Do You Have Time for a Quick Chat? Designing a Conversational Interface for Sexual Harassment Prevention Training

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ABSTRACT

Sexual harassment (SH) incidents are increasing and call into question the effectiveness of traditional SH prevention training. In this paper, we introduce a proof-of-concept design of a *conversational interface* (CI) for understanding SH cases. Key features of the interface include that it engages the learner in a dyadic conversation, prompts the learner for guidance, and tells a story of SH from a first-person perspective. From a mixed-methods study (N=32), learners experiencing a SH vignette using the conversational interface reported feeling less overwhelmed with the content, more engaged with the situation, and more comfortable discussing the topic compared to reading the same vignette online. Participants also reported that using a first-person narrative made the vignette feel realistic and relatable. However, there was no difference in empathy between the conditions. We discuss these results and implications for designing effective SH prevention training.

CCS CONCEPTS

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

KEYWORDS

Conversational Interface, Sexual Harassment, Training

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1 INTRODUCTION

After an American actress Alyssa Milano tweeted a request to those who have been sexually harassed or assaulted to reply with "me too", 1.7 million tweets were made within ten days in at least 85 countries [44]. According to a survey in 2018, 81% of women and 43% of men in the US reported experiencing sexual harassment or assault in their lifetime [29]. Incidents of SH continue to be reported on a regular basis and many organizations are seeking ways to build a proper anti-harassment culture such as offering repeated and mandatory SH prevention training. A typical training program is comprised of presenting information and resources online with case studies and evaluating learner's comprehension using surveys and quizzes. In-person classes are sometimes held to supplement the online training and discuss SH issues [53].

Despite prevalent training, recurring SH incidents are raising doubts about the effectiveness of existing SH prevention programs [21, 46]. Some researchers assert that current methods have little impact on changing one's actual behavior [21, 47] and may even have the opposite effect [9, 12, 52]. As our results will later show, the existing designs are perceived to be tedious, overwhelming, uncomfortable to express honest opinions, and un-motivating. Our work envisions a new class of interactive training delivered by an intelligent conversational agent. This paper progresses toward that vision by providing a realistic experience of having a conversation with an intelligent agent representing a person who has been sexually harassed.

In this paper, we explored the design of a text-based conversational interface (CI) to incorporate design principles that underlie effective SH training. We derived three key principles from the literature about how to design effective SH prevention training [16, 45, 48, 49, 53]: 1) Foster empathy towards SH targets through the use of first-person narratives, 2) use interactive and experiential methods (*e.g.*, role-play scenarios), and 3) utilize synchronous delivery methods (*e.g.*, online chat). While prior studies in the design and education research communities have tested different subsets of these principles [16, 20, 32, 37, 58, 63], we designed and implemented a CI that demonstrates a novel synthesis of all three principles for SH prevention training. Our proof-of-concept interface was designed to have a persona of a woman, named *Jane*, who has been sexually harassed in the workplace and engages the learner in a conversation about her experience from a first-person perspective.

We conducted a mixed-methods study (N=32) to explore the benefits and limitations of the CI design for the purpose of SH prevention training. Participants were randomly divided into two groups, either interact with our interface (CI group) or read the same vignette on a web page (Control group). In both groups, we measured empathy using an 8-item scale [5] and Inclusion of the Other in the Self (IOS) scale [4], and SH attitude using Sexual Harassment Myth Acceptance (SHMA) scale [39] to evaluate how experiencing the vignette through the interfaces affects learners' empathy towards the target and attitude towards SH. We interviewed participants and extracted the themes that emerged from their responses.

We compared the themes between the CI and the Control group and identified the themes that appear in the CI group only. The participants in the CI group reported feeling engaged due to the

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designed interactivity (N_{CI}=14). Participants also reported that reading individual messages was less overwhelming than being presented with an entire article and created suspense of how the conversation would unfold (N_{CI}=9). Participants appreciated the CI being a realistic simulation because this allowed them to feel comfortable discussing a sensitive topic (N_{CI}=8). They also felt immersed in the situation and motivated to help the target (N_{CI}=15). These benefits favorably contrasted with the limitations of the traditional SH training that participants had previously experienced. In contrast to our expectation that the virtual interaction with a SH target would increase empathy, the quantitative results revealed that there was no significant difference between the conditions on empathy.

Our study makes three contributions. First, we identify design principles from prior literature for effective training and demonstrate how to implement a subset of these principles within an intelligent CI. Second, our results provide a deeper empirical understanding of how our interface design affects a learner's experience relative to the status quo approach for the purpose of SH training. Lastly, we provide design implications for building intelligent interfaces that aims to arouse empathy and support experiential learning. Our work is original because we reveal insights on how our interface can complement the current practices through systematic analysis, and initiate thought-provoking discussions on how to improve the proposed design and the training. We anticipate that the results and the implications generalize to other training programs (*e.g.*, ethics, inclusiveness, and security training), contexts dealing with sensitive issues (*e.g.*, stigmatic diseases), and domains that value empathetic responses from users (*e.g.*, medical crowdfunding).

2 RELATED WORK

SH refers to unwelcome sexual advances, requests for sexual favors, and other verbal or physical harassment of a sexual nature [15]. Effective interventions are critical for reducing the prevalence and severity of SH. Our research focuses on advancing the use of training as an intervention for SH prevention [15]. Our work complements other HCI research and interventions that encompass sexual misconduct problems including dating and domestic violence [18], stalking [11], and online harassment [17].

2.1 Sexual Harassment Prevention Training

SH prevention training seeks to achieve two goals: 1) inform learners about anti-harassment policies and resources, and 2) educate learners about appropriate conduct and improve attitudes towards SH prevention [15]. Achieving the second learning goal is known to be more challenging but also less studied in the research community [47, 53]. A consistent finding in the literature is that training designed to promote *empathy* toward the target of SH improves a learner's attitude towards SH [53]. Diehl *et al.* showed that reading a SH case from a target's perspective increased empathy and reduced the acceptance of SH misconception compared to reading the case from a perpetrator's perspective [16]. Schewe and O'Donohue found that presenting empathy-arousing materials decreased men's self-reported likelihood of committing sexual abuse [55]. Empathy is also related to experience-taking, an imaginative process of spontaneously assuming the identity of a character in a narrative and simulating that character's thoughts, emotions, behaviors, goals, and traits [28]. A story written in first-person, where the main character relays a story from his or her point of view, is effective for experience-taking. Prior work shows that first-person narratives lead to favorable changes in participants' behavior and attitudes toward the character's group [14, 28] and positive perceptions of the learning experience [36].

The form of the instructional method is critical for arousing empathy and achieving the desired outcomes of SH training [54]. Providing multiple methods for training, such as video-based episodes combined with case analyses in text, correlates with increased sensitivity to SH scenarios [63]. However, studies on how to design effective instructional methods are limited [9, 46, 53]. Existing research focuses on text and videos [53] and these methods have shown success in clarifying the gray area of unwanted sexual behavior [3] and improving knowledge [47]. However, such methods have had little impact on changing actual behavior [21, 47] and even lead to adverse effects such as reinforcing gender stereotypes [52]. Researchers suggest that attitudinal change requires more interactive or experiential training [6, 47].

HCI researchers have primarily focused on creating technology that prevents SH *in-situ* such as developing panic buttons to draw attention of bystanders or notify emergency contacts [2, 27], crowdsourcing maps to show locations of SH incidents [2, 60, 64], and evaluating recording probes that collect contextual data on negative behaviors [7]. However, how to design technology that delivers effective SH prevention training has received little attention in the HCI community. Our work contributes to this limited body of literature by reporting on the design and evaluation of a conversational agent for SH prevention training.

2.2 Leveraging Conversational Interfaces for Sexual Harassment Prevention Training

A conversational interfaces (CI), an interface that allows a user to interact with a computer as if it were a conversational partner [66], has been increasingly leveraged in training and education [25, 33, 56, 61] as well as in other domains such as healthcare [22, 42]. Previous studies showed that the technology has the potential to assist attitude learning, which involves cognitive, affective, and behavioral aspects. Regarding the cognitive aspect, prior works have revealed the effectiveness of the CI in memory retention [1], critical thinking, and inquiring mindsets [23]. A CI is known to improve students' affective learning outcomes [62] and influence users' behaviors through distraction and encouragement [32].

Prior work has also investigated the use of a CI for storytelling. Emile [41] was created to discuss social theories in first-person narrative. A Freudbot [25] was designed to represent Sigmund Freud, a famous historical figure in psychology, and informed his theories and biographical events in Freud's voice. These studies reported that students endorsed the idea of using the interface as a promising direction in online education. Our work builds on these prior successes by extending and studying the use of a CI for SH prevention training. The goal is not only to acquire knowledge on the topic, as in prior uses of the interfaces, but also to arouse

learners' empathy towards the targets of SH and change attitudes about what type of behaviors are considered as SH.

3 DESIGN PRINCIPLES FOR SEXUAL HARASSMENT PREVENTION TRAINING

As summarized in Table 1, we enumerated principles recommended for designing effective SH prevention training from the literature [13, 16, 19, 45, 46, 48, 49, 53, 59] by searching key terms such as "sexual harassment training effectiveness" or "training design" in Google Scholar. We categorized the principles into three groups based on a prior work [53]: SH training content, instructional methods (*e.g.*, peer discussion and role play scenarios), and delivery mediums (*e.g.*, online, in-class). Inspired by Diehl's work [16] and literature about intelligent conversational agents [25, 41], we selected three of these principles, one principle from each group, as a starting point for our research:

- **P1. Foster empathy towards a SH target using first-person narrative.** Prior studies suggest that training intended to promote empathy (the ability to understand and share feelings) towards the targets of SH make a positive impact on changing SH attitudes [53]. Diehl and her colleagues found that presenting SH cases in first-person increased empathy and reduced attitudes that serve to excuse harassment [16].
- **P2. Use interactive and experiential methods.** Effectiveness of different training methods depends on the learning objectives. For example, passive learning methods such as lectures is useful for knowledge acquisition, whereas active and experiential methods (*e.g.*, role-play) is suitable for learning interpersonal skills. Experiential methods have been shown to be more effective than passive methods for reducing incidents of SH [45].
- **P3. Utilize synchronous delivery methods.** A synchronous delivery is a learning event in which a learner may interact with another in real-time (*e.g.*, online chat, face-to-face meeting). Prior research showed benefits of using synchronous mediums in the training [48]. For instance, Potter, *et al.* found that having in-person discussions with readings showed greater attitude change and knowledge gain than reading-only condition [49].

We designed a proof-of-concept CI that represents a novel synthesis of these three principles. However, the choice of a CI is not exclusive; it represents only one approach for how these principles could be implemented for a SH training program delivered through technology. Though our prototype focuses on the three principles only due to limited research scope and technical restrictions, additional principles could be incorporated into the implementation as we further study its usage for SH prevention training. Table 1 is intended to capture a broader design space for effective SH prevention training but should not be considered exhaustive.

4 DESIGN AND IMPLEMENTATION

The CI presents a SH vignette in first-person, simulating how a real person might discuss an incident of SH. The learner plays the role of a listener and participates in a real-time conversation to give advice and show reactions. As captured in Figure 1, a learner can start the conversation by saying hello to Jane. Then Jane responds

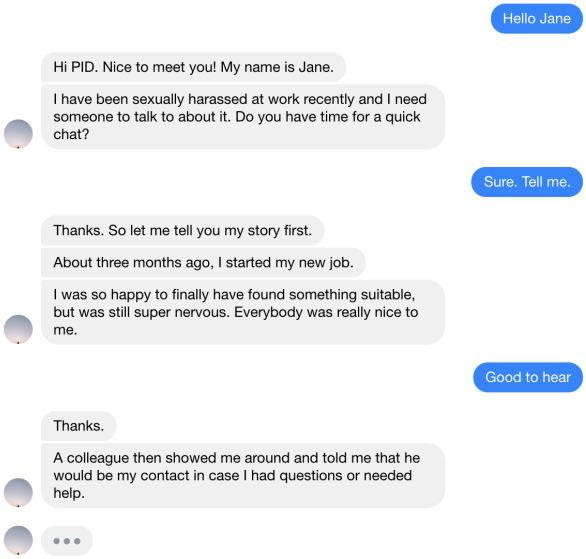

Figure 1: Messages on the left are from Jane and messages on the right are from the learner (Participant's ID: PID). After the learner says *"Hello, Jane"*, Jane starts chatting about her SH experience at workplace.

with two messages: *"Hi (Participant's ID). Nice to meet you! My name is Jane."* and *"I have been sexually harassed at work recently and I need someone to talk to about it. Do you have time for a quick chat?"* If the learner agrees, Jane starts narrating the vignette.

4.1 Sexual Harassment Vignette

We used the same vignette used in Diehl's work [16], where a female character unfolds her SH experience at work. Three months after she started working at her new workplace, a male colleague inappropriately complimented her. His inappropriate behavior escalated five weeks later when he put his arms around her and pressed her between himself and the photocopier, allegedly to help her operate the photocopier. The vignette escalates when he followed her after work and grabbed her arm. She pushed him away in panic and ran home. The vignette ends with her saying, *"For now, I am on sick leave. I don't see another way out; I guess I have to quit my job"*.

4.2 Implementation

We implemented the interface with Python, used Flask to build a webhook for Facebook Messenger Bot API, and hosted on Heroku server. We chose Facebook messenger due to the general familiarity of the tool and technical capabilities. All messages sent to and received from the learners were recorded in the PostgreSQL database. The interface was iteratively designed through multiple pilot studies. The goals of the pilot studies were to check whether our interface works without error, to observe users' interaction with the interface, and to get open-ended feedback about their experience. Based on the studies, we adjusted the speed and length of the the messages, designed phrases for quick replies, and prepared the responses that users are likely to ask.

Sexual harassment prevention training contents
• **Foster empathy towards targets of SH using first-person narrative [16, 53]**
• Clearly communicate organizational definitions, expectations, and reporting responsibilities of SH [53]
• Adapt contents to organizational context (*e.g.*, organizational climate, policies) and individual backgrounds (*e.g.*, gender) [45]
• Convey authentic contents (*e.g.*, interviews and testimonials) [59]
• Provide data-driven contents to reflect the frequency and relevancy of current SH occurrences [59]
• Include persuasive messages that the SH policies are legitimate and trainees should conform their behaviors to those rules [59]
Instructional strategies
• **Use interactive and experiential methods (*e.g.*, role-play) [45]**
• Set up pre-training to motivate trainees and evaluate readiness [19]
• Provide opportunities to practice behaviors (*e.g.*, how to respond to SH) [46]
• Incorporate specific and timely feedback about knowledge learned [46]
• Promote post-training support and resources to maximize retention [19]
• Increase exposure to SH training (*e.g.*, variety, length, recency of the training) [13]
Delivery mediums
• **Utilize synchronous delivery methods (*e.g.*, online chat) [48, 49]**
• Use computer-based training to address individual needs and legal concerns [53]
• Consider psychological safety for differing individual experiences (*e.g.*, small-sized classroom, confidentiality) [19]

Table 1: Design principles of SH prevention training derived from prior literature. The principles are not intended to be exclusive or exhaustive. In our CI design, we focused on the three highlighted principles.

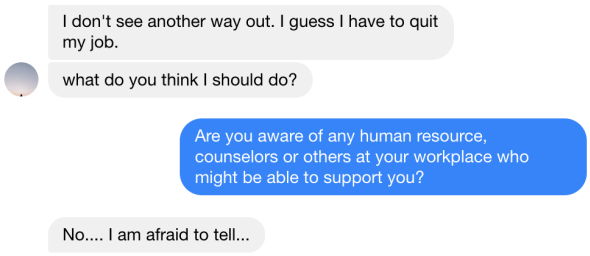

Figure 2: Open-ended message. A message on the right side is an example of an open-ended message that a learner can freely type their own response.

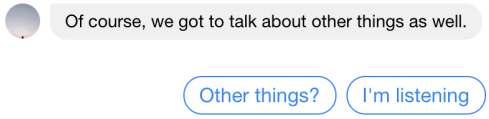

Figure 3: Quick reply. Suggested short messages in buttons (*e.g., "Other things?", "I'm listening"*) are quick replies that learners can click on rather than typing their own messages.

We chunked the vignette into 13 parts, and further separated each part into 3-4 messages. This process would make one message short (1-3 sentences per message) and easy to read. We also inserted prompts between two parts in which the interaction pauses or prompts a context-relevant question, and expects a response from the learner. The purpose is to simulate ordinary messaging experience and keep learners engaged. We created 13 prompts using two types of interactions: 5 open-ended prompts and 8 quick replies. We spaced these out within the vignette to promote engagement, but not so often that learners might perceive the prompts as interfering with the content or flow.

Open-ended prompts (Figure 2) allow the learner to write a free-form response to a given question. These prompt were used at points where we wanted the learner to reflect on the question and respond freely. The 5 prompts and their insertion points in the conversation were: "*Can you imagine how I felt?* (Prompt #5)", "*How would you feel if you were me at that time?* (Prompt #8)", "*What would you do if you were in my situation at that time?* (Prompt #11)", "*What do you think I should do?* (Prompt #12)", and "*Do you have any last thing to say?* (Prompt #13)". After receiving the learner's open-ended responses, the system continues the vignette without further discussion.

Quick replies (Figure 3) are responses that learners can select from a set of pre-defined responses rather than typing their own responses. Quick replies are useful when the system prompts the learner with a question for which the set of possible responses is limited. We used quick replies because we wanted to provide additional moments of reflection for the learner and be able to easily branch the conversation based on the learner's choices. We chose prompts for which we felt that quick replies would be most suitable depending on the context of the vignette and the expected number of responses to be made. We designed 1-3 quick replies per prompt based on user feedback from pilot studies. For instance, Figure 3 illustrates one prompt where the system pauses after a message saying, *"we got to talk about other things as well"*. We designed quick replies based on pilot studies that learners could either ask the *"other things?"* or react as *"I'm listening"*. The system gives appropriate responses according to the choices learners make. For example, if a learner clicks the prior quick reply, the system will answer, *"Things like where to find..."*.

We designed three additional interactions to improve the realism of the conversational behavior of the interface: question-answering, intention recognition, and typing action. First, we designed the

Jane's responses that could answer questions from learners. Based on pilot studies and brainstorming results, we anticipated questions learners might ask for the open-ended prompts and selected keywords that represent the questions. Then, we implemented a simple keyword matching algorithm from scratch that returns pre-defined responses when corresponding keywords are detected. For example, one participant asked, *"are you aware of any human resource, counselors or others at your workplace who might be able to support you?"* and the function detected the keywords *"human resource"* and *"?"* thereby replied, *"No.. I am afraid to tell"*. However, not all responses from the learner were able to be anticipated in the actual study, which we discuss in Limitations section. Second, the intention recognition checks whether some keywords are included in the messages. For instance, if phrases like *"keep going"* or *'I see"* appear in a learner's message, the algorithm understands that the learner wants to continue the vignette and acts accordingly. Other intentions include approvals (*e.g.*, yes), greetings (*e.g.*, hello), and end of a conversation (*e.g.*, bye). Lastly, we displayed a three-dot indicator for a typing receipt as shown at the bottom of Figure 1, namely the sender actions. These indicators were shown between messages for letting learners know when to wait and when to give reactions. We made 2- and 4.5-seconds gaps before short and long messages. We designed these to simulate realistic conversational behavior and provide time to read the received messages. One participant experienced a message delay longer than the intended gap due to a system error, which we managed to continue the study within a few minutes. Other than that, there was no major technical issue during the study.

5 METHOD

Our goal was to evaluate the use and design of a conversational interface (CI) to provide a virtual chatting experience with a target of SH for the purpose of SH prevention training. We also wanted to understand the perceptions of traditional SH prevention training and compare with our interface. We planned to answer the following research questions:

- **RQ1.** What strengths and weaknesses do learners perceive in the use of the CI for SH prevention training?
- **RQ2.** Does the experience through the CI increase empathy and improve attitude towards SH?
- **RQ3.** What limitations do learners perceive in traditional SH prevention training?

5.1 Participants

We recruited 32 participants from a university community in the United States through emails, email newsletters, flyers, and Reddit posts. We chose Reddit as we were able to target the local community subreddit for advertising the on-campus study. We did not enforce any selection criteria regarding their past SH training experience. However, we balanced gender across the conditions because gender is known to be a significant factor in determining SH attitude [9, 16]. The two groups were reasonably comparable by gender, age, education, ethnicity, residence, and occupation, as reported in Table 2. We also measured their pre-existing attitude towards SH using abbreviated Likelihood to Sexually Harass (LSH) scale [50, 51] before the study and found no significant difference between the two groups (U=111, Z=-0.6, p=0.5).

We found that 84% of the participants have done SH training in the past. Thus, most participants were able to share their experience and compare our interfaces to the traditional training methods. The types of training varied from in-class (N=15) to online (N=20), which represents the major current training methods [49]. People described their in-class training experience as a lecture-based program that professionals or student leaders discuss SH topics with other students, whereas online training was a combination of texts and videos with questions. The most commonly mentioned in-class training was Fycare workshop (www.fycare.illinois.edu/), which the university freshmen are required to take. The most commonly mentioned online training was provided by EverFi (https://everfi.com/), which the university employees and students are required to take every year.

5.2 Study Procedure

Participants went through an informed consent process and logged in to our website with their assigned ID (Control group: P1-16, CI group: P17-32). Before the experiment, participants completed a survey that asked demographics and pre-existing attitudes towards SH using abbreviated LSH scale [50, 51]. Then, the participants were randomly assigned to the experimental conditions: reading the vignette presented on the website (Control condition) or conversing through a messenger (CI condition). The Control condition presented the same vignette and the format (text) used in a prior study [16]. The CI condition presented the same vignette through a messenger embedded within the website.

In both conditions, we introduced Jane as someone who was sexually harassed in her workplace. Additional information was not provided to prevent different portrayals of Jane between the groups. We did not explicitly mention whether the vignette was fictionalized or autobiographical because adding the information may confound people's perception about the interface [30, 40] and most real-world CIs do not provide such information. Facebook Messenger was already logged in with the researcher's Facebook account to secure the participants' anonymity, which is one of the reasons why we chose the on-site user study. As required by the Institutional Review Board, we provided anti-harassment resources for the potential risks that our study may bring. After reading or chatting, the users completed a survey that measures their empathy towards the target and attitude towards SH.

After the survey, a semi-structured interview was conducted that lasted about 30 minutes. The authors created the interview questions and revised them through multiple pilot studies. First, we asked about their experiences and suggestions for improvement of the traditional SH training, if any, and to compare with the method we used in the study. We asked their impression, especially benefits and shortcomings, of either using the CI (CI condition) or reading the vignette (Control condition). We further asked about how they felt towards the vignette and the character in the vignette. Participants received $10 for the one-hour study, which is slightly higher than the current minimum wage in our state.

Factors	Range	Control (%)	CI (%)	Factors	Range	Control (%)	CI (%)
Gender	Male	6 (38)	7 (44)	**Ethnicity**	White	7 (44)	8 (50)
	Female	9 (56)	9 (56)		Asian	6 (38)	8 (50)
	Prefer not to say	1 (6)	0 (0)		Hispanic or Latino	3 (19)	0 (0)
Age	18-20 years	6 (38)	0 (0)	**Education**	High school degree or equivalent	0 (0)	3 (19)
	21-30 years	6 (38)	7 (44)		Some college but no degree	9 (56)	5 (31)
	31-40 years	1 (6)	3 (19)		Bachelor degree	3 (19)	5 (31)
	41-50 years	2 (13)	5 (31)		Graduate degree	4 (25)	3 (19)
	51-60 years	1 (6)	1 (6)				
Residence	Population larger than 50,000	9 (56)	7 (44)	**Occupation**	Students	12 (75)	8 (50)
	Suburb or small city	7 (44)	9 (56)		Others (accountant, filmmaker, *etc.*)	4 (25)	8 (50)

Table 2: Demographic profiles of the participants. The CI and the Control groups each had 16 participants. Both groups were comparable by gender, age, education, ethnicity, residence, and occupation.

5.3 Data Analysis

We interviewed participants to explore the benefits and the limitations of the interface they used **(RQ1)** as well as the shortcomings of the traditional training methods **(RQ3)**. Also, we conducted surveys to learn about the effect of the conversational interface on empathy and attitude towards SH **(RQ2)**.

5.3.1 Interviews. We used thematic analysis [10] to address the first and the third research questions. Researchers first recorded and transcribed all interviews. Two researchers independently coded the idea units using the transcripts. The researchers discussed and grouped the codes into higher-level themes until a consensus was reached. To test inter-rater reliability, a coder who did not participate in the open coding was trained on the themes. We randomly selected a subset of the data (approx. 15%) as a test sample. The coder and one of the researchers labeled the sample independently and compared the results. Cohen's Kappas were 0.86 (Control condition) and 0.89 (CI condition), indicating *very good* agreement beyond what would be expected by chance [35]. Lastly, researchers and the coder counted the occurrences of each theme.

To address the first research question, two researchers first generated themes *within* each group and then compared the themes *between* the two groups. As both groups used the same vignette, we expected that the common themes that appeared in both groups were related to the content of the vignette, whereas the themes that only appeared in the CI group were related to the effect of the instructional media (conversational interface). To answer the third research question, researchers discussed the common themes that appeared in both groups.

5.3.2 Surveys and measurements. For the second research question, we did linear mixed-effects analyses using *lmerTest* package in R [34] with survey results. We used abbreviated LSH scale [50, 51] to measure pre-existing attitude towards SH before the experiment. After the experiment, we measured attitude towards SH and empathy towards Jane. We used Sexual Harassment Myth Acceptance (SHMA) [39] (α=0.87) to measure attitude towards SH. SHMA is a comprehensive scale that contains subtle misconceptions about SH and used to measure attitudes and beliefs that serve to excuse sexually harassing behaviors. The reason we used LSH and SHMA scales is that they are the most frequently employed attitudinal measures of SH [53], and were also used in the most related prior work [16]. We measured empathy using an 8-item scale of empathy-related reactions [5, 43] (α=0.81). We also measured empathy during the interview using the Inclusion of the Other in the Self (IOS) scale [4] which we show seven Venn diagrams of two circles, each circle representing Jane and the self, in different degrees of overlap. We asked respondents to select a diagram that best describes their relationship with Jane and why.

6 RESULTS

In this section, we describe the perceived benefits and limitations of the CI **(RQ1)**. We then discuss the effect of the conversational interface on empathy and attitude towards SH **(RQ2)**. Lastly, we describe the limitations of traditional SH training **(RQ3)**. The $N_{condition}$ denotes the number of participants in the *condition* group who mentioned that theme.

6.1 Benefits of the Conversational Interface Design (RQ1)

We describe four benefits of the *conversational interface* mentioned by participants in the CI group only: immersive storytelling, interactive learning, effective presentation, and comfortableness discussing a sensitive topic.

6.1.1 Immersive storytelling and motivation (N_{CI}=15). Participants mentioned that they were immersed in the situation and became motivated to take the role of a helper to Jane by supporting and giving resources, even though they were aware that Jane is not a real person: *"I would want to guide her to some resources or just give some advice. (...) If someone is suffering, as a good human being, it is your job to help them out. Even though, you know it is not a real human being"* [P19]. Some people mentioned that the role-play was so immersive that they felt responsibility in making genuine and helpful remarks: *"I feel as if my actions have more influence and more responsibility, to be honest, and give genuine responses"* [P17].

6.1.2 Interactive learning and the value of conversation (N_{CI}=14). Participants mentioned that the interactivity of the media in which participants send and receive messages to and from the CI improved the learning experience: *"You don't skip through it. If it's interactive, you don't get bored"* [P18]. Participants who have not experienced similar conversation valued the opportunity to interact with Jane: *"this is the first time I got a chance to talk to someone (who went through SH). So now I can understand their emotions better"* [P19].

6.1.3 Effective presentation with suspense (N_{CI}=9). Participants found the chatting experience engaging because breaking up the long paragraph into several messages showed the information in a concise way: *"I don't like reading long things. I like it (CI) because it just breaks it up"* [P28]. Also, reading messages one by one added suspense to the vignette: *"(When using a CI,) you add in suspense*

kind of the thing because you don't know what she (Jane) is going to say after that. In an article, you know the information (given to you) has already been defined and edited." [P19].

6.1.4 Comfortableness discussing a sensitive topic (N_{CI}=8). People endorsed the idea of using the CI as they felt less vulnerable to other's reactions: *"People are scared about their (people attending in-class training) reactions. SH is a lot more sensitive (topic) so maybe people will feel more comfortable talking with a chatbot (CI)"* [P29]. Thus, participants mentioned that they were less afraid of communicating their opinions when using the interface: *"People can ask their questions and be honest, and not be judged by another person"* [P18].

6.2 Benefits of First-Person Narrative (RQ1)

In addition to the four unique benefits that emerged from the CI group only, there were two benefits that the group mentioned due to the *first-person narrative style* of the vignette. Similar benefits were also mentioned in the Control group because both groups shared the same vignette.

6.2.1 Realistic and relatable scenarios ($N_{Control}$=11, N_{CI}=9). Participants mentioned that the first-person narrated scenario felt more realistic and relatable to themselves. Participants liked how the thought process of the main character was described in detail with *"emotions of the person"* [P22], thereby conveying the vignette in a more relatable way: *"it puts people in more of a personal perspective as in like this person is actually talking to you"* [P20].

6.2.2 Sympathy ($N_{Control}$=8, N_{CI}=13). Participants mentioned how the first-person narration of the vignette helped them to sympathize more with the target. P14 said, *"I think it (first-person narrative) even brings more pathos into it and you feel more like it is you, like sympathize more"* [P14]. Although most participants endorsed the first-person narration, one subject pointed out a caveat of having too much sympathy: *"I need to give suggestions to Jane, that means I shouldn't fully dive into what she says (...) From a third-person view, I can better see the whole situation"* [P10].

6.3 Limitations of the Conversational Interface Design (RQ1)

Participants described three main limitations of the CI experience: infrequent and hurried responses, limited coverage of resources, and bounded conversation.

6.3.1 Infrequent and hurried responses (N_{CI}=8). People mentioned that they wanted to send messages more frequently and in open-ended messages. Although the CI is a text-based communication in which people can take time to read the messages as long as they want, P32 mentioned how users could feel pressured to give quick responses: *"It feels like at some point you are required to produce a response in a quicker turnaround. So, if you can't really find the resources right there, then you feel like that you are not very supportive to that person"* [P32]. Our finding discovered that users could feel pressured to respond immediately when immersed into an emotional conversation.

6.3.2 Limited coverage of resources (N_{CI}=4). Our design focused on improving learner's attitude about SH rather than providing existing resources. Participants noted that it would be difficult to incorporate mentions of all resources in a dyadic conversation. A CI design might therefore serve as a useful complement, rather than a replacement, to traditional training programs.

6.3.3 Bounded conversation (N_{CI}=12). Participants felt that a CI would be unable to engage in a deep conversation. This limitation may also inhibit the conversation: *"A lot of people would probably just try to get it done as fast as possible because they know it's fake"* [P17]. These perceptions were likely affected by the prototype nature of the CI used in our study. Some participants felt that technical advances would continue to improve the viability of using CIs for training.

6.4 The Effect of Interface on Empathy (RQ2)

We built a linear mixed-effects model and performed ANOVA on Empathy. We included Interface as a fixed-effect variable and LSH (pre-existing attitude towards SH) as a random-effect variable. We did not find significant difference between the conditions when predicting Empathy (Control: M=6.10, SD=0.85; CI: M=5.73, SD=0.68). There was no significant difference in the IOS empathy levels between the two groups (Control: M=4, SD=1.32; CI: M=4.12, SD=1.31).

The first author open-coded and categorized the responses of one interview question where we asked about a user's choice of the IOS empathy level [4]. In both groups, the most common reason that explained users' empathy was related to the extent of overlap between their direct or indirect experience in the past and that of Jane's (*e.g.*, *"I went through a couple things like her, so I get her. But never had exact experience. I can relate to how she feels but not what she is going through"* [P1]). Some participants reported less empathy if their current situations were different, although they had similar past experience (*e.g.*, *"her experiences are not so much mine anymore as it was me 10 years ago"* [P9]). We did not ask about the past or current experience of SH in this study due to its sensitivity and risk, but it could have been a possible factor that affected the results.

One reason that stood out in the CI group was about the level of personal connection with Jane. Three participants in the CI group mentioned that chatting about a personal experience through messenger brought the feeling of trust (*e.g.*, *"she did confide to me with her situation and her personal life and she trusted me enough to give her advice,"* [P17]). However, 7 participants in the CI group said the connection was shallow: (*e.g.*, *"If I know someone that just was like Facebooking me said this and it wasn't like a close friend, I still wouldn't feel like super close"* [P28]). The results imply that a feeling of connectedness (*e.g.*, friendship) is important to increase empathetic interaction.

We measured SHMA in which lower SHMA implies lower acceptance of SH misconceptions, thus more favorable. We didn't find a significant effect of Interface when predicting SHMA. We found higher Empathy was associated with lower SHMA ($\chi^2(1)=5.52$, $p<.05$), which means designing empathy-arousing interfaces is a promising approach to improve attitude towards SH.

	Limitations of Traditional Training (RQ3)	Benefits of the Conversational Interface (RQ1)
Interface	**Tedious and commonsense:** Users felt tedious and overwhelmed because *"too much information was thrown at you at once"* [P18] and *"most of it was common sense"* [P17].	**Effective presentation with suspense:** Users felt less overwhelmed because they could read one message at a time and *"suspense because they didn't know what she (Jane) was going to say"* [P19].
	Lack of motivation: Users had little motivation that *"they just did it because it was mandatory"* [P1].	**Immersive storytelling and motivation:** Users were immersed into the realistic simulation that they felt motivated to be engaged: *"If someone is suffering, it's their job to help them out"* [P19].
	Lack of interaction: Training (esp. online training) had limited interaction that participants thought it was *"not a good way to get people's attention"* [P20].	**Interactive learning and the value of conversation:** Participants actively interacted to continue the conversation because *"you don't get bored"* [P18] and *"this is the first time I got a chance to talk to someone (who went through SH)"* [P19].
	Fear of being judged: Training (esp. in-class training) felt uncomfortable because SH *"is a sensitive topic"* [P5] to discuss in person.	**Comfortableness discussing a sensitive topic:** *"Not being judged by another person"* [P28] encouraged users to speak up their honest opinions about SH.
Scenario	**Hypothetical scenarios:** Scenarios were perceived as *"unrelatable"* [P1] that participants *"don't anticipate being involved in such things"* [P12].	**Realistic and relatable scenarios:** Scenarios were perceived as realistic and relatable because it *"portrayed the thought process"* [P5] in detail.
		Sympathy: Scenarios helped participants to *"sympathize with the person"* [P8].

Table 3: Summary of the five limitations of traditional SH training methods (middle column) identified in our study. We found that the limitations contrasted by the six benefits of the CI approach (right column).

6.5 Limitations of Traditional Sexual Harassment Prevention Training (RQ3)

We interviewed participants about their past SH training experience and five themes of shortcomings emerged. In Table 3, we summarized the limitations and how they align with the benefits of the CI. Note that the themes are derived from both groups (N_{Total}), rather than the condition groups independently.

6.5.1 Tedious and commonsense (N_{Total}=13 (Control: 10, CI: 3)). Participants remembered their experience as skipping through online videos and lectures or attending mandatory workshops while glancing at their mobile phones. Participants said that the training was overwhelming: *"Too much information is thrown at you at once"* [P18]. Also, people mentioned that most of the information was common sense to them, thereby, felt tedious: *"I grew up knowing these things are wrong so it wasn't new to me"* [B2]. However, participants understood that the information has not much room for the change, thus, some people mentioned *"changing the format might be a good idea"* [P8], instead of changing the content. We explored a CI as a new format of delivering SH cases and found that users felt less tedious and suspense about what message would come next (subsection '*Effective presentation with suspense*').

6.5.2 Lack of motivation (N_{Total}=10 (Control: 5, CI: 5)). Participants mentioned that they just wanted to finish their requirement, thus not motivated as much as they should. To encourage motivation, P18 suggested incentives such as telling them that *"their responses are going to be graded later"* or *"used as to help this chatbot talk with another person who went through SH"* [P18]. Also, P26 suggested a different format that offers other motivating reasons towards the training: *"Offering them in different formats might help people to understand the reason behind them and why they are important, as opposed to just being a mandatory saying that you have to do it"* [P26]. Our CI design offered a new format of training in which people felt responsibilities to help Jane and were motivated to look for resources and give advice (subsection '*Immersive storytelling and motivation*').

6.5.3 Lack of interaction (N_{Total}=10 (Control: 3, CI: 7)). Although online training has adopted some interactive features to get people's attention such as clicking buttons or solving quizzes, people still thought they are limited: *"Sometimes, I would just space out and not be listening to the videos."* [P20]. For suggestion, some subjects said they would like to have more interactions: *"Perhaps if there were more ways to interact, that might be more interesting."* [P8]. Moreover, P20 mentioned that having a conversation with another person would be a more productive approach: *"you bounce around ideas that you want to talk about, which is more productive"* [P20]. We found that the CI design enhanced the interactivity of the training, thereby held users' attention (subsection '*Interactive learning and the value of conversation*').

6.5.4 Fear of being judged (N_{Total}=4 (Control: 1, CI: 3)). People mentioned how they felt *"uncomfortable"* [P6] to talk about SH in person. Specific to on-site training, students felt *"pressured to have a reaction or show that I am understanding"* [P25], and felt *"vulnerable"* [P31] to talk about such a sensitive issue in front of others: *"it's a very sensitive material to students (so that) it's hard to speak about, even if it's strangers but you might encounter them again like it's hard to voice"* [P29]. Also, P31 mentioned that some people could feel vulnerable in on-site training such as *"If you have some kind of SH experience yourself you might not want to share that in a room full of people"* [P31]. A comfortable environment to make honest opinions was important to participants and, in that sense, online was preferred than on-site training: *"It (online) makes you feel less vulnerable because you only interact with the computer"* [P31]. This shortcoming could be addressed by using a computer-based method rather than in-person communication and one way could be using the CI that learners found it comfortable (subsection '*Comfortableness discussing a sensitive topic*').

6.5.5 Hypothetical scenarios (N_{Total}=12 (Control: 7, CI: 5)). Participants mentioned how scenarios and examples felt unrelatable to themselves because *"people feel that it will never happen to someone that they know. (...) It doesn't relate to people"* [P4]. Participants suggested more realistic and personal examples to make the training more realistic: *"A real life scenario is important because you can*

identify if something is going on, you can relate to (the real situation)" [P19]. This limitation could be addressed by presenting SH case studies in first-person narrative from the CI in which it was found to make the vignette more realistic and relatable (subsection '*Realistic and relatable scenarios*').

7 DISCUSSION AND DESIGN IMPLICATIONS

When we interviewed participants about traditional SH training, they described the training as tedious, un-motivating, non-interactive, unrelatable to themselves, and uncomfortable to express honest opinions. These reported limitations contrasted surprisingly well with the benefits of our CI approach; a more engaging, motivating, and interactive experience without fear of being judged by others. Especially, many participants were surprised to realize how unprepared they were to give helpful advice to Jane and were motivated to attend to information and resources that they previously thought commonsense. This finding shows that our approach could be useful as a motivational instrument before the training starts. In addition, the first-person narrative of the vignette described the emotions and thoughts of the character so that learners could sympathize and relate to the situation. These benefits might be best explained by transportation theory [24]. Transportation theory explains the persuasive effects of narratives that transport users to feel connected with the protagonists, thereby increasing enjoyment, engagement, and motivation. This study demonstrated success in transporting participants in SH cases as they were immersed in the chat and motivated to help the character. Also, using the same medium people use to communicate with another (messenger) could have helped the transportation process.

One of the goals for SH training is to promote empathy within the learner. Although we found no main effect of Interface on Empathy, we discovered directions of improvement from the interview. First, our study suggests that building a personal connection (*e.g.*, friendship) between the learner and the persona of the CI is important for empathetic relationship. Thus, future designs of CIs could aim for establishing the connection such as adding rapport-building conversation. In addition, empathy could have been stronger if Jane's situations felt more similar and relatable to a learner's circumstances. Designers may want to personalize the CI and the vignette based on the social, cultural, and work context of the learners. Given that some participants wanted to distance themselves from the character to advise from an analytical viewpoint, the relationship between a learner and the character should be carefully designed to lead to more empathy, such as an empathy-giver (*e.g.*, friend) rather than a problem-solver [14]. Similar to a prior work in which people had empathy towards the agent after casting into a role of the chatbot [61], it may be even possible to create a CI that learners cast into the role of Jane.

A common goal for designing CIs is to simulate a natural human-to-human conversation with perfect human-likeness [31]. However, we discovered that the participants in our study did not want the interaction to be real, but realistic, in the context of SH training. When we asked whether they would prefer an online chat with a real person who experienced SH over our system, 9 participants preferred our system, compared to 5 participants preferred a real person. Using our interface, participants felt more comfortable to express their honest opinions about a sensitive topic: *"SH is a lot more sensitive, so maybe people will feel more comfortable talking with a chatbot"* [P29]. The finding indicates designing CIs in SH training or possibly other sensitive domains may not focus on human-likeness. For instance, a CI that reacts to the user's responses as real humans do may not be desirable to promote users' honest opinions and comfortableness. Then, we asked whether they want to online chat with a real person, but an actor who role-play as Jane. Interestingly, all participants preferred the virtual agent over an actor because *"an actor feels like a faker because they act the things that aren't their stories [P29]"*. People may have lower expectations of the virtual agent compared to a real person, thus higher acceptance to the story that the agent unfolds [8].

Despite the fact that participants preferred to engage in an online chat with the virtual agent over a real person, knowing that the conversation is not with a real person at start demotivated some users to have more interactions. Prior research suggest that a CI should explicitly identify itself as a machine, not pretending to be a human [31], and describe its capabilities at the start of the conversation to reduce the expectation gap [26]. Our finding implies that the prior discussion could be situational in which the designers need to decide when and how to disclose the identity of a CI based on its context of use. Although revealing capabilities upfront can be useful for task-oriented CIs, designers of non-task-oriented CIs such as social chatbots may consider benefits of revealing the identity later in the conversation.

In this study, the CI represented a female persona, Jane. Using a single representation allowed us to determine the differences between the conditions as well as to avoid the situation where the effects of the conditions may be eroded by the effects of an unexpected persona. Building on to our research, the interaction between the gender of the protagonist and of the user could be an interesting direction for future research. Other demographic factors such as race should be further tested in the design as Liao and He found that racial mirroring influence human-agent interaction [38].

The findings of this work could generalize to other domains. First, the CI design could be utilized in other training programs that include case studies such as ethics and security training. CIs that narrate the case studies from a first-person perspective would allow realistic and engaging learning experiences. Second, the CI approach could be explored in the domains that deal with sensitive topics. For instance, users would feel more comfortable to engage through a CI when counseling for stigmatic or traumatic experiences. Finally, our discussions about empathy-arousing designs could be beneficial to other domains where empathetic reactions from users are valued such as medical crowdfunding.

7.1 Limitations

The CI used in the study was a proof-of-concept and had limited technological scope. Future research is needed to evaluate the perception and the impact of an advanced implementation of the interface that supports multiple-turn and contextual responses [65]. Second, this study focused on a text-based CI where the user interacts through a messaging interface. The text-based interface was sufficient for exploring the value of the approach for SH prevention

training. However, the design community has increasingly advocated for the embodiment of conversational agents [57] and future work should evaluate the effect of adding different visual representations to the CI. Third, we used a single fictional vignette for the study. Future research could consider designing different types of the vignette such as authentic narratives (*e.g.*, Twitter posts). Fourth, the novelty effect may have added to the positive perception of our interface. We do not know how repeated interventions would affect their perception in the long-term. Lastly, our study included 32 participants from a university community. Therefore, we are scoping our claims based on our sample, where 84% of the users had past training and 59% of the users were 18-30 years old. Future research is needed to test our findings for a broader group of participants including people with less training experience as well as diverse backgrounds and beliefs.

8 CONCLUSION

We explored the design of a CI as an instructional method for SH prevention training. The CI delivers a vignette through a first-person narrative and messaging interface, and engages the learner through open-ended and quick-reply prompts. Through a user study, we found unique benefits of using a CI for the training, including engagement through interactive discussion, immersion through role-playing as a listener in the vignette, and comfortableness of discussing a sensitive topic. The benefits favorably contrasted with the perceived limitations of the traditional SH training that participants had previously experienced. Although we found no significant difference between conditions on empathy, we suggest that meaningful relationship between the learner and the persona of the CI and personalization of the vignette can increase empathy. Our research advances the design and the use of CIs for SH prevention training and other domains that aim for engaging, empathetic, and emotionally comfortable user experiences.

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