Designing and Evaluating a Chatbot for Survivors of Image-Based Sexual Abuse

Wookjae Maeng
Seoul National University
Republic of Korea
ideaplayer@snu.ac.kr

Joonhwan Lee*
Seoul National University
Republic of Korea
joonhwan@snu.ac.kr

ABSTRACT

Image-based sexual abuse (IBSA) is a severe social problem that causes survivors tremendous pain. IBSA survivors may encounter a lack of information and victim blame when seeking online and offline assistance. While institutions support survivors, they cannot be available 24 hours a day. Because the immediate reaction to IBSA is crucial to remove intimate images and prevent further distribution, survivors need first responders who are always accessible and do not blame them. Chatbots are constantly available, do not judge the conversation partner, and may deliver structured information and words of comfort. Therefore, we developed a chatbot to provide information and emotional support to IBSA survivors in dealing with their abuse. We analyzed nine chatbots for sexual violence survivors to identify common design elements. In addition, we sought advice from five professional counselors about the challenges survivors have while responding to their harm. We conducted a user study with 25 participants to determine the chatbot's effectiveness in providing information and emotional support compared to internet search. The chatbot was better than the internet search regarding information organization, accessibility, and conciseness. Furthermore, the chatbot excels in providing emotional support to survivors. We discuss the survivor-centered information structure and design consideration of emotionally supportive conversation.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; *User studies*; Ubiquitous and mobile computing systems and tools.

KEYWORDS

image-based sexual abuse, revenge porn, chatbot, information support, emotional support

ACM Reference Format:
Wookjae Maeng and Joonhwan Lee. 2022. Designing and Evaluating a Chatbot for Survivors of Image-Based Sexual Abuse. In *CHI '22: ACM CHI Conference on Human Factors in Computing Systems, April 30–May 5, 2022, New Orleans, LA.* ACM, New York, NY, USA, 21 pages. https://doi.org/10.1145/3491102.3517629

*Corresponding author

CHI '22, April 30–May 5, 2022, New Orleans, LA

ACM ISBN 978-1-4503-9157-3/22/04…$15.00
https://doi.org/10.1145/3491102.3517629

1 INTRODUCTION

Image-based sexual abuse (IBSA), well known as revenge porn, is defined as the "non-consensual creation and distribution of private sexual images" [52, 53]. IBSA often occurs in romantic relationships where partners send or receive private sexual images [67]. Following the end of a relationship, ex-partners may exploit intimate images to shame victims and damage their reputations by posting them on social media, sharing them with friends, and uploading them to pornographic websites [24]. That is why this kind of sexual violence is referred to as revenge porn. However, the term "revenge porn" is inappropriate in describing the complex situations of IBSA since some offenders sexually harass victims for the sake of having fun and earning money rather than seeking revenge on their former partners [52]. Furthermore, IBSA may manifest in dating and domestic violence, in which intimate partners use sexual images of their victims to exert control, harass, and blackmail their victims [35]. Third parties may get involved in IBSA by obtaining explicit sexual images from lost or hacked smartphones, as well as those left for repair [39]. As a result, it is proper to refer to this sexual violence as image-based sexual abuse to describe the variety and nature of the harm adequately [52].

IBSA is a severe social problem causing tremendous pain to victims. According to a national survey conducted in Australia, one out of five Australians aged 16 to 49 years has experienced IBSA [69]. In South Korea, the Advocacy Center for Online Sexual Abuse Victims assisted almost 170,000 IBSA victims in 2020, a 68.4 percent increase over the previous year [78]. Due to the possibility that many survivors would not disclose their cases to the centers, the actual number of cases is expected to exceed the reported cases [63]. Numerous countries, including Australia and South Korea, have enacted laws to protect citizens from those who share intimate images online without their consent [45, 89]. In addition to distribution, Australia's legislation criminalizes anybody who sends or threatens to send images of minors [90]. South Korea imposes criminal penalties up to three years on anyone who merely views non-consensually created or shared intimate images [45]. Despite the introduction of relevant legislation, many survivors continue to remain silent about IBSA, either because they blame themselves for sending their intimate images to perpetrators or they lack the information necessary to seek legal resources [18]. Many IBSA survivors avoid online and offline social activities, resulting in various psychological, social, and physical problems [18]. Depression and anxiety disorders are common symptoms of psychological distress in IBSA survivors [18]. In addition to psychological problems, survivors may lose their jobs due to professional and reputational damage caused by IBSA, resulting in economic problems [32]. Some survivors have to move because they may face a physical threat

due to 'doxing,' the act of posting personal information about them online [32].

Due to a lack of information and emotional support, survivors may have difficulties responding to IBSA and seeking assistance from their resources [20]. According to Eaton's study, 73% of survivors did not seek assistance after abuse, and they mentioned embarrassment and fear as primary reasons for not seeking aid [73]. While 20% of them sought assistance from friends and family, emotionally vulnerable survivors feared being blamed [73]. Emotional support (e.g., telling survivors that it is not their fault) is necessary to assist survivors in seeking help and managing psychological difficulties such as anxiety, depression, and self-blaming [62]. Only 7% of survivors requested that the administrators of websites where their intimate images were posted delete them [73]. Because the early reaction to IBSA is essential for removing intimate images and preventing further distribution, survivors are advised to contact websites or social media platforms to remove the images [18]. Where and how to report IBSA on these platforms are critical information for survivors who may be unaware of the systems' existence or how to use them [27]. Survivors may have difficulties employing reporting systems in those platforms due to low digital literacy [44] and the systems' poor usability [27]. Therefore, information and emotional support is crucial in supporting survivors in finding available resources and coping with their incidents from the outset [81].

Unsupported and isolated IBSA survivors who have not disclosed their incidents to others seek assistance online [34]. Typically, survivors look for information on removing their distributed images and communicating with the person who has them [43]. Additionally, survivors seek advice from other IBSA survivors and their stories to become better informed about the details of their coping methods [68]. On social media, survivors of sexual violence may find links to scholarly journal papers and statistical data [19]. However, such resources may be insufficient to address the harm at hand. Along with internet resources, trained counselors at helplines and organizations provide IBSA survivors with information and emotional support [77]. However, counselors are not always available 24 hours, and the pool of counselors educated in technology-facilitated sexual abuse is limited [47]. Even when helplines are available, young women, who are the most common target of IBSA, have psychological barriers, referred to as phone-call phobia, that prevent them from calling helplines [38]. These young survivors prefer texting to talking because it gives them more control over their conversations, and they feel at ease in silence [25]. In addition, IBSA survivors may fear being judged by counselors after sharing their experiences [64].

Because survivors can converse with chatbots in text and are unafraid of being judged by their conversational partners, chatbots can be less burdensome first responders, listening to survivors' stories and providing relevant information to them immediately at any time [49]. According to previous studies, people felt more at ease discussing sensitive topics with chatbots since they, unlike humans, could not judge them [66]. Additionally, individuals are inclined to answer sensitive questions, provided their privacy and anonymity are protected [42]. Survivors may disclose to the chatbot details about their experiences that they would not share with anyone else [64]. Along with providing information, chatbots may assist survivors emotionally in coping with their challenges [81]. The emotional support provided by chatbots was proven to help lower people's stress and anxiety [31].

Therefore, we developed a chatbot to provide survivors with critical information and emotional support to deal with IBSA. First, we analyzed nine chatbots related to sexual violence and categorized their functions into design elements to build a design rationale for the chatbot for IBSA survivors. Along with the design rationale, we sought guidance on better supporting survivors from professional counselors who have assisted them. Then, based on the design rationale and guidance, we created seven modules that constitute a chatbot for IBSA survivors: 1) resources, 2) coping strategies, 3) complaint letter writing, 4) IBSA knowledge, 5) legal procedure, 6) survivors' stories, and 7) rights. We built these seven modules using a rule-based approach to provide survivors with organized information. Additionally, we implemented retrieval-based modules powered by AI to offer information and emotional support for survivors depending on their intentions. Finally, we developed a hybrid chatbot that combines rule-based and retrieval-based modules to provide survivors with structured information and tailored emotional support.

We conducted a user study with 25 participants to determine the hybrid chatbot's effectiveness compared to internet search, the most common method for seeking information and emotional support. Participants in the user study performed ten tasks that sought information and emotional support through a chatbot or an internet search after reading a hypothetical scenario of an IBSA survivor. Then, participants completed a post-survey assessing each study condition's information and emotional support. Finally, we conducted follow-up interviews to identify the benefits and drawbacks of chatbots and internet search.

As a result of the user study, we found that the hybrid chatbot outperforms internet search regarding information support. Most participants highly evaluated the chatbot for its information organization, accessibility, and concise representation. In contrast, several participants indicated that the hybrid chatbot did not exceed internet search regarding information reliability and objectivity. Unlike information assistance, the hybrid chatbot excels internet search in all aspects of emotional support. Numerous participants said that they felt consolation from the emotionally supportive messages sent by the hybrid chatbot. On the other hand, almost all participants said they received little emotional assistance throughout their internet search. Worse still, some search results, such as news reports about offenders receiving no or minor punishment, may leave survivors emotionally vulnerable.

Based on the user study findings, we discuss three design implications for chatbots that provide information and emotional support to IBSA survivors. First, we suggest a survivor-centered information structure to assist IBSA survivors in obtaining information. More precisely, aligning the information-centric menu of chatbots with the sequence of IBSA coping strategies. Second, we highlight the benefits of hybrid implementations, which combine rule-based and retrieval-based modules to allow users to quickly get organized information and emotional support at any point throughout the conversation. Lastly, we propose design considerations for the initiation of emotionally supportive conversation. To demonstrate its ability to provide emotional support, we recommend that a chatbot

start a conversation with small talk rather than an information menu. In addition, we advised chatbot makers to manage survivors' expectations of consolation before starting emotionally supportive interactions.

This paper makes three contributions to the HCI community: 1) we created a design rationale for chatbots for sexual violence survivors by combining expert advice and existing chatbot design elements. 2) we detailed the chatbot's development process to inspire researchers and practitioners to create systems that support sexual violence survivors. 3) we demonstrated how a chatbot could address the challenge of providing information and emotional support to people in ways that are both accessible and effective in the context of their lives.

2 RELATED WORK

We reviewed the literature on IBSA and the challenges sexual violence survivors have in obtaining information and emotional support online and offline. Additionally, we examined technological solutions for addressing sexual abuse, including chatbots.

2.1 IBSA

Young women aged 18 to 29 years are the major victims of IBSA [29]. Because sexting, the practice of sending and receiving sexually explicit images or texts, is prevalent among young adults [68]. The images of sexting can be shared without partners' consent or used to threaten them [50].

In addition to sexting, perpetrators may intimidate to disseminate illicitly filmed videos by hidden cameras [35]. Illicit filming frequently happens in intimate partner violence, including domestic and dating violence, and violent partners may use the filmed videos to threaten and control the survivors [47]. Furthermore, many intimate abusers have been found to upload intimate images on revenge porn websites or social media [35]. Apart from public online space, perpetrators have been reported to transmit the images to groups associated with survivors such as friends, family, and colleagues [47]. When offenders intimidate to distribute intimate images, many survivors feel compelled to obey their requests to avoid the irreversible situation [47]. Moreover, survivors were frustrated that they could not disclose their incidents to people around them to seek help in responding to the threats [47]. Therefore, to assist isolated IBSA survivors in the context of their lives, accessible and effective support, such as information and emotional assistance, is needed.

2.2 Information support for IBSA survivors

Sexual violence survivors require "accurate, current, appropriate, and contextually-useful" information to respond properly to their incidents, such as pursuing legal action and getting medical treatment [87]. Friends and family are among the most reliable sources of information support because they understand the survivors' context better than others. However, many survivors avoid seeking information assistance from friends and family members because of social stigma, which may lead close people in their lives to respond negatively against them [64, 82]. Isolated and unsupported IBSA survivors turn to the internet for crucial information on reacting to their harm, such as removing their images from websites and communicating with the owners of their images [18, 34]. Young females, the most common target of technology-facilitated sexual violence (e.g., IBSA), are accustomed to using search engines to gather crucial information [72].

HCI researchers examined online communities and social media platforms to understand how sexual violence survivors share their experiences and seek help from other survivors. Anonymity was critical in survivors seeking and offering assistance through community websites [17]. If their privacy is not entirely protected on social media, survivors of sexual violence may share links to broad information, such as scholarly journal papers and statistical facts, to avoid disclosing their identity [19]. However, such resources may be insufficient to address the harm at hand. In addition, survivors may not get information quickly through social media because it is not designed for real-time communication [19].

IBSA survivors saw a lack of information necessary to address urgent problems in their situation [75]. Although almost all survivors want service providers to remove their images from platforms, only a tiny number of survivors report to websites and social media [75]. Perhaps many survivors are unaware of reporting systems or how to use them to request their images be removed from social media [27]. Although most social media platforms and websites have reporting systems, only 16% specify IBSA in their system's menu, and those systems need up to six steps to report IBSA [27]. Therefore, IBSA survivors need to learn to use reporting systems to delete the images. Evidence may be required to pursue legal action against IBSA [24]. However, many survivors cannot report their cases due to a lack of evidence or evidence that is unacceptable [22]. Therefore, IBSA survivors need to learn how to gather credible proof, such as links, screenshots, and identification of perpetrators. Consequently, this paper investigates how to support IBSA survivors in coping with their incidents while maintaining their anonymity and providing critical information in real-time.

2.3 Emotional support for IBSA survivors

Sexual violence cause survivors significant psychological distress [18]. Anxiety, depression, PTSD, and suicidal ideation are significant indicators of psychological sufferings [18]. In particular, IBSA survivors may experience severe psychological anguish as much as sexual assaults survivors [24]. Some survivors even self-harmed to alleviate negative feelings or thoughts [75].

According to Short's work, fewer than 10% of survivors seek assistance from formal resources such as the police and helpline [75]. Most survivors said that their experiences resulted in severe humiliation or feelings of shame, which prevented them from seeking help or reporting the incident to the police [75]. Moreover, many survivors abandoned legal actions because of frustration with the lack of support they anticipated [75]. Emotionally vulnerable survivors relied on informal resources such as family and friends and communicated with them for assistance [29]. However, family and friends may blame survivors for the incident, leading to re-victimization and self-blame [54]. Negative social reactions have been shown to aggravate survivors' PTSD and lead to self-blame [83]. Victim-blaming is reported to reduce crime reporting and discourage victims from seeking assistance [54]. Although it has been found that disclosing survivors' incidents increases the likelihood

of survivors receiving better support, the first social reaction to the disclosure is critical in motivating survivors to seek assistance and manage their emotional pain. In other words, the first response to survivors should be encouraging, not accusatory [83].

Emotional support is one of the positive social reactions to provide survivors with encouragement, reassurance, and compassion [81]. Ulman defined emotional support as the following nine behavior [81]: 1) preventing victims from self-blame, 2) reassuring victims that they are not at fault, 3) understanding the incident, 4) reframing the experience, 5) not judging victims, 6) accepting victims' stance, 7) caring about victims' emotion, 8) feeling sorry for victims, and 9) empathizing with victims' feeling. Emotional support has been associated with improved adjustment after sexual violence. Additionally, Emotional support is found to alleviate PTSD symptoms and increase the survivors' perceived control over their recovery [84]. Furthermore, survivors who get emotional support have a more impressive capacity for active response to their traumas [83]. Coping via emotional support may also be seen as a sign of "resilience," indicating the survivor's ability to accumulate resources that mitigate the trauma's effect [41]. Therefore, this paper examines ways to provide emotional support to emotionally vulnerable survivors to aid in their recovery from harm. This paper also investigates how to ensure survivors get positive social reactions when they first disclose their experiences.

2.4 Chatbots for IBSA survivors

There are technological solutions for automatically detecting and removing intimate images. For example, Facebook employs photo-matching technology to prevent the further distribution of reported images on its platforms [23]. A study tested a prototype based on photo forensics for automatically retrieving survivors' images [56]. However, these solutions assume that survivors have already submitted their intimate images to the system. Survivors unaware of reporting systems and how to use them may have difficulty obtaining assistance from these systems [27]. As a result, we focus on providing coping methods to IBSA survivors unfamiliar with technologies and need to take the first step toward addressing their harm.

Apart from providing information, chatbots are better at offering emotional support to survivors than other available options such as websites and mobile applications. According to Computers Are Social Actors, humans engage socially with computers, even though they are not human [57]. Due to the critical role of emotion in social interaction, users may have an emotional conversation with a chatbot [61]. In addition, people preferred social chatbots, such as those that communicate sympathy and empathy, over impersonal chatbots [48]. Although it can only engage in scripted conversations, a chatbot that delivers cognitive behavior therapy (CBT) effectively alleviates the depressive symptoms [31]. In addition, the same chatbot has shown the capabilities of forming emotional bonds with users on a level with CBT treatment with humans [26]. Therefore, we anticipate that a chatbot can provide emotional support to IBSA survivors.

After demonstrating the empirical evidence for chatbots in health care, HCI researchers examined how people interact with chatbots while dealing with sensitive information [49]. People prefer chatbots over humans when disclosing sensitive information such as credit card numbers and sexually transmitted diseases [48, 66]. People assume machines are better at securely managing their personal information because they are machines, a belief known as 'machine heuristics' [76]. In this context, HCI researchers and practitioners introduce chatbots as a supporting tool for sexual violence survivors [64]. In line with previous studies, we expect survivors to obtain accurate, updated, relevant, and contextually valuable information from chatbots. In addition, survivors may get emotional support from the chatbot by disclosing their experience because the chatbot does not judge them and securely keeps their conversation. Therefore, this study designed a chatbot to provide survivors with emotional support while also delivering much-needed information on responding to IBSA.

We developed research questions to assess the chatbot's usefulness in providing information and emotional support to IBSA survivors. We chose online search as a baseline for comparing the efficacy because it is the most common method for IBSA survivors to seek resources [72]. The research questions are as follows.

- RQ1: Is a chatbot more effective in supporting IBSA survivors than an online search engine?
  - H1: A chatbot will get a higher rating than online search when it comes to providing information support to IBSA survivors
  - H2: A chatbot will get a higher rating than online search when it comes to providing emotional support to IBSA survivors
- RQ2: What are the advantages and disadvantages of using a chatbot and online search?

3 DESIGN ELEMENTS OF CHATBOTS FOR SEXUAL VIOLENCE SURVIVORS

We employed similar search strategies used in previous systematic reviews published at CHI to find reference chatbots [74]. We conducted keyword searches of the ACM Guide to Computing Literature and Google Scholar using boolean operators. Our boolean keywords were ("sexual" OR "domestic" OR "dating" OR "gender") AND ("violence" OR "abuse" OR "assault" OR "harassment") AND ("victims" OR "survivors") AND "chatbots." Then, we compiled a list of chatbots that were mentioned in those publications.

We narrowed down the list of reference chatbots that meet the following criteria. First, we selected chatbots explicitly designed for survivors of sexual violence, not for general workers. That is why we excluded chatbots, such as Spot [65], Law [71], which are designed to prevent workplace harassment, off our list. Second, to identify the chatbots' features, we selected chatbots that provide a detailed description of their design or implementation. Our final list of reference chatbots are as follows: rAinbow (Bo) [11], Sunny [59], SIS BOT [9], Sophia [12], Jael.ai [7], Maru [8], Hello Cass [4], You are not alone [16], and Caretas [3].

We summarized each chatbot's purpose and various features for target users as below.

- Bo [11] is a chatbot for survivors of domestic violence, created by AI for Good. The mission of AI for Good is to use

ethical technology and AI to address global issues [1]. Bo launched in January 2018 for women experiencing domestic abuse in South Africa through Facebook Messenger [88]. Bo provides various resources, including victim stories, information on recognizing physical/sexual/financial abuse indicators, survivors' legal rights, and methods for leaving a relationship. Bo also offers tests on risk assessment, relationship abuse, and consent to help survivors of domestic violence better understand their situation. According to its homepage, Bo has exchanged over 860,000 messages with around 18,000 unique users [11].

- Sunny [59] is a chatbot embedded in a mobile application for disabled women who have experienced sexual violence, created by 1800RESPECT. 1800RESPECT is the National Sexual Assault Domestic Family Violence Counselling Service for Australia [58]. Sunny was developed in collaboration with women with disabilities to ensure better assistance for its users [59]. Sunny provides information on sexual violence, survivors' legal rights, and various survivor stories. Users can tell the chatbot their stories and contact 1800RESPECT for help [60]. Like its name, Sunny can disguise itself as a weather application to avoid being monitored. Sunny meets the WCAG 2.0 accessibility standards with an AA+ rating and has been verified to the Digital Service Standards of the Digital Transformation Agency. Sunny launched in November 2018 can be downloaded from the App Store or Google Play Store [14].
- SIS BOT [9] is a chatbot for women facing various forms of violence, especially sexual violence. It was created by Lieutenant Colonel Mekhiyanont, a police officer in Thailand for over 12 years, who has dealt with numerous allegations of sexual violence [85]. SIS BOT provides a "holistic approach to help victims from the beginning to the end of the justice process [85]." For example, domestic abuse survivors may contact Sis Bot for assistance in filing a police complaint, preserving evidence, locating support services, and obtaining legally required compensation [70]. In addition to survivors, this chatbot may be used to assist witnesses. SIS BOT can recognize the type of violence and guide users to appropriate coping methods in response to their incidents using artificial intelligence [85]. Quizzes inside the chatbot assess users' understanding of violence. Mekhinyanont intends to use Sis Bot as a training tool and a step-by-step guide for trainees counseling survivors of gender-based violence. SIS BOT launched around June 2019 and is accessible through Facebook Messenger [91]. SIS BOT converses with users in Thai.
- Sophia [12] is a chatbot for domestic violence survivors, developed by Kona Connect. Kona Connect is a Swiss nonprofit organization dedicated to human rights and technology [12]. Sophia assists users in gathering and storing potential evidence, locating nearby available resources, and obtaining information regarding relationships [13]. In addition, Sophia allows users to remove conversations easily and leaves no digital trace, preventing intimate violent partners from finding the conversation. Sophia launched in December 2021 and is accessible through Telegram or on any web browser. The chatbot is currently available in 222 countries in English, French, German, and Italian, with more language support and localized information on the way [13].
- Jael.ai [7] is a chatbot for survivors of domestic violence, developed by Axiom88. Axiom88 is a digital agency based in the United States that creates websites and mobile applications [2]. Jael.ai asks the appropriate questions at the appropriate time because domestic abuse situations may be complicated to handle. For example, Jael.ai guides survivors to the nearest shelter after asking for their location. In addition, Jael.ai automatically notifies a counselor in the nearest shelter to help survivors leave safely [21]. Axiom88 is building a nationwide database of resources to ensure survivors get the most relevant help. Soon after, Jael.ai will be integrated into instant messaging applications like Facebook Messenger and WhatsApp [7].
- Maru [8] is a chatbot for young females who experience online harassment. Maru was co-designed by Plan International [10] and Feminist Internet [5] using the feminist design principle [51]. Plan International is a development and humanitarian organization dedicated to advancing children's rights and gender equality for girls [10]. Feminist Internet is an organization whose mission is to improve equitable access to the Internet for women and other marginalized groups via creative, critical practice [5]. Feminist design principles are as follows: 1) Co-design Maru with young activists, 2) Consider barriers people may face in accessing Maru, 3) Ensure Maru's language is empathetic and inclusive, 4) Ensure Maru's appearance does not reinforce stereotypes, 5) Reflect on biases that might exist in the team, and 6)Ensure Maru represents global perspectives [51]. Maru provides various information, including resources, the role of witnesses in assisting survivors, how to report incidents to platforms, how to cope with incidents, how to collect evidence, how to care for oneself, and how to protect social media accounts. Maru also offers survivors solidarity, emotional support, and survivor stories. Maru launched November 2020 and is accessible with any web browser [8].
- Hello Cass [4] is a chatbot for survivors of sexual violence, developed by Good Hood. Good Hood [6] is an Australian startup that advises on and organizes technological solutions for social impact. Hello Cass has user modes for survivors, witnesses, and even perpetrators. Survivors rate their situation on a 10-point scale and get advice from the chatbot based on their rating. In addition, Hello Cass provides information on resources, counseling centers, safe leaving plans, police/intervention orders & court, and domestic violence. Furthermore, Hello Cass educates bystanders on supporting survivors of domestic violence. Unlike other chatbots, Hello Cass assists offenders in restraining their aggressive behavior toward their families by directing them to local counseling facilities. Hello Cass officially debuted in May 2018. Survivors can converse with Hell Cass on Short Message Service (SMS) and homepages. Hello Cass has sent over 7000 messages in 2019 [30].
- 'You are not alone' [16] is a chatbot for domestic violence survivors, created in collaboration with Swansea Council's

Digital Services team, Social Services team, and Microsoft [79]. This chatbot offers information about domestic abuse, coping strategies, counseling facilities, and pertinent legislation. This chatbot asks the user a series of questions to help them in obtaining the most appropriate support. Users' conversation with the chatbot is confidential, and users maintain their anonymity. Hello Cass debuted in June 2020. This chatbot is accessible through the internet and is compatible with any browser.

- Caretas [3]. is a chatbot created in collaboration with Talk2U and the United Nations Children's Fund (UNICEF) in Brazil for teenagers who have experienced or are at risk of online harassment such as IBSA. Talk2U [15] is an English company that develops chatbots for social good. Caretas has a fictional character who recounts her experience with IBSA. The summary of the fictional character is as follows: "Fabi Grossi, a 21-year-old girl, is desperate. Her ex-boyfriend shared an intimate video of them on a Whatsapp group, and it is quickly getting out of control. She does not know what to do about it, so she starts a conversation with you, letting you know everything she is going through seeking help. What would you do in her situation? Can you help her out? [3]." Fabi Grossi is inspired by Brazilian girls who have faced revenge porn in recent years. Talk2U and screenwriters from Brazil and Argentina wrote the scripts, and UNICEF and experts in adolescent prevention policies approved them. The dialogue is narrated in the first person. Beyond text messages, Talk2U included narrative elements from teenagers' daily life, like selfie photos, voice messages, and a screenshot of chatting. Instead of selecting responses through a button, users may type any text into this chatbot. Caretas launched in May 2017 and is accessible on Facebook Messenger. Users may converse with Caretas in Portuguese. Caretas has conversations with 1,664,876 unique users, according to its homepage [3].

We identified the functions of nine chatbots and classified them into eleven categories based on their similarity, as shown in Table 1. Five chatbots provide information regarding resources, criminal procedures, and gender violence. Four chatbots offer coping strategies and victim stories, while three explain survivors' rights. One chatbot provides emotional support, listens to survivors' experiences, initiates an emergency call, and instructs the user to care for themselves. Seven chatbots converse through button selections, while two chatbots converse via typing. We created the chatbot for IBSA survivors to perform all ten functions and implemented a hybrid approach that allows button-based and text-based responses.

In addition to the design rationale, we sought advice from five professional counselors who have supported IBSA survivors. The counselors said that one of the most challenging tasks for IBSA survivors is writing a complaint letter to the police. Given the significance of a complaint letter as evidence, survivors should describe their experience based on specific facts to ensure its validity. For example, some survivors may write the date of their incidents as yesterday or last month rather than using the yyyy/mm/dd format. In addition, many survivors struggle to begin writing about their experiences because there are no precedents. Although many survivors visit police stations for assistance in writing a complaint letter, they may have difficulty recalling their experience while under pressure in an unfamiliar environment. Therefore, the counselors advised us that the chatbot should lead survivors to draft a complaint letter in comfortable settings.

4 DESIGN AND IMPLEMENTATION

4.1 Design

We designed a chatbot for IBSA survivors based on the design rationale and advice from experienced counselors. This chatbot consists of seven modules: 1) resources, 2) coping methods, 3) writing a complaint letter, 4) facts about IBSA, 5) legal proceedings, 6) survivor stories, and 7) survivors' rights.

4.1.1 Resources. We compiled a list of IBSA support centers to design the resources module. We selected four representative support centers that provide specialized services such as images removal, emergency aid, counseling, and legal assistance: images removal (Advocacy Center for Online Sexual Abuse Victims), emergency aid (Korea Womes' Hot Line), counseling (Smile Center), and legal assistance (Korea Legal Aid Corporation). These facilities are necessary to assist survivors in addressing their incidents from beginning to end. Instead of providing all available support services, we intended to offer only four representative support centers to reduce survivors' information overload. We shortened the names of support centers to fit inside the chatbot's user interface (UI) for the list. In addition, we added keywords denoting the primary services offered by centers below the support center's name. For example, the Advocacy Center for Online Abuse provides services such as removing intimate images from online platforms and monitoring re-uploading via a technological solution and manual inspection by center activists. Furthermore, we included links to each support center's homepages to allow survivors to visit them directly (Figure 1) [1].

Survivors may access a list of available support centers by selecting the support centers option from the chatbot's information menu or typing 'support centers' into the chatbot. Survivors can quickly determine the kind of support center and its services. If a survivor wants to know more about image removal services, he or she may click on the item and visit the website.

4.1.2 Coping methods. We designed a coping method module that includes removing intimate images, determining if images have been distributed, and dealing with threats to share images. The chatbot begins by advising survivors to look after themselves by monitoring their status and alerting authorities when they are in danger. Next, the chatbot instructs survivors to delete any social media profiles that include their personal information and seek police protection. Then, the chatbot presents seven police personal protection measures and one court personal protection measure as follows: 1) warning perpetrators, 2) protecting the house, 3) connecting to protection facilities, 4) personal security, 5) personalized patrols, 6) establishing an emergency reporting system, and 7) changing and protecting personal information, and 8)prohibiting

[1] Small images are included in the article to keep the number of pages to a minimum. To view the image in more detail, either zoom in using the file viewer or check the supplements linked to the publication.

Table 1: Function list of nine chatbots

	Bo	Sunny	SIS Bot	Maru	Hello Cass	You are not alone	Caretas	Sophia	Jael.ai	Hybrid
Resources		O	O	O				O	O	O
criminal procedure			O	O	O	O		O		O
facts about violence	O	O		O	O	O				O
coping methods	O		O	O				O		O
survivor stories	O	O		O			O			O
survivors' rights	O	O						O		O
emotional support				O						O
disclosure of the incidents		O								O
emergency call		O								O
self-care				O						O
modality	buttons	buttons	buttons	buttons	buttons	buttons	texts	buttons	texts	hybrid

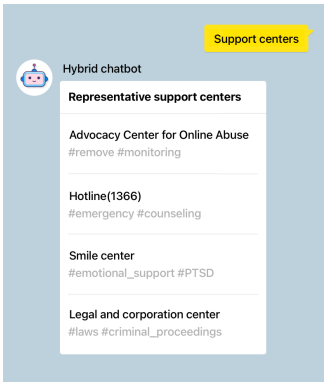

Figure 1: Resources module

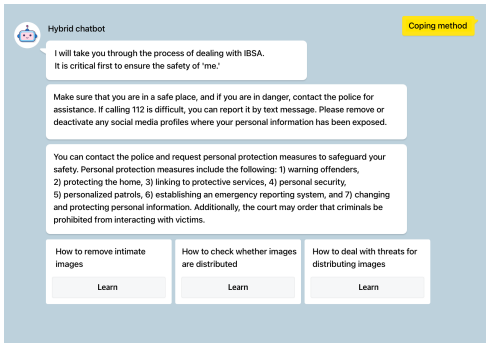

Figure 2: Coping methods module

perpetrators from meeting victims. Finally, the chatbot provides survivors with three options for more information on the following topics: how to remove intimate images, how to monitor the distribution of intimate images, and how to respond to offenders' threats to share intimate images.

Survivors may receive coping methods instruction by either selecting the coping method option from the chatbot's information menu or entering the 'coping method' into the chatbot. Survivors should remember that the priority is to take care of themselves after reading the chatbots' message. Then, they follow the chatbot's directions. They begin by assessing the safety of their surroundings and reminding themselves that calling emergency services comes first in a risky situation. After that, they delete their social media accounts to avoid the leakage of personal information. Then, they request specific measures from police officers to protect themselves after learning nine options. Finally, survivors may select one of three options for more information on coping strategies: removing the shared intimate images, monitoring if their images have been shared, and reacting to offenders who threaten them to distribute the images (Figure 2).

4.1.3 How to remove images. We designed a submodule where the chatbot informs survivors on removing shared intimate images. This submodule contains information on 1) how to react when the survivor has already removed evidence, 2) the advantages of contacting the police or support centers, 3) detailed descriptions of image removal services, 4) how to deal with situations with limited evidence, and 5) a brief overview of global online platforms' image removal services.

The chatbot should reassure survivors who have already removed original images received from perpetrators. Many survivors may remove intimate images upon receiving them because it is painful to confront the images. Fortunately, digital forensics can recover the original images used in criminal cases. Survivors are warned not to attempt to recover their images on their own because unofficially restored evidence may lose its validity. That is why police officers guide survivors to hand over their devices containing evidence to the police in their original condition. Therefore, the chatbot first should reassure survivors who have removed images while acknowledging that their action is not at fault. The chatbot then informs the user that digital forensics may recover removed images. The chatbot also advises survivors not to restore their images on their own or via unauthorized institutions. Finally, the chatbot urges survivors to submit their smartphone containing images to the police in its current state.

The chatbot should encourage survivors to report their incidents to police or support centers as soon as possible. Because police or support centers may be involved in the initial action, like collecting evidence, they can rapidly remove the distributed images. In

addition to image removal, those agencies and their affiliated institutions may also provide survivors with psychological counseling or legal advice. Some survivors assume that image removal services are not accessible because they choose not to report their offenders to the police. However, support centers provide image removal services even if survivors do not file a complaint. Therefore, the chatbot urges survivors to contact authorities and support facilities immediately. The chatbot also informs survivors that reporting the incidents immediately enables authorities and support facilities to gather evidence and provide image removal services faster than usual. Furthermore, the chatbot educates survivors about the kind of services available to ensure they receive psychological and legal assistance. Finally, the chatbot emphasizes that image removal services are available from support centers without the need to file a police complaint.

The chatbot provides a detailed description of image removal services to assist survivors in comprehending the process. IBSA support centers follow three steps while providing removal services: 1) requesting that platforms remove distributed images, 2) confirming the removal of shared images and providing survivors with a report detailing the image removal process, and 3) monitoring re-upload of the images to minimize the harm and prevent further distribution. In addition, the centers provide survivors with a report on the progress of their monitoring regularly.

The chatbot should encourage survivors to collect the necessary information to assist support facilities in identifying the offender who created or shared the images. Because support centers may have difficulty obtaining precise identifying information, survivors should provide them with at least incomplete information such as the estimated transmission time and a part of the uploader's ID. The chatbot also explicitly advises survivors to seek removal services from support centers to prevent discouraging those with limited evidence. Finally, the chatbot directs survivors to the gathering evidence section, which provides further information to survivors interested in collecting evidence.

Online platforms have their processes for reporting and removing shared intimate images. Global social media, in particular, may have different policies for IBSA depending on the country. Therefore the chatbot leads survivors to support center websites, where they may learn how to report IBSA on various global social media platforms.

This paragraph describes how IBSA survivors interact with the images removal submodule. Survivors may access this submodule by either selecting the 'how to remove images' option from the chatbot's coping strategies module or typing phrases like 'how to remove images' into the chatbot. Even if they are in a difficult circumstance, survivors are encouraged to report their cases and actively seek services after reading the chatbot's message. For example, survivors can decide to immediately report their cases to police or support centers, even if they have already removed the received intimate images from offenders. In addition, those who have deleted original evidence are more likely to request digital forensics by submitting their mobile device to the police. Some survivors can be relieved to learn that they may get image removal services without denouncing their offenders to the authorities. Even if there is no evidence, survivors are encouraged to request image removal services.

Survivors may anticipate the kind of service they will get and how it will be provided. After reporting their cases, survivors demand assistance, including psychological counseling and legal advice. Most importantly, survivors comprehend the steps of image removal services, which alleviates their concerns about their images being distributed permanently. Survivors may regain control of the distributed images by checking their regular reports of image removal services. Survivors will also be actively collecting information such as the time of receiving and the identities of offenders to aid the investigation (Figure 3).

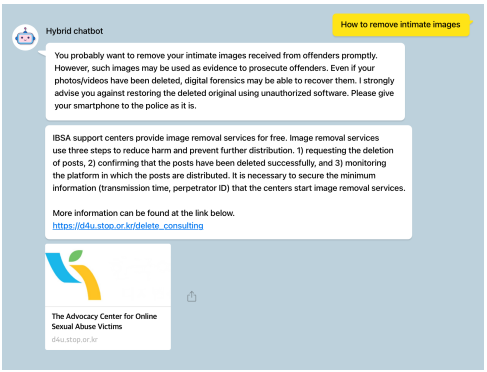

Figure 3: How to remove module

4.1.4 How to check whether images are distributed. We designed a submodule where the chatbot explains how to check whether their intimate images have been shared. Specifically, this submodule encourages survivors to seek assistance from support centers and provides instructions on monitoring the distribution of their intimate images.

First of all, the chatbot urges survivors to contact support centers to monitor the distribution of their images. Because they could experience severe psychological distress due to seeing shared images. Nevertheless, the chatbot also tells how to search for their intimate images on various online platforms for survivors who wish to check their images independently. For example, the chatbot instructs survivors to use various search engines and type keywords related to their personal information, such as their name, age, school, or company. The chatbot also advises survivors to check image search results to find their images immediately. Second, because looking for files stored in cloud services via search engines is difficult, the chatbot guides survivors to the Korea Communications Commission's (KCC) website. They may use KCC websites to search for files saved in cloud services.

Next, the chatbot explains how to gather evidence on platforms and messengers. The chatbot urges survivors to collect links that include their images and take screenshots. In addition, the chatbot advises survivors not to leave closed social media groups or messenger chat rooms to record the conversation and track down the offenders. The chatbot also instructs survivors to ask witnesses to collect evidence and not quit the groups to get information on the perpetrators.

Survivors may access this submodule by either choosing the 'how to check distribution' option from the chatbot's coping strategies

module or entering phrases like 'How can I monitor whether my images are spread' into the chatbot. After receiving the message from the chatbot's submodule, survivors may request support centers to monitor the distribution of intimate images. Some survivors will follow the chatbot's search strategy guidelines to verify whether their images have been shared. First, survivors will compile a list of available search engines. Second, survivors write down keywords relevant to their personal information, including their name, age, school, and occupation. Lastly, survivors will look for their images using the prepared keywords on various search engines. Survivors will scan image search results to locate their images. After that, survivors will examine the titles and links within search results. Because survivors cannot verify whether their images are disseminated within cloud services using search engines, they will visit the KCC webpage to search for their images stored in cloud services. If survivors discover online platforms that host their images, they gather all the uniform resource locator (URL) addresses of the posts containing their images. Additionally, survivors screenshot the post in case the perpetrator deletes it. If survivors discover evidence in closed groups on social media or chat rooms on messengers, they should not leave to trace the offenders. Some survivors have often been informed by friends that their images have been shared on online platforms. In such cases, survivors ask witnesses to collect proof and not leave to track the abusers (Figure 4).

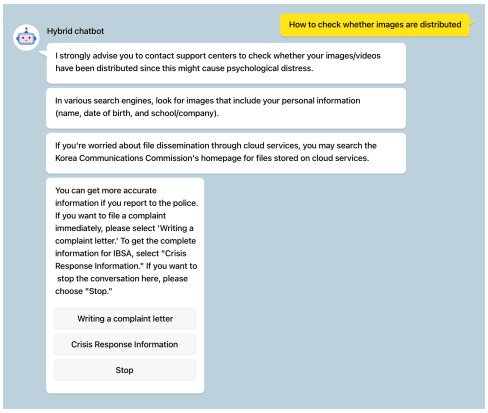

Figure 4: How to check whether images are distributed module

4.1.5 How to deal with threats for distributing images. We designed a submodule where the chatbot advises survivors on dealing with the offenders who threaten to distribute their intimate images. This submodule covers 1) communicating with offenders, 2) collecting evidence of offenders' threats, and 3) not contacting perpetrators for evidence.

Above all, the chatbot encourages survivors to demand that offenders remove their private images. Survivors may avoid contacting offenders who threaten to disseminate their images for fear of more abuse. However, some abusers may distribute survivors' intimate images if they feel survivors ignore them. Therefore, the chatbot advises survivors not to avoid contact with perpetrators. Additionally, the chatbot advises survivors to ask law enforcement or support organizations to communicate with perpetrators. Because interacting with perpetrators may result in considerable psychological suffering for survivors.

The chatbot urges survivors to document abusers' threats. The chatbot guides survivors on evidence collection based on the communication channel used: text messages and phone calls. For example, suppose an abuser sends a survivor blackmailing messages. In such a situation, the chatbot instructs survivors to use the export feature to save the conversation as files since popular instant messengers contain an export feature. If the messenger does not support exporting, the chatbot recommends survivors to take screenshots or record the whole conversation screen, including the time, sender, receiver, and entire messages. Printing the screenshots will assist survivors in submitting them to the police. Survivors are requested to stay in the chat rooms to trace the offenders. When an abuser calls to threaten her or him, the chatbot explains that recording the conversation without the offender's consent is legal, provided the survivor's voice is included.

Certain survivors may be unable to prove that their offenders threatened them. For instance, abusers may leave no evidence because they can threaten survivors without using communication devices. Other survivors may leave the chat room in the middle of an abuser's threat. In such cases, survivors may attempt to contact abusers to record the abusers' threats. However, contacting offenders to collect evidence can be problematic because survivors may face more abuse by the offender, and survivors' messages eliciting confessions from abusers might be used against them in court. Therefore, the chatbot cautions survivors against contacting offenders to gather proof. Additionally, the chatbot advises survivors to contact support centers even if they lack evidence.

Survivors may access this submodule by either clicking the 'how to deal with threats to distribute' button from the chatbot's coping strategies module or inputting phrases such as 'Tell me how to handle the abuser's threats' into the chatbot. After reading the messages included in this submodule, survivors will no longer avoid communicating with offenders and instead send them messages demanding the removal of intimate images. In addition, they request that support centers contact offenders to prevent psychological pain. Survivors follow guidelines for documenting abusers' threats. They export messenger conversations as files or take screenshots of the entire chat, including the time, sender, and recipient. Survivors are not afraid to secretly record phone calls with perpetrators because it is not illegal. Even if a survivor does not have evidence for the abuser's threats, he or she seeks assistance from support centers (Figure 5.)

4.1.6 How to collect evidence. We created a separate module to explain collecting evidence because the evidence is critical when pursuing legal actions or seeking image removal services. Although survivors may learn to gather proof in a coping strategies module, some may directly jump to this module at the beginning of the conversation to quickly follow the chatbot's guidelines for collecting evidence. Therefore, we have designed this module to provide step-by-step instructions on gathering evidence. This module includes 1) requesting the police to gather evidence, 2) capturing messenger conversations, 3) documenting online posts, 4) handling erased

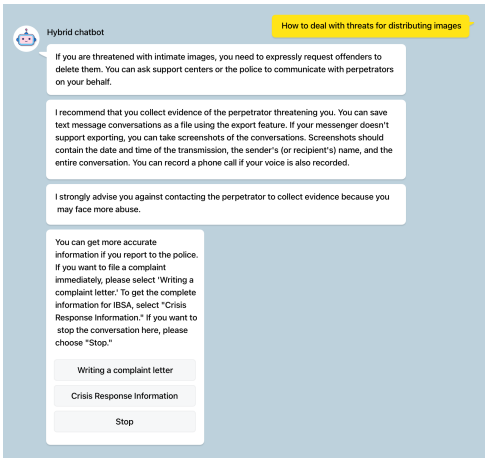

Figure 5: How to deal with threats for distributing images module

evidence, and 5) discouraging survivors from contacting abusers to acquire evidence.

The chatbot urges survivors to call the police immediately to collect the evidence. Although survivors can collect evidence independently, police use technology solutions to collect, examine, and preserve the proof. Therefore, before offering survivors guidelines for evidence collection, the chatbot advises them to contact the police to gather evidence.

The chatbot educates survivors about collecting evidence on instant messengers and websites. If an offender sends survivors intimate images or videos, survivors should download them to preserve them. In addition, survivors should export the conversation as text files. The chatbot informs survivors that popular messengers such as Facebook Messenger, WhatsApp, and Telegram have an export feature. Because Telegram's export feature is only available in the desktop version, the chatbot explains how to install the desktop version of Telegram and save chat history using it. If the messenger does not provide an export feature, survivors should take screenshots to include information, such as the date, time, sender, receiver, and entire messages. Collecting evidence via screenshots of conversation may be challenging when an abuser sends an overwhelming number of messages to survivors. Hence, the chatbot suggests that survivors use the screen recording tool to save the chat history as a video file while scrolling through the dialogue. Finally, the chatbot then tells survivors to continue the conversation with the offenders to trace them and get further evidence.

Additionally, the chatbot teaches survivors about gathering evidence on social media and websites. Because some survivors may be unfamiliar with collecting URL addresses in mobile applications, the chatbot directs survivors to the web-based version of social media. Survivors should save all URLs to posts including their intimate images. Furthermore, survivors take screenshots of each page to preserve evidence in case websites take down the images. The date, time, and uploader should be included in the screenshots.

Survivors may leave the chat rooms to avoid facing intimate images and abusers' threats. Survivors then may blame themselves for missing out on the opportunity to collect evidence in such circumstances. Therefore, chatbots should advise survivors not to be too hard on themselves, as evidence may be recovered. The police may be able to restore removed images using digital forensics or chat histories from messaging service providers' server logs. In addition, the chatbot cautions survivors against attempting to recover the evidence either using unauthorized software or hiring unlicensed firms. Because the evidence that is not adequately restored may lose its validity in court. Therefore, chatbot urges survivors to call the police even when they lack evidence, as police may acquire missing evidence.

Finally, the chatbot warns survivors against contacting offenders to obtain evidence. Because they experience psychological distress as a result of their interaction with offenders. In addition, survivors' messages to persuade offenders to confess may backfire in court (Figure 6).

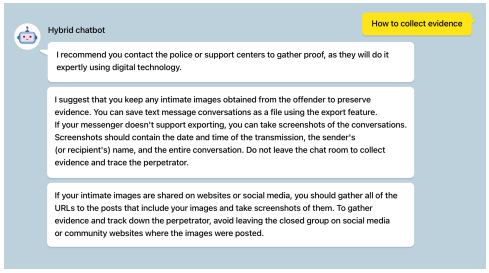

Figure 6: How to collect evidence module

4.1.7 Writing a complaint letter with conversation. We designed a module for helping survivors write a complaint letter because professional counselors tell us that most survivors find it difficult. The chatbot informs survivors to consider consistency and concreteness while writing a complaint letter in an honest manner. The chatbot emphasizes the importance of the details in describing threatening remarks and situations as much as possible.

We designed this module to summarize the incident of survivors after they have a conversation with the chatbot. To assist survivors to describe their incidents in detail the chatbot leads the conversation to ask questions on their experience and to present examples of other cases.

The chatbot asks four questions to survivors consisting of the date of incident, information of perpetrators, description of incident, and description of threats. At first, the chatbot asks the date of the incident and guides survivors to answer the date in the format of yyyy/mm/dd. Secondly, the chatbot asks the full name of the perpetrator. Thirdly, the chatbot tells survivors to describe their incident in detail with an example of an IBSA case. Lastly, the chatbot tells survivors to describe the threats if they are threatened.

After survivors answer four questions, the chatbot presents the answers in a formal-looking form and informs survivors to copy or export the summarized conversation which can be used to fill out a complaint letter. Then the chatbot asks whether the images are distributed and explains the distribution of images without consent can be a criminal offense. If a survivor answers yes to the question, the chatbot presents the link to the cyber police. If a

survivor answers no or 'don't know' to the question, the chatbot leads the conversation to coping methods (Figure 7).

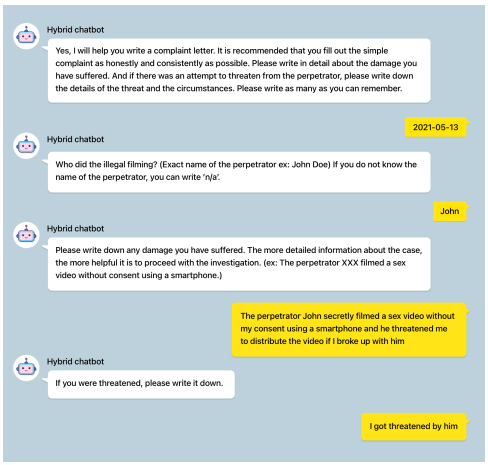

Figure 7: Writing a complaint letter module

4.1.8 Learning IBSA. We designed a module to help survivors understand IBSA based on the pushied cases because many survivors are concerned about whether their cases would be punished. We reviewed all legal terms with two lawyers and paraphrased the terms in plain languages.

This module consists of four parts: the definition of intimate body, the distribution of images by third parties, images taken with consent, and statute of limitations. We clearly state in messages that survivors should consult police officers on the statute of limitations (Figure 8).

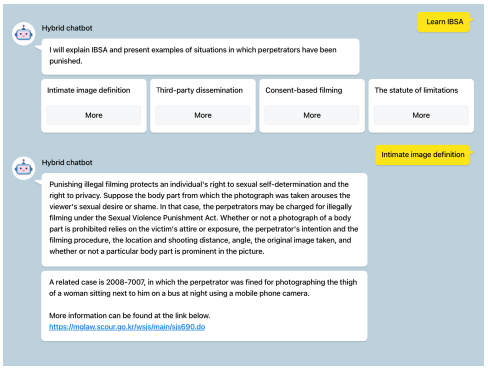

Figure 8: Learning IBSA module

4.1.9 Survivor stories. The chatbot presents real-life stories of survivors to help users better understand IBSA cases from A to Z. We designed this module to give detailed information such as how to collect evidence and report to the police and to encourage survivors to change their situation for the better. One of the stories is about a young woman who was threatened to distribute her intimate images by her partner. She contacted a helpline to get advice on collecting evidence of threats and captured screens of chat with the perpetrator to report to the police. Finally, the perpetrator was sentenced to eight months in prison and was fined 50,000,000 won (about 43,000 usd) (Figure 9).

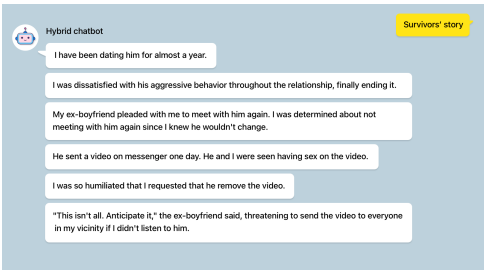

Figure 9: Survivor stories module

4.1.10 Criminal proceedings. We created this module to provide information on from investigation to trial (Figure 10). We also made chatbot explains victims' right to privacy and victims' right to protection. The chatbot informs survivors of three stage of criminal proceedings consisting of investigation, prosecution (Figure 11), and trial.

In addition to criminal proceedings, the chatbot explains victims' right to privacy in each stage of criminal proceedings. For example, the chatbot provides information on pseudonym form to protect their name in investigation.

The chatbot also explains victims' right to protection and provides five legal support centers.

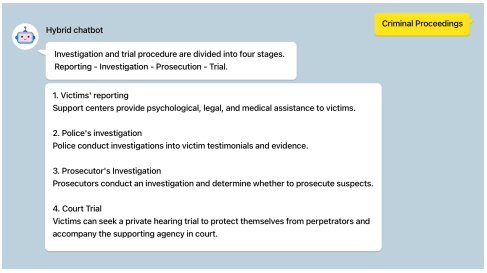

Figure 10: Criminal proceedings module

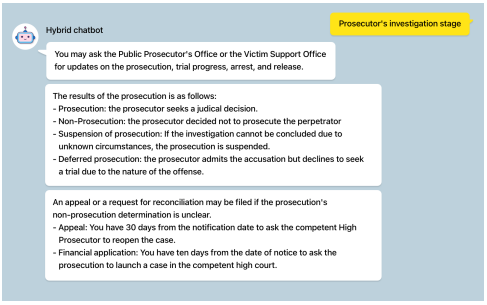

Figure 11: Prosecution's investigation stage module

4.1.11 Victims's right. We designed this module to educate survivors about ten victims' rights. 1) right to attend, 2) right to compensation, 3) right to be heard, 4) right to be informed, 5) right to privacy, 6) right to protection, 7) right to restitution, 8) right to return of property, 9) right to a speedy trial, and 10) right to enforcement.

Survivors may access this submodule by either clicking the 'Victims' rights' button in the chatbot's FAQ module or by typing phrases such as 'What is the right of victims?' into the chatbot. Survivors can learn about each victims' right and may use those rights to protect themselves and receive fair treatment in legal proceedings (Figure 12).

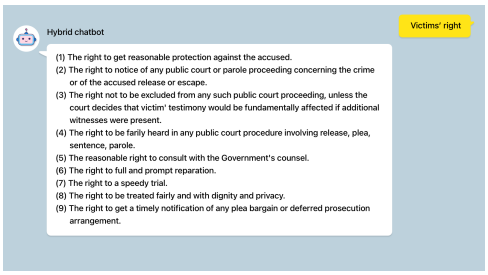

Figure 12: Victims's right module

4.2 Implementation

We implemented the chatbot in a hybrid fashion, combining two modules: a rule-based module and a retrieval-based module. A rule-based module leads users through a predefined decision tree. Users interact with the rule-based module by following a scripted conversation flow and choosing relevant replies. A retrieval-based module engages in conversation with users by selecting a suitable response from a predefined set. Users interact with the retrieval-based module by inquiring for information or expressing emotional distress to get consolation. We developed a hybrid chatbot that allows users to ask questions, receive appropriate responses and obtain a sequence of well-organized information by combining a rule-based module with a retrieval-based module. In addition, users can ask questions and receive answers during a predetermined dialogue. We created a rule-based module for a hybrid chatbot using Kakao i Open Builder and deployed it in Kakao talk, South Korea's most popular messenger.

4.2.1 Rule-based module. Based on the design section, we created 49 submodules and classified them into six modules. We developed a primary information menu with six modules and organized submodules to provide well-structured information for survivors (Figure 13).

4.2.2 Retrieval-based module. We developed the retrieval-based module employing a deep learning language model to respond to users' inquiries for information and their emotional expression to get consolation. We followed three steps to build a retrieval-based module: 1) data collection and creation, 2) language model fine-tuning, and 3) language model evaluation.

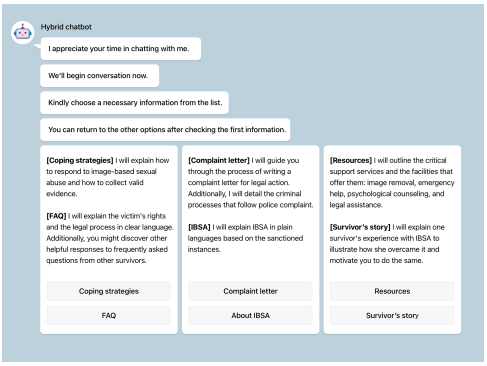

Figure 13: Main menu of hybrid chatbot

4.2.3 Data collection and creation. We collected and created two datasets: emotional support and information support. The emotional support dataset was collected using publicly accessible data in the AI Hub, a repository of datasets for developing AI services such as natural language processing, managed by South Korea's National Information Society Agency. We acquired a Wellness conversation script dataset containing recordings of psychiatrists conversing with their patients. This dataset contains three columns: conversation category, patient mentions (e.g., anxiety, depression, and worries), and psychiatrists' emotional support. Survivors of sexual violence are included in the dataset's patients. There are 5,231 conversations with 359 categories. We removed conversations on severe mental illness and focused on 2,681 conversations with 121 categories. Professional counselors who assisted IBSA survivors reviewed and edited all emotional support messages to make them more cautious and considerate.

The dataset of information support was collected and created. We collected all frequently asked questions and answers from support centers for sexual violence including IBSA. By paraphrasing the questions, we increased the amount of data from 63 to 189. In addition, we surveyed to collect questions that survivors might ask in coping with sexual violence. We presented a hypothetical scenario of sexual violence to participants and requested them to imagine themselves as the victim. We then asked the participants to create questions to deal with sexual violence. We collected 1009 questions from the survey and classified them into 128 categories. Moreover, by paraphrasing and extracting keywords from the original questions, we increased the 2800 questions into 4098 questions with 353 categories. Then, we requested professional counselors to make 353 answers for 353 categories. Finally, we selected 110 answers and 1650 questions related to IBSA. Professional counselors reviewed all 110 answers and made them more friendly.

4.2.4 Language model fine-tuning. We used Bidirectional Encoder Representations from Transformers (BERT) as our retrieval-based module's deep learning language model. Using Google Colab, which has Tesla K80 GPUs, we fine-tuned the BERT, pre-trained language model with 4,331 data points classified in 231 categories. The number of the epoch was 50. When we feed a message into the fine-tuned BERT model, the model returns the most relevant message category out of 231 categories. For example, if the message is a question like

"How can I erase my photo," the model returns the category 'image removal services' as the answer. On the other hand, if the message is an emotional expression such as 'I don't want to live,' the model return the category 'suicidal thought.'

4.2.5 Language model evaluation. We achieved 95% accuracy by evaluating the fine-tuned language model with the newly collected 100 data points. In addition, we manually verified the suitability of the response.

4.3 Hybrid chatbot

We developed a hybrid chatbot by combining retrieval-based and rule-based modules. We followed two steps for implementing a hybrid chatbot. First, we identified the categories of retrieval-based modules corresponding to the 49 submodules of the rule-based module. For example, we chose the category 'image removal services' because it related to the submodule 'how to remove intimate images. We selected 77 categories from 231 categories in the retrieval-based module. In some cases, a submodule inside the rule-based module has multiple relevant categories within the retrieval-based module. For instance, the categories 'image removal services' and 'social media reporting systems' are linked to the submodule 'how to remove intimate images.

Second, we connected the output of 77 categories to 49 submodules that correspond to them. For example, when a user asks the hybrid chatbot 'How can I erase my photo?', the retrieval-based module classifies the inquiry as 'image removal services.' The retrieval-based module responds to the category 'image removal services' like 'You can request image removal services at the Advocacy Center for Online Sexual Abuse Victims. https://d4u.stop.or.kr.' Then, we connect 'image removal services' to the submodule 'how to remove intimate images.' After connecting a category with a submodule, the hybrid chatbot directs users to the relevant submodules to obtain further information. For instance, the hybrid chatbot asks the user if they want to get more information on their question. In other words, the hybrid chatbot asks the user "Would you want to get more information on image removal services?." Now, the user has the option of receiving more information or not. If the user consents to receive information, the hybrid chatbot will direct them to the submodule 'how to remove intimate images.' Following that, the user follows the submodule's conversation flow. Therefore, if a user's message category is linked to a submodule, the user can access more information through the submodule. Otherwise, the hybrid chatbot does not inquire if the user wants further information.

In addition to obtaining further information, the hybrid chatbot allows users to change the conversation topic in the middle of a dialogue. For example, a user receives information in the 'how to remove intimate images' submodule. While receiving information regarding image removal services, the user becomes interested in psychological counseling. The user then asks the hybrid chatbot 'How can I get psychological counseling?' and the retrieval-based module categorizes the question as 'psychological counseling.' Following that, the retrieval-based module returns responses regarding 'psychological counseling' such as 'You can obtain psychological counseling from professional counselors in support centers such as Smile center (02-333-1295), Women's call (1366), and Advocacy Center for Online Sexual Abuse Victims (02-735-8994).' After responding to the questions, the hybrid chatbot asks the user if he/she wants to get more information. If the user accepts to receive more information, the hybrid chatbot will take the user from the submodule 'how to remove intimate images' to the submodule 'psychological counseling.'

5 METHOD

We designed a user study to compare the hybrid chatbot with search to answer two research questions: is a chatbot better than search for supporting IBSA survivors? (RQ1), and what are the advantages and disadvantages of chatbots and search? (RQ2)

5.1 Ethical considerations

The research protocol of this research was reviewed and approved by the institutional review board (IRB) of our university and we strictly followed the protocol to conduct user study. Because of COVID 19 pandemic, we proceeded the whole process of the user study online to safely protect participants. Any participants could access the online research consent form, including the protocol, and voluntarily consent to the form. In the research consent form, we informed participants that by reading the scenario in the survey, they would recall previous unpleasant experiences. If the participants experienced any discomforts during the survey, we asked them to withdraw the survey immediately and contact us to guide them to counseling centers in our university. If a participant suffered from psychological damages in the study, we would take psychological treatment procedures in medical centers, and researchers would handle the cost. We also notified participants that their data would be kept safe and that only the researcher would access it. We did not gather any personally identifying information about our participants, such as their name or affiliation, and we removed any personal information from their responses.

5.2 Recruitment

We recruited 25 young females aged 24 to 34 who had not experienced IBSA. Because in Eaton's study, females ages 18–29 were the most common target of IBSA, we limited the age of participants from 20s to 30s [29]. Previous studies conducted surveyed non-victims of sexual violence who imagined themselves were victims in a hypothetical scenario to identify their risk perception, interpretation of the incidents, and factors affecting their willingness to report [40, 55, 80, 86]. Following the previous studies, we conducted a user study with non-IBSA survivors rather than IBSA survivors to investigate the seeking of information and emotional support, thereby, to control bias in user study results caused by prior knowledge of IBSA coping methods. Because the survivors had previously taken action or sought help from support centers, some IBSA survivors were likely to know more about reacting to the harm than non-victims. As a result, we predicted that IBSA survivors would acquire more relevant search results by employing sophisticated keywords. However, because they were experiencing IBSA for the first time, most IBSA victims were observed to have no prior understanding of responding to the harm [33]. Because the purpose of our research is to create a chatbot that would deliver much-needed information to IBSA victims in their situation, we

designed the user study with non-IBSA victims to consider the possibility that IBSA victims had no prior knowledge.

5.3 User study

We designed a user study to compare a hybrid chatbot and online search regarding information and emotional support. Because IBSA survivors employ online search as the most common way to find resources to deal with their incidents, we compare the chatbot's effectiveness to online search as a baseline [36, 72]. In addition, we designed a within-subject user study to determine the benefits and drawbacks of both conditions.

We created a hypothetical scenario based on the previous studies [24, 28, 37]. We created the scenario based on the previous studies and tailored it to a more complicated IBSA situation in which a perpetrator threatened the survivor with the distribution of illegally captured images. The purpose of the hypothetical scenario is to assist participants put themselves in the survivor's shoes and perform the user study from the survivor's perspective.

The hypothetical scenario is as follows:

> Jane ended her relationship with John. Despite John's entreaties, Jane refuses to meet him again. On May 13, 2021, John threatened to publish Jane's intimate images online if she did not return to him. Jane did not accept John's words since they had not taken intimate images together. John told Jane that he secretly recorded her when they were having sex. Jane was in such a state of panic that she had no idea how to deal with the situation.

We asked participants to read the hypothetical scenario and imagine themselves Jane in the scenario. Then, we asked participants to complete ten tasks searching for nine pieces of information and one piece of emotional support. We collaborated with experienced counselors to create the tasks that reflected the real needs of IBSA survivors.

We conducted a post-survey to quantify the information and emotional support provided by the chatbot and online search. Participants completed questionnaires at the end of each condition.

The survey consisted of 22 items, 13 drawn from the information quality assessment [46] and nine from the social reactions questionnaire [81]. 1) accessibility, 2) appropriate amount, 3) believability, 4) completeness, 5) conciseness, 6) consistency, 7) ease of operation, 8) error-free, 9) interpretability, 10) objectivity, 11) relevancy, 12) timeliness, and 13) understandability are the items on the information quality assessment [46]. The social reactions questionnaire assesses societal reactions to survivors of sexual violence. We chose the following items in the emotional support/belief dimensions: 1) preventing self-blame of victims, 2) telling victims it is not their fault, 3) understanding the incident, 4) reframing the experience, 5) not judging victims, 6) accepting victims' stance, 7) caring victims' emotion, 8) feeling sorry for victims, and 9) understanding victims' feeling [81].

We interviewed participants to examine the benefits and drawbacks of both the chatbot and the search.

5.4 Procedure

Researchers explained the goal and procedure of the study to the participants. Informed consents were obtained from the participants before the user study. Because of COVID 19 pandemic, we proceeded the whole process of user study online to safely protect participants. At first, participants added the hybrid chatbot, made by researchers, on their messenger. Participants were asked to share their screens to researchers because researchers could observe the whole process of tasks. The participants were also asked to read a hypothetical scenario on Jane and put themselves in the context of Jane. The participants were randomly assigned to one of two groups. Group 1 participants conducted tasks with search first and then with chatbot while group 2 participants conducted tasks with chatbot first and then with search.

The researchers explained the user study's purpose and procedure to the participants. Before the user study, participants signed the consent form. Because of the COVID 19 pandemic, we conducted the user study online to protect participants. Initially, participants added the hybrid chatbot, developed by researchers, to their messenger. Then, participants were requested to share their screens with researchers to observe the entire task process. The researchers asked participants to read a hypothetical scenario concerning Jane and put themselves in her shoes. The participants were divided into two groups at random. Participants in Group 1 completed tasks using search first, then chatbot, whereas participants in Group 2 completed tasks using chatbot first, then search.

The following are the ten tasks: 1) Find helplines and support centers for victims of image-based sexual abuse. 2) Discover coping strategies for threats to distribute intimate images on the internet. 3) Find survivors' stories that are similar to Jane's. 4) Learn how to collect evidence of distributed images. 5) Learn how to write a complaint letter and base the letter on Jane's story. 6) Learn how to handle John's retaliation after reporting him to the police. 7) Learn how to delete distributed intimate images off the internet. 8) Learn how to acquire financial assistance for IBSA. 9) Find out about victims' rights in the investigation and trial. 10) Jane is frustrated as if it were her fault. Look for words of consolation for Jane.

Participants completed a post-survey in each condition after finishing ten tasks. The user study concluded with follow-up interviews with participants to discuss the advantages and disadvantages of both the chatbot and search.

5.5 Data analysis

The user research provided us with both quantitative and qualitative data. We used one-tailed paired t-tests to evaluate hypothesis 1 and hypothesis 2 in quantitative analysis. We employed thematic analysis to address research question 2 in qualitative analysis. First, we transcribed all of the interviews and reviewed the transcriptions together, analyzing the key concerns that emerged from the user study. The transcriptions were then open-coded line by line to organize and conceptualize the main themes.

6 RESULTS

6.1 Is a chatbot more effective in assisting IBSA survivors than internet search engines?

6.1.1 H1: A chatbot will be more favorably rated than search results for information assistance to IBSA survivors. In eleven information quality, hybrid chatbots were preferred above internet search engines for information help. The eleven characteristics of information are accessibility, sufficient quantity, completeness, conciseness, consistency, simplicity of operation, flawlessness, interpretability, relevance, timeliness, and understandability. However, in terms of two information characteristics, credibility and objectivity, participants favorably rated internet search engines than the chatbot. Confidence intervals for thirteen information attributes are shown in Figure 14. Table 2 summarizes the statistics in detail, including the degree of freedom, p-value, effect size, and confidence interval.

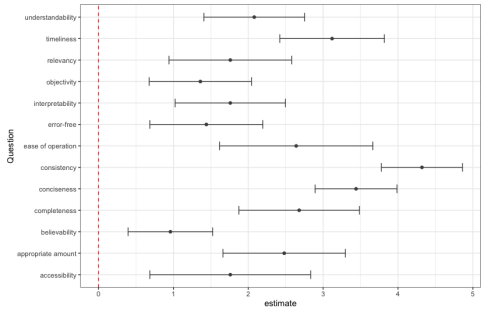

Figure 14: Statistical results of information support

Table 2: Statistical results of information support

item	df	p	d	95% CI
accessibility	24	2.47E-03	0.68	[0.686,2.83]
appropriate amount	24	1.81E-06	1.25	[1.66,3.3]
believability	24	1.81E-03	0.7	[0.395,1.52]
completeness	24	4.23E-07	1.37	[1.87,3.49]
conciseness	24	2.43E-12	2.6	[2.89,3.99]
consistency	24	1.46E-14	3.29	[3.78,4.86]
ease of operation	24	1.85E-05	1.06	[1.62,3.66]
error-free	24	6.14E-04	0.79	[0.686,2.19]
interpretability	24	5.00E-05	0.99	[1.02,2.5]
objectivity	24	4.01E-04	0.82	[0.677,2.04]
relevancy	24	1.75E-04	0.89	[0.941,2.58]
timeliness	24	2.32E-09	1.84	[2.42,3.82]
understandability	24	1.36E-06	1.28	[1.41,2.75]

Participants indicated that the hybrid chatbot excelled in information organization, accessibility, and conciseness.

6.1.2 Information organization. Due to the organized information in the chatbot, most participants said that the hybrid chatbot would be preferable to internet search engines right after experiencing IBSA. Participants said that survivors might struggle to determine which pieces of information to seek in a distressed situation (P09, P14, P15). Because the hybrid chatbot presented a menu of information and then asked survivors which information they needed, participants found it straightforward to obtain the information they needed (P01, P16). P01 emphasized that the information menu served as a reference frame that guided her to relevant information and helped her maintain psychological stability. "It will be easier to use this chatbot in emotionally unstable situations. I am not sure survivors can do rational Google searches. It is not easy to consider which information I need at the beginning. The frame provides me with a sense of security, and I can get whatever information from it (P01)." The information menu may also serve as an "overview of required information(P02)." Participants preferred to choose from the menu (P07, P12, P14). The menu encouraged survivors to take vital information they may otherwise overlook (P09, P13, P14). P13 and P15 said that the chatbot took the lead in the dialogue, anticipating the sequence of procedures necessary to handle IBSA. "The chatbot provided me with the essential information in my situation, based on the sequence of actions."

On the other hand, almost all participants indicated that survivors might have difficulties when it comes to looking for information, from selecting the appropriate keywords to evaluating the search results. Half of the participants failed to consider proper search queries for relevant results. For example, P07 said, "It was my first exposure to revenge porn. Because I lacked knowledge, I was unaware of any important keywords (P07)." Over half of the participants claimed that they could not get the desired results despite using the correct keywords. Numerous participants emphasized the difficulties of obtaining information on writing complaint letters (P03, P06, P07, P11, P15).

Additionally, participants expressed disappointment at not finding relevant information on the websites of support centers (P04, P06, P12, P16) and annoyance at seeing advertising for legal firms (P05, P09, P12), nonsense articles (P14), and academic materials (P02) among the top results. Numerous participants said they felt compelled to call a hotline since most support center websites urged survivors to do so (P04, P08). P14 attempted to switch the search engine to retrieve the needed information but could not.

6.1.3 Information accessibility. Unlike search engines, over half of participants reported immediately acquiring relevant information using the hybrid chatbot. They preferred immediate results obtained by typing a keyword. For example, P03 said that she quickly discovered coping strategies for retribution by typing the keyword "revenge." "Chatbot is easy to use. When I typed revenge, this chatbot advised me on how to handle reprisal from offenders (P31)." In the case of P14, she found important information by typing after exploring only the hybrid chatbot's menu for looking up information. "At first, all I did was click buttons. However, no matter how many buttons I clicked, I could not get the necessary information. I began typing after finding some responses using keywords (P14)." That is, the hybrid approach facilitated users' access to information.

On the other hand, search engines were inadequate for obtaining information immediately for IBSA. Several participants found broken links at the top of search results that included helpful information (P04, P09, P11). P02 said that it was annoying to download files from some results and that it lacked information accessibility for specific files that required particular applications for opening.

"Downloading pdf and word files from search results was cumbersome. Even worse, They were not useful. Without MS Word, I would be unable to open the files (P02)."

Additionally, P06 complained that her search results were banned due to the usage of sex-related terms. "My search results were banned on Naver (South Korea's most popular online platform), maybe because I typed porn (P06)."

6.1.4 Concise representation. One-third of participants said they preferred the hybrid chatbot due to its brief description. A hybrid chatbot was found to effectively provide "summarized" information (P01, P05, P06). P01 said explicitly, "However I find useful documents, it takes time to read them. It was simple to read the chatbot's summary information (P01)." Several participants said survivors might comprehend the concise information at a single glance (P05, P11). P11 said, "The information in the chatbot is straightforward and easy to understand. It was not a large amount and was easily readable. The chatbot will be more helpful than Google because survivors are likely to get necessary information much faster (P11)."

On the other hand, half of the participants said that search engines were insufficient for usage due to the lack of conciseness of the results. It was challenging to read and digest lengthy material, regardless of its importance in an emergency (P02, P06, P15). P02 said that the extensive material in search results is not "survivor-centered." Numerous participants expressed difficulty comprehending legal materials because it was more lengthy than other documents (P05, P09, P14). P14 and P15 utilized the search function (Finder) in pdf documents to locate crucial information for them.

6.1.5 Information credibility and objectivity. According to several participants, the hybrid chatbot was not better than search engines regarding information credibility and objectivity. P12 pointed out that she could not trust all of the chatbot's information because she could not identify the chatbot's creator. "The chatbot's reliability was low since I had no idea who created it. I could not trust the chatbot unless credible institutions created it (P12)." On the other hand, half of the participants said they could trust the official website. P08 said that information obtained from government agencies and support centers is more trustworthy than from the chatbot. Numerous participants placed their confidence in legal information obtained from the Ministry of Justice (P02, P15). Furthermore, P07 claimed that information obtained from professional institutions was more objective than the chatbots. "I clicked on only support center links because the information provided by them is more objective (P07)."

Several participants stated that the information provided by the chatbot was somewhat reliable. They trusted the links related to the chatbot's information (P03, P12). Moreover, other participants trusted the chatbot's information because the chatbot is a well-designed system (P04, P09). Additionally, P16 believed the information in the chatbot would be current, as chatbots are a more recent technology than webpages.

6.2 A chatbot will be more positively evaluated than search results for emotional support to IBSA survivors

In emotional support, hybrid chatbot was more effective than online search in all nine items of the social reaction questionnaire. Figure 15 illustrates the confidence ranges for nine items from the social reaction questionnaire. The statistics are summarized in detail in Table 3, which includes the degree of freedom, p-value, effect size, and confidence interval.

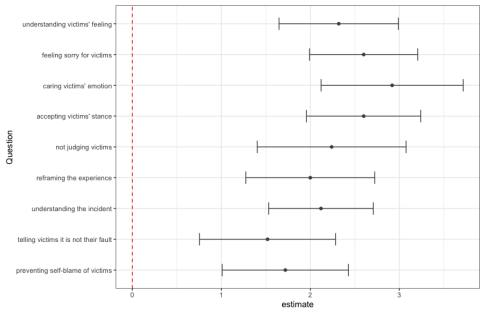

Figure 15: Statistical results of emotional support

Table 3: Statistical results of emotional support

item	df	p	d	95% CI
preventing self-blame of victims	24	4.17E-05	1	[1.01,2.43]
telling victims it is not their fault	24	4.03E-04	0.82	[0.756,2.28]
understanding the incident	24	1.10E-07	1.49	[1.53,2.71]
reframing the experience	24	7.25E-06	1.14	[1.28,2.72]
not judging victims	24	1.10E-05	1.11	[1.4,3.08]
accepting victims' stance	24	1.43E-08	1.67	[1.96,3.24]
caring victims' emotion	24	8.73E-08	1.51	[2.12,3.72]
feeling sorry for victims	24	5.25E-09	1.77	[1.99,3.21]
understanding victims' feeling	24	2.25E-07	1.43	[1.65,2.99]

Over half of participants reported that the hybrid chatbot had stronger emotional support than online search. Many participants stressed that the chatbot consoled them (P09,P10,P12,P14,P16). Although P10 was skeptical about chatbots' comforts, she was deeply touched by chatbots' words and said that it would be helpful for survivors. "At first, I thought it would not be impressive for users to listen to words of comfort from chatbots. But it was really touching and it could be helpful for survivors (P10)." Participants also said that chatbot talks friendly (P13) and kindly explains necessary information to users (P16). P11 expressed that she felt honesty and carefulness in wording while having conversation with the chatbot. "I felt the honesty of those who made this chatbot and I felt the carefulness of wording in the chatbot." P10 said that survivors may feel grateful to creators who consider the context of them. "Although

chatting with the chatbot, survivors may feel grateful to chatbot's makers behind the chatbot (P10)."

While almost all participants reported being unable to get emotional support through the search, worse still, some search results may put survivors in an emotionally vulnerable state. Numerous participants said that they could not obtain emotional support from search results (P11, P12, P14, P15, P16). P12 said that she could not get emotional support from information-centric search results and had to seek it elsewhere. "There was no emotional support throughout the internet search. Because search engines give only objective information, I was only able to find a few counseling resources (P12)." Search results could discourage survivors from reporting their incidents (P04, P10, P13, P14, P16). P04 emphasized that most survivors may abandon reporting to the police after reading headlines on top search results indicating that many abusers received little punishment. "Numerous search results showed that perpetrators received little punishment. After reading a few news articles, survivors may decide not to pursue legal action. Many news articles negatively affect survivors' emotional state (P04)." Reading news articles about no penalty or minor punishment for offenders made participants feel overwhelmed (P13), anxious (P14), and intimidating (P10). P10 said she got emotionally hurt to view advertisements for legal firms seeking perpetrators. "I was irritated that advertisements for law firms representing criminals appeared at the top of search results. Survivors may suffer psychological distress upon finding that numerous law firms advertised their success in defending countless sex crime offenders (P10)."

7 DISCUSSION

We suggest the implications for information and emotional support based on the user study findings. Finally, we propose a survivor-centered information structure, explore the advantages of a hybrid implementation, and discuss design considerations for emotionally supportive conversations.

7.1 Structure of information centered on the survivor

Most participants emphasized that the chatbot's biggest strength is its information structure. The chatbot allows participants to "select" necessary information from information structure rather than "searching" it online. However, participants encountered several challenges when using search engines, ranging from selecting proper search keywords to finding credible sources within the results. For example, numerous participants said that they struggled to consider appropriate search terms due to a lack of prior knowledge. In addition, participants who assumed they were survivors expressed more significant concerns with the reliability of search results than usual. While they believe the top search engine results are generally credible, they carefully examine IBSA search results to ensure the contents are trustworthy. As a result, we expect survivors will have a more challenging time locating useful information than non-victims. Especially survivors suffering from psychological distress may have trouble looking for information via search engines due to a decline in cognitive abilities. Therefore, we propose an information structure centered on the survivor to assist them in quickly obtaining vital information.

We suggest three implications based on the user study results to structurize information for survivors. 1) creating information menus to indicate the sequence of coping methods, 2) highlighting sources of information, and 3) presenting information concisely.

The chatbot for IBSA survivors should assist survivors in developing coping strategies in response to the harm. Participants preferred that the chatbot led them through a sequence of coping methods during their conversation. Survivors may be unable to plan their coping strategies due to psychological pains. Therefore, we encourage chatbot creators for IBSA survivors to design conversation in a manner with the sequence of coping methods. First, we recommend the chatbot creators compile a list of features by referring to the section of this paper devoted to design elements of reference chatbots. Then, we advise the chatbot creators to divide all features into four to six groups to alleviate survivors' cognitive overload. These groups comprise the primary information menu of the chatbot. Notably, we recommend that the primary menu be arranged to correspond to the sequence of coping strategies. For instance, urgent coping methods such as removing intimate images are prioritized. Following that, modules on collecting evidence, locating resources, writing a complaint letter, and FAQ is presented.

Second, we recommend that chatbot creators highlight information sources inside the chatbot's messages. Survivors may be more concerned with the reliability of the chatbot's information. Therefore, we suggest that the chatbot introduce its creators and provide links to more information at the end of its messages. First, it is preferable to explain who created the chatbots and how they were created in greetings. Because some users may overlook the greeting messages, a separate module for the introduction of the chatbot might be added to the chatbot's main menu. Second, we recommend that chatbots provide information sources at the top of messages and their links to them at the end of each conversation. We discovered that some participants regarded information with links as credible and clicked on links to get further information.

Finally, we advise chatbot designers to keep their messages as concise as possible. While participants requested extensive information on IBSA, they struggled to understand lengthy material via conversational user interfaces. We propose two implications for improving the conciseness and understandability of chatbot' information. First, chatbots are more effective at offering an overview of information and links to them than providing entire information. In other words, chatbots are more suited to serving as a hub of information rather than pouring information at survivors. Second, tables and diagrams are effective tools for improving the readability of information rather than relying solely on text. While the chatbot interface is text-based, basic visualization can deliver information to survivors effectively.

7.2 Benefits of a hybrid implementation for information and emotional support

Although most participants found necessary information by navigating the chatbot, several participants had trouble locating essential information while following the chatbot's information structure. This implies that some participants may get confused by the chatbot's complicated tree structure even though the chatbot is

designed to be survivor-centered. We implemented the chatbot's information structures using rule-based modules based on the design elements of reference chatbots. Because the chatbot should provide survivors with adequate information to help them deal with IBSA, its information structure becomes complicated to include the required information. As the depth of the structure increased, users' cognitive overload caused by the chatbot's complexity surged considerably. Therefore, survivors may struggle to obtain critical information in a chatbot that uses rule-based modules.

We found that several participants typed phrases including necessary information to access information when they could not find it within the chatbot's structure. They changed their interaction with the chatbot from browsing the information structure through buttons to typing phrases containing critical information into the chatbot. The retrieval-based module enables users to obtain information by entering keywords into the chatbot. As a result, we propose a hybrid approach that combines rule-based and retrieval-based modules to enhance the information accessibility for survivors.

The hybrid chatbot allows users to access information in the chatbot directly. For example, survivors can learn how to request personalized patrol from the police by typing 'personalized patrol' into the hybrid chatbot. Survivors have to take two steps in the rule-based module to obtain information on personalized patrol: clicking the 'FAQ' button in the information menu and then clicking 'Victims' rights' in the FAQ module. In addition, the hybrid chatbot enables users to obtain further information about their questions. In the same example above, once survivors get information about personalized patrol, the hybrid chatbot asks if they want to learn more about personal protective measures. If the survivors consent to receiving additional information, the hybrid chatbot directs the survivor to the 'Victims' rights' submodule.

The hybrid chatbot is more capable of assisting survivors than retrieval-based modules alone. Survivors may convey their psychological pain to the chatbot by expressing self-blame such as 'It was my fault. I should not have sent my images.' Then, the retrieval-based module in the hybrid chatbot comforts the survivor with supportive messages like "it was not your fault and you are not to blame." Besides sending comforting messages, the hybrid chatbot may provide further information by connecting survivors to the support center module, which offers psychiatric treatment, or the coping technique module, which instructs survivors on deleting shared personal photographs. In this manner, the hybrid chatbot may give survivors emotional and information assistance.

7.3 Design consideration of emotionally supportive conversation

Almost all participants emphasize that the chatbot is better at providing emotional support than online search. They found comfort in the chatbot's sincere and circumspect words. Several participants anticipated that the chatbot would console survivors with thoughtfully written messages. Other participants rated the chatbots' emotional support as superior to that of online search but significantly inferior to that of humans. In addition, IBSA survivors exhibit emotional instability due to traumatic experiences [18]. Consequently, we should exercise caution when providing emotional support to survivors through chatbots. IBSA survivors may have a negative attitude about the chatbot's emotional support.

In the user study, we discovered that only two participants expressed emotional distress and received the chatbot's emotional supportive messages. Most participants got comforting messages from the information menu's emotional support module at the start of the conversation. They said that they could not have expected the chatbot to understand the emotional expression, given that the conversation started with an information-centric menu. In addition, they skipped the chatbot's greeting messages indicating that the chatbot could have a consoling conversation. Therefore, we propose a hybrid chatbot that starts with small talk to demonstrate its potential for emotional support rather than presenting an information menu.

The hybrid chatbot can inform users of its capacity for emotionally supportive conversation in small talk. For example, the hybrid chatbot may send a message containing examples of emotionally supportive conversations. Users are likely to think the hybrid chatbot understands emotional expression if they concentrate on the chatbot's greeting messages.

In addition to notifying its emotionally supportive conversation feature, the hybrid chatbot can determine if users desire information or emotional assistance from small talk. If a survivor expresses a need for emotional support, the chatbot may initiate an emotionally supportive conversation with the survivor using a retrieval-based module. Because survivors may be skeptical of the chatbot's ability to console, the chatbot should mention explicitly that its capability for consolation is inferior to that of humans at the start of the emotionally supportive conversation. Additionally, the chatbot informs survivors that it prepared some messages with professional counselors to show sincerity. For example, suppose a survivor expresses her desperation with the statement, "I don't want to live." The chatbot will comfort the survivor with a well-crafted message in the retrieval-based module, which says, "If it's too hard, you can't even find a way, which may lead to extreme thoughts. However, you are a valuable person. You are not alone. Consultation with experts may also be helpful. 1588-9191: Call of Life."

Because survivors may need emotional support to seek help, the chatbot should delegate emotional support to humans when it fails to console them. If a survivor expresses dissatisfaction with the chatbot's comforts, the retrieval-based module may recognize the survivor's intent and connect the survivor to helplines that offer text-based services.

8 LIMITATION AND FUTURE WORK

We have two limitations in this study: the characteristics of participants and the number of hypothetical scenarios.

First, we conducted the user study with non-victims of IBSA rather than survivors of IBSA. Although we performed the user study with non-victims of IBSA to minimize bias in the results and cover the case that IBSA victims had no prior knowledge of coping strategies, IBSA survivors may give insight into the genuine challenges in finding information and emotional support. Consequently, further user studies with IBSA survivors to validate the hybrid chatbot's efficacy may be necessary to enhance the applicability of the findings in this research.

Second, we carried out the user study using a single case of IBSA instead of several cases. We decided to conduct a user study based on a single scenario to compare the chatbot and internet search in the same condition while controlling for the variation introduced by the different scenario types. Because IBSA may occur in several ways, we need to ensure that the hybrid chatbot can handle a range of IBSA scenarios. Expanded user studies, including various types of IBSA, may help improve the chatbot's generalizability for IBSA survivors.

9 CONCLUSION

We found that a hybrid chatbot was more effective in providing information and emotional support to IBSA survivors than an online search. The hybrid chatbot excels in information organization, accessibility, and concise representation. Furthermore, the hybrid chatbot demonstrates the ability to console survivors via survivor-friendly language. We suggest design implications for a chatbot that assists survivors of IBSA with information and emotional support based on the findings of a user study. Based on the findings, we propose three design implications for a chatbot that provide information and emotional support to IBSA survivors. First, the chatbots' information structure should be designed survivor-centered: 1) the order of the information menu should correspond to the sequence of coping methods, 2) The creators' information and hyperlinks to information sources should be provided. Second, a hybrid implementation has benefits such as quick access to information and emotional support during the conversation. Third, chatbots should be designed to have small talks with survivors to manage their expectations for emotional support. Finally, chatbots should be capable of requesting the assistance of human counselors for sophisticated emotional support. This paper makes three contributions to the HCI community: 1) We present the design rationale for chatbots targeting sexual violence survivors. 2) We suggest a hybrid approach for supporting users in accessing information and receiving emotional support. 3) We discuss the practical implications for developing chatbots to assist IBSA survivors. We hope that our findings will be beneficial to IBSA survivors.

ACKNOWLEDGMENTS

Special thanks to Hyunjin Yoo. We thank the anonymous reviewers for their valuable feedback. This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2021S1A5B8096358).

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