survivors themselves (Park & Lee, 2021).

MR19: The CA should be nonjudgmental and open-minded.

One additional valuable recommendation that the CA should offer is to de-escalate the crisis. The CA could use techniques such as positive language, a message that is free of reflective emotion, and validating language to help calm the individual. P4 stressed, *“we have to try to de-escalate the situation and make them feel safe and calm and comfortable.”*

MR20: The CA should de-escalate the crisis.

Instrumental Support: it refers to the CA's ability to direct DV survivors to different tangible resources (i.e., financial, housing) (Cohen & Wills, 1985). There was consensus among participants that the CA could serve as an effective tool for linking users to tangible resources. As part of the CA's services, survivors would have access to referrals for medical, safety, or mental health services such as emergency shelter, family therapists, hospital, DV advocacy, etc. As P9 said, *“So I guess a chat box feature that would be able to connect people to the resources that exist within like a really good comprehensive website.”* Despite CAs not being physically present and, hence, maybe lacking the direct capacity for actual support, it has been observed that some young people have reported instances in which these CAs have facilitated referrals to healthcare providers or encouraged communication with friends in order to provide practical assistance (Bae Brandtzæg et al., 2021).

MR21: The CA should make referrals to resources.

One of the features that might be incorporated within the CA is the ability to determine the location of the user. Based on the user's location, the CA can provide them with local resources based on their needs, whether they are housing, financial, family, food, or health-related. Obtaining the user's location might be accomplished by asking the user for permission to allow GPS location or asking them for their Zip code. P6 mentioned, *“A way to enter your zip code and get your local 211 or law enforcement, your local, like first responders or medical care.”*

MR22: The CA should provide localized resources.

Trust and Rapport Building

The theme of trust building pertains to meta-requirements regarding the cultivation of trust and the formation of positive relationships between CAs and DV survivors, which necessitate the presence of essential features like confidentiality, attentiveness, and transparency on the part of CAs. A number of meta-requirements were identified. First, the feeling that the tool will provide a safe environment for survivors, and that whatever is presented in the conversation will remain confidential is one of the factors that will increase communication and enhance the ability to speak comfortably. P8 mentioned, *“we let them know that everything that they're going to talk with us is confidential”* Thus, CA designers should implement measures that guarantee the confidentiality of survivors' conversations and the protection of their privacy (Kim et al., 2018).

MR23: The CA should ensure the confidentiality and privacy of conversations and data.

As part of building a rapport with survivors, it is equally critical to demonstrate compassion via attentiveness and make sure to remain available to them at all times. Engaging in active listening involves not only listening to what is being said but also listening to what is not being said and interpreting it in light of the nonverbal message (Cormier et al., 2009). The attentiveness and listening activity involve more than just listening silently, but also receiving, understanding their concerns, and reacting. P7 described, *“building trust and those activities might center around, just active listening, making sure that you are accessible to that individual, that you are allowing them to be the subject matter experts in their lives and you're not coming in to try to dictate that.”*

MR24: The CA should ensure attentiveness and accessibility.

In addition, the CA should ensure transparency throughout the conversation. P9 stressed that *“as much transparency upfront with what this feature is and what it can do and what it cannot do. to set those expectations for people who might be utilizing it is going to be really key.”* The transparency of the CA's purpose, services provided, and referrals would increase the amount of trust and engagement with the CA (Kretzschmar et al., 2019).

MR25: The CA should ensure transparency throughout the conversation.

Design Principles of CAs

Compared to conventional approaches used for general CAs, CAs designed to support DV survivors require the development of DPs that are unique and tailored to their needs. Due to the nature of DV and its sensitive

context, CAs should be developed with DV survivors' needs, challenges, and expectations in mind. Based on the meta-requirements that we identified above, a set of design principles were outlined. First, we propose our first design principle which emphasizes the importance of the CA's introduction to the conversation by starting with a warm greeting, ensuring the conversation's confidentiality, and prioritizing safety. Among the many quality attributes that CA is built on is affect, which includes attributes like greeting and expressing personality (Radziwill & Benton, 2017). Additionally, the CA should take into consideration the survivor's safety before proceeding with the conversation. Evidently, digital interventions promote user confidentiality, privacy, and safety while simultaneously delivering tailored care on a real-time basis that can effectively enhance users' well-being (Glass et al., 2017). These practices would enhance survivors' engagement and create a safe and comfortable setting for conversations. Therefore, we derive:

DP1: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with the capability of initiating the conversation with a warm greeting, ensuring confidentiality, and prioritizing safety to enhance a survivor's engagement and establish a safe environment for conversations.*

CAs have been researched in regard to improving their NLP and conversational capabilities, so they can better answer survivors' queries, and improve user experience in terms of conversation flows (Griol et al., 2014). CAs are expected to fully comprehend the survivor's message and extract the intention that the survivor is conveying, regardless of how the message is worded, to be able to produce a response that has the potential to contribute meaningfully to the conversation (Allen et al., 2001). In the same context, it has been suggested by researchers that CAs should emulate human communication characteristics to provide a more natural, engaging user experience (Derrick et al., 2011). According to Moon (2000), a machine (i.e., CA) that implements a relation strategy of reciprocally increasing self-disclosure through textual interaction with the user is likely to disclose more personal information. Overall, by communicating effectively, a relationship can be established and the survivor's needs can be met. Hence, we propose:

DP2: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with a perceptive, flexible, and natural conversational flow geared towards a specific objective, combined with a reciprocated conversation, effective clarification, and contextual understanding to establish trust and enable meaningful communication to meet the survivor's needs.*

Wrapping up the interaction is part of the trauma-informed, survivor-centered approach that can be ended naturally after offering resources (Wood et al., 2021). The use of Artificial Intelligence (AI) has great potential in the process of empowering people (Kondylakis et al., 2013). Empowerment is a critical component of a survivor's life. By gathering relevant information and receiving emotional support from those around them, some survivors can build up their sense of power. However, in most instances, empowerment may be hindered by apprehension about social interactions. The CA has the potential to address this issue. Overall, concluding the conversation properly through empowerment and provision of support would augment the probability of sustained engagement, improve the survivor's interaction with the CA, and ensure the survivor feels supported. Hence, we propose:

DP3: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with appropriate conversation closure through the provision of the necessary information as well as empowering and showing gratitude to enhance the survivor's engagement with the CA, and cultivate a sense of support.*

It has been shown that DV survivors are receptive to technology-based interventions based on trauma-informed principles (Emezue et al., 2022). Besides, another aspect of optimizing the conversations is the use of simple language and providing all of the information requested by users in a minimal number of steps. There has been a suggestion that the CA used in crises should be as simple as possible to facilitate access to and navigation through the information provided (Maniou & Veglis, 2020). Further, incorporating both closed-ended and open-ended questions can enhance engagement by preventing the questions from becoming monotonous (i.e., close-ended questions) or time-consuming (i.e., open-ended questions). Lastly, according to our interviewees, the CA should avoid questioning survivors in a pushy or personal way. It has been demonstrated that users were dissatisfied with CAs that asked for personal information too soon following the first conversation, showing a lack of politeness in the conversation (Svikhushina et al., 2021). Thus, we derive:

DP4: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with the language abilities to convey a message that is trauma-informed and simple, incorporates both open-ended and closed-ended questions, and avoids repetitions, invasive questions, and over-promising to solve the DV to avoid any re-traumatization and enhance the survivor's autonomy.*

DP5 emphasizes the importance of providing informational support to DV survivors through the CA. Assuring the CA is provided with educational materials and content regarding the topic of DV would assist in raising awareness about this issue. There has been a growing awareness among survivors that they are seeking informational support online (Mason & Magnet, 2012). They resort to such solutions because they are always available, accessible, usable, and offer suggestions they might find useful. Thus, the CA should be equipped with educational materials and DV-related content and offer such advice and safety strategies in an interactive manner. **DP5** aligns with previous HCI research that stresses the vital role that CA plays in providing information to sexual survivors in terms of knowledge and advice (Park & Lee, 2020). Acquiring the required knowledge would lead survivors to feel less uncertain and more empowered and make informed decisions so that they could take action to protect themselves. Therefore, we suggest:

DP5: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with the capability to communicate DV-related information, including knowledge, facts, advice, and safety strategies, so that survivors are better informed and less uncertain.*

Survivors may not require immediate assistance, and they ultimately seek respect, empathy, and a supportive ear. This aligns with previous research, which demonstrates that offering emotional support (i.e., showing empathy and actively listening) contributes significantly to the recovery of survivors following a violent incident (Ullman, 2000). In the context of domestic and sexual violence, it has been demonstrated that CAs' ability to express empathy and provide active listening is perceived as supportive by survivors and reduces emotional burden (Park & Lee, 2021). Conveying emotional support would boost survivors' feelings of empowerment, comfort, and validation. Hence, we propose:

DP6: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with human traits and conversational abilities that convey emotional support, such as being a kind, empathic, and active listener, as well as respecting the decision of the survivor and being non-judgmental to enhance their emotional well-being.*

Research has shown that resource referral improves the survivor's quality of life in several ways, including reduced exposure to IPV, reduced coercion, enhanced safety planning, and better utilization of community resources (Gupta et al., 2017). Further, this stresses the importance that the CA should provide localized resources to survivors based on their geographical location. As a result of trauma, the survivor may find themselves in high need of nearby resources (i.e., shelter, hospital, local DV agency). Thus, they need a tool that facilitates their access to these resources and provides them with quick feedback. Therefore, we derive:

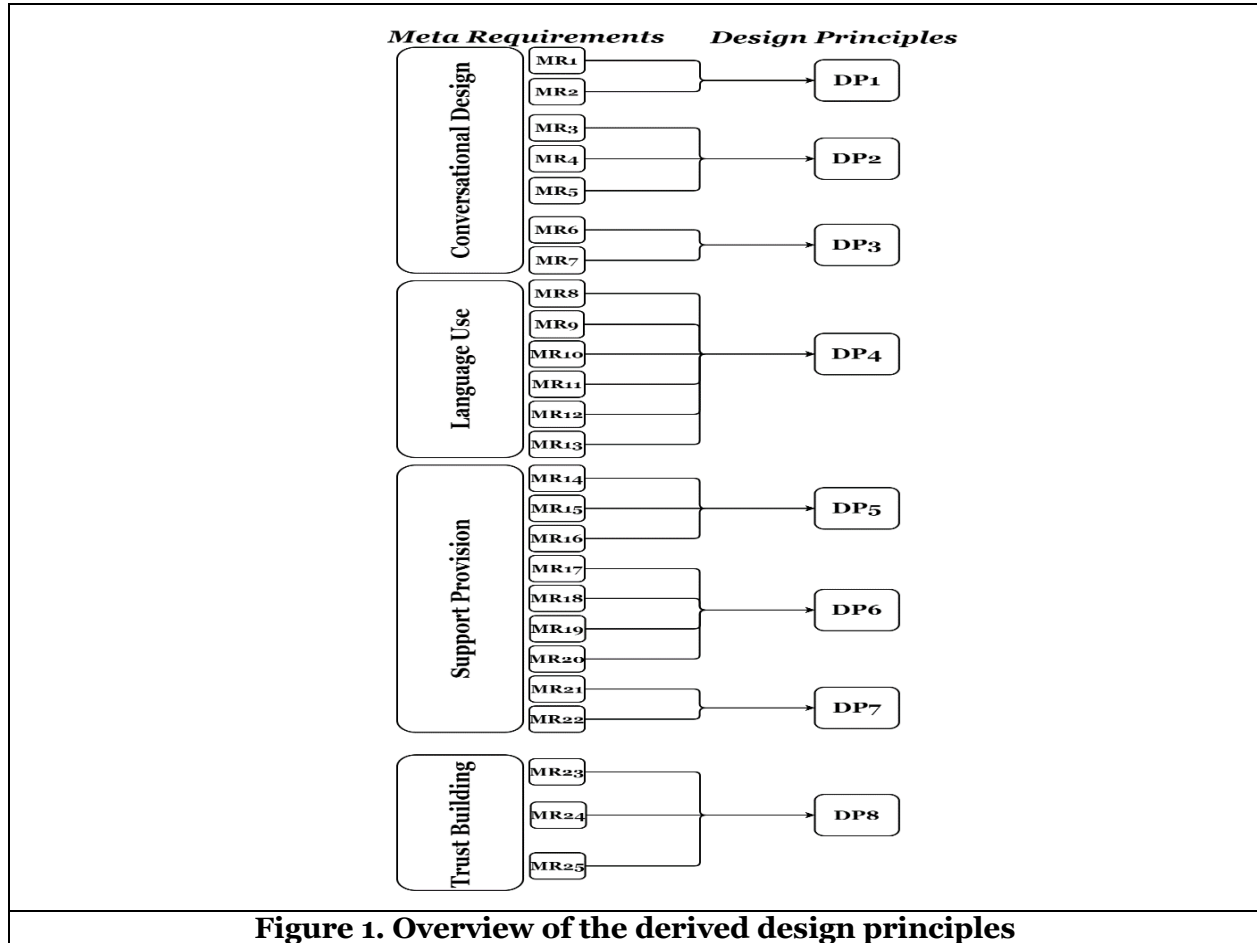
DP7: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with functionalities and technical solutions that provide instrumental support in terms of referrals to resources and providing localized resources to increase their access to tangible assistance in a timely and efficient manner.*

Prior IS studies emphasize the importance of trust, confidentiality, and transparency of the CA in building a rapport with the user (Ahmad et al., 2022). Further, a CA's characteristics, such as nonjudgment, emotional neutrality, and patience, make them better suited for handling sensitive information than humans (Lee et al., 2020). Providing privacy and transparency in a CA is of paramount importance; the absence of transparency may discourage some users from using automated CAs and undermine their confidence in them (Kretzschmar et al., 2019). Hence, we propose:

DP8: *For CA designers and researchers to design a CA that offers support to DV survivors, provide the CA with conversational capabilities and functionalities that ensure the survivor's information is private and confidential throughout the conversation, and ensure transparency about what they are offering to foster a sense of trust.*

Discussion

The primary objective of this study is to identify MRs and DPs for CAs that can provide support to DV survivors. By conducting interviews and analyzing literature, this study identifies 25 MRs and derives eight DPs based on those MRs. A summary of the MRs and DPs is presented in Figure 1. In this section, we delve into the main findings, their implications, and the study's limitations.



The derived DPs provide insight into the features and interaction design of the CA-based intervention of DV. Each of these DPs addresses a specific aspect of CA design that may contribute to greater survivors' engagement, support, and communication. For instance, DP1 emphasizes the importance of introducing the CA in a welcoming manner and establishing a safe and comfortable environment in which survivors can converse. DP2 emphasizes the need for perceptive, flexible, and natural communication to ensure an effective conversation between survivors and CAs. Furthermore, the DPs cover critical topics, including the proper closure of a conversation (DP3), the use of trauma-informed language and asking appropriate questions (DP4), educating on DV (DP5), expressing emotional support (DP6), referring to tangible resources (DP7), and communicating in a transparent and confidential manner (DP8). Mainly, the DPs place a high priority on creating a secure environment and ensuring safety. This aligns with what chat/text services offer when survivors initiate a call (Wood et al., 2021). Furthermore, the DPs highlight the significance of anthropomorphizing the CA and addressing its limitations in terms of communication and responsiveness. Incorporating these practices enhances the CA's human-like characteristics, resulting in more natural and user-friendly conversations for survivors (Diederich et al., 2020). Another significant insight from the DPs is the potential for CAs to provide multifaceted support to survivors, encompassing informational, emotional, and instrumental support. Survivors may benefit from these forms of support when alternative means of support may be lacking from friends or family members. DPs also emphasize confidentiality and transparency to enhance survivors' trust in CAs.

We posit that the implications of our study hold substantial significance for the conceptualization and implementation of CAs-based intervention of DV, thus contributing to the advancement of CA design and development in this field. Implementing the derived DPs into the development of CAs would potentially result in more engaging and supportive environments for DV survivors. Further, providing survivors with tailored interventions requires understanding their context and adjusting the tone and style of the conversation as necessary. It is possible for CAs to enhance the relevance and effectiveness of their interventions by taking into account factors like language preferences, emotional states, and individual needs. We argue that our DPs can guide the development of empathetic and responsive CAs that are capable of handling crisis situations and providing appropriate support. Although CAs are able to reproduce conversations as they typically occur in person in DV interventions, they have the capability of providing innovative interventions, such as crisis intervention or real-time detection of suicidal thoughts, that may not be possible through traditional human interaction. Since CAs can be trained and programmed with algorithms, they are able to detect changes in mood, language, and behavior that may indicate immediate assistance. By utilizing large language models (LLMs) such as GPT, it is possible to improve the design of CAs by enabling more natural and dynamic conversations that are better adapted to the users' needs. Our study may have implications beyond DV intervention, such as mental health and other sensitive topics.

This study shows limitations that present future research opportunities. First, our sample size is relatively small mainly due to the required expertise of the participants and their limited availabilities. Nevertheless, our sample size is comparable to other interview studies (Ahn et al., 2020; Park & Lee, 2020), and deemed sufficient, because the primary objective of our qualitative research was not to generalize but to elucidate the DPs and the capabilities of the CA. Second, a DSR project can go through multiple design cycles for refinement and enhancement (Kuechler & Vaishnavi 2008). In the next design cycle, we are going to build a CA prototype and evaluate and analyze its functionality and effectiveness. Third, we recruited DV domain experts in this study. Future research may consider engaging DV survivors directly by adopting survivor-centered, trauma-informed approaches (Jumarali et al., 2021).

CAs have the potential to play a role in DV intervention. This study identified a number of key meta requirements and proposed several design principles for CA-based intervention for DV survivors. Our research findings suggest that supporting DV survivors with CA requires unique design principles compared with the general CA design. The meta-requirements and design principles form the theoretical and practical base for CA researchers and developers to facilitate building support for DV survivors.

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