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Research Paper

Conversational-Linguistic Politeness for Chatbot Design: an Evaluation of Parameters and Card-Based Approaches

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Abstract. Chatbots often find it challenging to meet user expectations by providing appropriate responses and engaging in natural dialogues. Previous research suggests that incorporating linguistic and conversational strategies, particularly those centered on politeness, can significantly enhance user satisfaction and interaction quality. However, current conversation design practices often lack clear guidance to support these strategies, leaving designers to rely on personal preferences. To enhance the design of polite chatbots, previous work has investigated the use of politeness parameters, which help in understanding how politeness is expressed in chatbot dialogues through language function variety and indirect communication. In this work, our initial focus is on assessing participants' perceptions when exposed to different uses of these parameters. To achieve this, three fictional scenarios were presented to six participants to assess the combined impact of various politeness parameters. Although participants acknowledged different polite design strategies, discussing the parameters during the interactions proved challenging. To investigate the use of these parameters during the design process, we instantiated them in a card-based tool with four categories. A workshop was conducted for evaluation where seven participants first designed polite dialogues without the cards. Then, the participants were presented with the cards to reflect on whether they could have supported the design process. Some benefits mentioned by participants included supporting tailored dialogues, guiding design decisions, and maintaining a consistent tone. In summary, our contributions involve evaluating the effectiveness of politeness parameters as design tools, introducing a set of four cards to assist in formulating politeness strategies (currently used in educational settings), and exploring user perceptions when presented with these cards.

Keywords: Chatbot, Culture, Politeness, Indirectness, Conversation Analysis, Card

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1 Introduction

Since the year 1950, the concept and utilization of chatbots have been evolving and expanding [Chaves and Gerosa, 2021]. Human beings commonly engage in natural language dialogue, which serves as a fundamental social practice [Marcuschi, 1991] and is the key method for accomplishing objectives during interactions with chatbots [Chaves *et al*., 2022]. For the linguist Marcuschi [1991], characteristics of conversations include interactions between at least two speakers, turn-taking, opening, and closing, all of which are standard features in conversational agents.

The concept of individuals talking with chatbots in everyday language, as suggested by Følstad *et al*. [2021], is undergoing a transformation driven by advancements in Large Language Models like Ghatgpt [1]. Despite these advancements, many current chatbots still face challenges from their limited capabilities, with interpreting user inquiries, providing suitable responses, and maintaining natural conversations [Singh and Beniwal, 2022], often resulting in unmet user expectations and frustration Følstad *et al*. [2021]. Hence, developing a deeper understanding of conversational practices is crucial for the success of chatbots Chaves *et al*. [2022].

Previous studies have explored the utilization of linguistic strategies in conversational interfaces. For instance, linguistic theories from the fields of Conversation Analysis (CA) and Pragmatics have been used to support chatbot design and implementation, as demonstrated in studies by Dall'Acqua and Tamburini [2021], and Moore and Arar [2019]. Empirical studies in the domains of tourism [Chaves *et al*., 2022] and health [Hu *et al*., 2022] have shown the significant impact of linguistic choices on user perceptions. For instance, [Chaves *et al*., 2022] found that the appropriate register significantly influences user perceptions, while Hu *et al*. [2022] explored the use of politeness theories for conversational agents.

Politeness, a multifaceted and culturally influenced phenomenon [Searle, 1979; Chaves and Gerosa, 2021]. Its concept varies across cultures, languages, and social contexts [Searle, 1979]. While discussions on culturally informed conversation design have focused on language aspects like colloquial vocabulary [Monteiro and Salgado, 2023], there exists a current gap in well-defined theoretical frameworks tailored to the conversation design process [Chaves *et al*., 2019]. As a result, designers often depend on their linguistic inclinations and individual preferences [Chaves *et al*., 2019], which can be influenced by their language habits and socio-cultural environment. In some cases, this can reinforce stereotypes [Monteiro and Salgado, 2023].

Hence, existing literature lacks the necessary support for conversation designers to establish culturally polite communication strategies in chatbots. This study specifically delves

[1] https://openai.com/, accessed: 15 October 2025.

into the incorporation of politeness in chatbot communication, aiming to thoroughly investigate this culturally-influenced aspect. In a study by Monteiro *et al*. [2024b], we identified distinct politeness strategies employed by elementary school students for crafting simulated dialogues utilized in chatbots. The politeness strategies in the chatbot mock dialogues revolved around two key parameters: language function variability and the use of indirectness.

To understand how these politeness parameters can support conversational designers in designing polite chatbots, we describe our process for evaluating the application of these politeness parameters. More specifically, we aim to answer the following research questions:

- RQ1 - How do participants perceive the use of the politeness parameters as chatbot conversational strategies?
- RQ2 - How do participants perceive and classify chatbot dialogues as polite?
- RQ3 - How do participants perceive the chatbot conversation designer's intent?

To address the research questions, we conducted a qualitative study in which we designed three fictional scenarios. Each scenario featured context, dialogues between a chatbot, conversational intentions, and politeness parameters. We asked participants from diverse backgrounds to identify the strategy and intention in each scenario and determine whether the dialogues could be considered polite.

The main findings indicate that adapting the dialogues using the politeness parameters resulted in the identification of various strategies in the scenarios, as well as different values associated with politeness (e.g., kind, cold, rude), and the alignment of participants' understanding of the designer's intent with the objectives of the scenarios. However, these politeness parameters proved to be hard to operate with at the design time by IT professionals who lack a background in Linguistics. During the workshop, some participants suggested improving the chatbot's utterances by adding phatic expressions to help convey meaning, while others found indirect utterances to be awkward and unnatural. However, they struggled to explain why some phrases and structures worked better than others. This challenge is because adopting politeness strategies comes naturally to humans and is often not consciously thought about in terms of linguistic and conversational parameters[Chaves and Gerosa, 2021].

Additionally, when discussing politeness strategies, participants often referenced values such as formality, humanlikeness, or efficiency rather than talking about the politeness parameters directly. This reflects the challenge of implementing the politeness parameters in practice, as they require a deep understanding of the complex linguistic and cultural properties of politeness. These observations highlight the need for clear and practical guidelines for incorporating politeness parameters into chatbot design, leading us to organize the politeness parameters in cards that can help structure discussions among designers, teams, stakeholders, and end-users.

In this extension of our work in Monteiro *et al*. [2024a], we explore how a proposed set of design cards can support the process of designing polite chatbots. We explore design issues and opportunities by addressing two central research questions:

- RQ4 - How do participants perceive designing polite chatbots without the cards?
- RQ5 - How could the cards support this process?

To examine these questions, we conducted a workshop in which participants redesigned an educational chatbot for politeness. They first redesigned dialogues without using the cards and then explained their choices. Later, they were introduced to the cards to assess their potential support, with the aim of preventing bias in participants' reasoning. Finally, our results were categorized using a qualitative coding method [Denzin and Lincoln, 2008; Creswell, 2007].

When analyzing the process without the cards, participants heavily relied on individual preferences, prior experiences and external cultural influences, leading to an unstructured process with contradictions, as previously observed in other works [Chaves *et al*., 2019]. When asked about the possible benefits of using the cards, participants mentioned supporting reflection on how to tailor dialogues, aiding in the process of writing dialogues, serving as a verification point for researchers and practitioners to define a tone of voice, and assisting design practices, among others.

Finally, our main contributions are: (1) assessing politeness parameters in chatbot communication, (2) providing a set of cards for designing polite strategies, and (3) exploring a tailoring process for chatbots to promote politeness without traditional design resources and evaluating the proposed cards. We also discuss ethical considerations in dialogue design.

This work is organized as follows. Section 2 presents related works that inform the research. In Section 3, we discuss the theoretical concepts that support our study. Section 4 outlines the methodology of three steps, including data collection, workshop and analysis procedures. For Step 1, Section 5 details the methodology and Section 6 the results. Section 7 describes our process of defining the cards in Step 2. For Step 3, Section 8 describes the methodology and Section 9 its results. In Section 10, we analyze the implications of our findings. Finally, in Section 11, we conclude our work and provide reflections on limitations and future directions for research.

2 Related works

The field of conversational agents has seen rapid growth, with current design approaches focusing on using linguistic strategies to enhance user experiences. For instance, Dall'Acqua and Tamburini [2021] have suggested a practical workflow for chatbot projects based on Pragmatics and CA principles, aiming to understand the structured patterns of conversation creation and identification [Luff *et al*., 1990; Marcuschi, 1991]. This workflow involves defining project requirements, creating mock-ups, establishing ground truth, and project execution. The Natural Conversation Framework (NCF) is a versatile pattern language for conversational design grounded in CA [Moore and Arar, 2019]. It includes an interaction model, content format, pattern language for common conversational activities, and a method for navigating conversational applications.

In tourism-related interactions, Chaves *et al*. [2019] explored the influence of the register on chatbot user perceptions, whereas Chaves *et al*. [2022] found linguistic features that

affect appropriateness, credibility and user experience. For older adults' conversational interfaces, Hu *et al*. [2022] examined direct speech and politeness, categorizing dialogues using Politeness Theory and Grice's Maxims. They found that linguistic and non-linguistic features, directness, and neutrality influence politeness strategies during design.

In exploring culture and conversational design, studies have focused on language familiarity, voice, style, register, and proficiency [Monteiro and Salgado, 2023]. For example, grammatical errors in a non-native Intelligent Virtual Agent induced perceptions of cultural diversity [Obremski *et al*., 2021]. Other studies examined the effects of proficiency on interactions between immigrants and nationals in German universities [Lugrin *et al*., 2018]. Some explored linguistic and cultural differences between Chinese and Western cultures, aiming to design culturally sensitive conversational agents [Zhou *et al*., 2017].

In summary, integrating linguistic and CA perspectives is crucial during the design process of conversational interfaces. The workflow proposed by Moore and Arar [2019] provides practical and methodological guidelines for developing effective chatbots. Furthermore, studies investigating linguistic features, directness, and politeness cues can contribute to a personalized conversational design that better caters to users' needs. However, as mentioned earlier, despite previous investigations into politeness as a linguistic strategy in conversational interfaces and robots, the consideration of sociocultural knowledge in conversational design remains open, as emphasized by Hu *et al*. [2022]. In the next section, we present the theoretical concepts that guide our work.

3 Theoretical foundations

In this section, we describe theories and concepts about language and communication, culture, and card-based design.

3.1 Language and communication

In the following subsections, we introduce theories and concepts related to language and communication that support this work.

3.1.1 Conversation Analysis

Within the framework of CA, words are not analyzed in isolation as mere semantic units but rather as tools or artifacts that are strategically utilized in interactions. These communicative acts include requests, proposals, accusations, complaints, and others negotiated through talk. CA has always been an integral theory for understanding the patterns and structures underlying conversations [Luff *et al*., 1990], specifying the linguistic and sociocultural knowledge that must be shared for a successful interaction.

The objective of CA is to systematically describe structural characteristics that underlie particular aspects of a conversation. For example, it is common to find conversational exchanges which occur as paired actions. Schegloff and Sacks [1973] proposed the concept of adjacency pairs to analyze recurrent structural properties of the organization of paired actions. Conversational structures are normative, socially organized procedures [Luff *et al*., 1990]. Some common adjacency pairs may include (but are not limited to): Greeting - Greeting, Information-Thank/Acknowledgment, Offer - Acceptance, Question - Answer, Permission - Acceptance, Assessment - Agreement, Request - Promise.

3.1.2 Language functions

The seminal work of Jakobson [1960] has profoundly impacted several academic fields, including linguistic anthropology, literary studies, anthropology, and communication studies. In this influential work, Jakobson argued that every use of language has patterns, each with distinct functions. His communicational model has become a cornerstone of these disciplines and continues to influence scholars today. As presented in[Jakobson, 1960], Jakobson's model offers a comprehensive framework for understanding the various functions of language. This model posits that each factor in the communication process corresponds to a distinct function of language:

- Conative function: used to persuade someone to take a certain action or respond in a certain way, usually expressed through vocatives and imperatives.
- Expressive or Emotive function: used to convey the speaker's attitude or emotions towards the discussed topic.
- Referential or Informative function: used to describe, identify, and categorize objects, events, or ideas. It conveys factual information.
- Metalinguistic function: the use of language to talk about the language itself.
- Phatic function: used to establish, prolong, or discontinue communication.
- Poetic function: used to focus on the aesthetic aspects of language.

3.1.3 Indirectness and (im)politeness

Indirectness involves non-literal meaning arising from a mismatch between an expression and its intent [Haugh, 2015]. Searle [1979] was the first to connect the concepts of indirectness and politeness as a cultural phenomenon [Searle, 1979; Haugh, 2015]. Although some mechanisms for indirectness are not language-specific, the standard forms of one language may not retain their potential as indirect speech acts when translated into another language. In this sense, during a translation, for example, there may be a mismatch between the speaker's intended meaning and the sentence's literal meaning [Haugh, 2015]. Also, Haugh [2015] identifies different types of indirectness:

- Conversation implicatures: speaker's intended meaning goes beyond the literal meaning of the words spoken. These are instances where a speaker means something else besides what is said.
- Indirect speech acts: when the basic sentence of the speech act does not match its intended meaning, as opposed to being based on propositional meaning.
- Indeterminate illocutionary acts: multiple illocutionary points that the speaker intends.
- Non-literal illocutionary acts: associated with figurative meanings, such as understatements, overstatements, irony, sarcasm, and metaphors.
- Collateral acts: non-serious conversational acts where the speaker does not intend to be held committed to

what they say, such as kidding, joking, punning, and mimicking.
- Pre-sequences: instances where a speaker assesses the addressee's response before proceeding with the intended speech act, such as in a request preceded by a pre-request or an invitation preceded by a pre-invitation.

3.1.4 Politeness parameters

According to Chaves and Gerosa [2021], manners refer to a chatbot's ability to exhibit a polite conversational behavior. Although the concept of politeness may differ across cultures, it generally pertains to managing relationships, with participants aiming to establish harmony in their interactions. In chatbot dialogues, manners can be demonstrated through specific speech acts such as greetings, apologies, and closings [Chaves and Gerosa, 2021].

A previous study [Monteiro *et al*., 2024b] explored how indirectness and language function could aid in understanding the manifestation of politeness in chatbot dialogue design. As previously stated, various studies have examined the relationship between indirectness and politeness. In addition, scholars have emphasized the need to consider culturally specific expressions of indirectness [Haugh, 2015]. For example, the English sentence "Can you hand me that book?" conveys an indirect request, whereas its Czech counterpart "Muzete mi podat tu knizku?" is more direct, representing different notions of politeness [Searle, 1979, p.50]. This parameter is based on Haugh [2015]'s six types of indirectness.

The language function parameter builds upon the communication model and the six language functions described by Jakobson [1960]. These language functions are also used in chatbots to achieve a specific objective, reproducing common behaviors observed in human-to-human chat interfaces [Chaves and Gerosa, 2021]. For example, if a chatbot is aimed at providing information or assisting users with specific objectives, incorporating phatic expressions such as "How are you?", "How can I help you?", and "Thanks," among others, can help build rapport with the user. This humanizes the interaction, creating a more natural and convincing exchange in chatbot conversations [Chaves and Gerosa, 2021].

3.2 Culture

Tylor [1871] is known for providing one of the earliest definitions of culture, which is still accepted today by some contemporary anthropologists. In his definition, culture is "that complex whole which includes belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society". Tylor believed that culture is a learning process rather than biological determinism.

Geertz [1973] believed that culture is essentially symbolic, and he viewed culture as "the fabric of meaning in terms of which human beings interpret their experience and guide their action." According to Keesing [1974], this approach makes Anthropology a matter of interpretation embedded in the contextual richness of social life.

Other perspectives view culture as taxonomic, a way to distinguish and classify people, activities, and settings [Hofstede, 2001]. In HCI research, Hofstede's cultural model is among the most widely known and cited [Salgado *et al*., 2015]. However, this approach does not favor research or HCI practitioners interested in identifying cultural aspects that may emerge from and be relevant to a particular cultural context [Salgado *et al*., 2015]. This research aligns with Geertz's [Geertz, 1973] interpretation and views culture as a learned, symbolic, and shared lens that people use to interact with, react to, and feel about symbols, terms, and situations.

3.3 Card-based design

Card sets, similar to standard playing cards, have been utilized in design for a while. Research indicates various card decks tailored for design facilitation, with an early example being The House of Cards, introduced in 1952 to stimulate innovative thought. Other examples include Meta Cards, Oblique Strategies, Creative Wack Pack, among others [Roy and Warren, 2019].

When considering the advantages of employing a card-based approach in the design process, cards serve as aids for inspiring, organizing, and communicating ideas [Carneiro *et al*., 2012]. Other benefits include fostering creative synthesis of information and ideas, building a common understanding and communication platform for teams, offering tangible representations of design elements or information, and presenting concise summaries of valuable information and methods [Roy and Warren, 2019]. Regarding weaknesses of card-based approaches, Roy and Warren [2019] identifies issues such as overwhelming users with excessive information, oversimplifying content due to space constraints, complexity hindering user comprehension and application, and challenges associated with updating the content.

Also according to the authors [Roy and Warren, 2019], there are five types of card-based design approaches: cards that provide prompts to stimulate creative thinking; cards that summarize good design practices, know-how, or information; cards that summarize design methods; cards that provide concepts for specific problems and domains; and cards that provide checklists to aid specific design tasks. Most card deck evaluations often consist of feedback from users on whether they liked or benefited from using them rather than design outcomes [Roy and Warren, 2019]. User trials and feedback suggest that designers and other users generally like card-based approaches. However, negative feedback primarily revolves around challenges in comprehending the use of certain decks, as well as confusion or information overload when individual cards contain insufficient or excessive content.

4 Methodology

The main goal of this research is to explore different methods to aid in designing polite chatbots. To guide our investigation, we employed language and communication theories and concepts. The study involved a team of three researchers who contributed at various steps of the research process: (A) Senior HCI specialist, (B) HCI specialist, and (C) Senior HCI specialist and Linguist. In summary, this research presents three steps: Step 1 - Parameters Evaluation, Step 2 - Card Development, and Step 3 - Card Evaluation.

In the Parameters Evaluation step (Step 1), we aim to address RQ1 (perception of politeness parameter usage), RQ2 (participants' perception of politeness in chatbot dialogues), and RQ3 (participants' perception of the designer's intent). In essence, Step 1 seeks to illuminate the subjective perceptions

and significance that individuals attribute to these parameters through a workshop involving designers and user participants.

Designing with these parameters can be challenging [Monteiro *et al*., 2024a] due to the complexities of linguistic and cultural expectations of politeness, requiring the designer to have a deep understanding of such concepts. To address this, in Step 2 (Card Development), we implemented a card-based approach. This strategy enhances creativity, promotes team alignment, provides tangible representations of design elements and information, and offers concise summaries of valuable insights and techniques.

During Card Evaluation (Step 3), we assessed the use of the cards in the design process. Here, we investigate participants' design approaches without the cards (RQ4) and the potential support provided by the cards when introduced at the study's conclusion (RQ5).

4.1 Data coding and analysis

Our data analysis was based on transcripts and documents generated from the workshop sessions. Participants used post-it notes to answer the workshop questions (Step 1 and Step 3), which we then collected and organized. For each workshop question, we gathered participants' responses from each session and excerpts from audio transcriptions.

Because our study heavily focuses on participants' perceptions of parameters, conversational strategies, politeness, and the designer's intent, we applied each step of the coding process as performed by researcher B, and then evaluated and discussed it with researchers A and C. Our coding process is defined as follows:

- I. Open coding is the initial stage of the analysis, which involves an inductive analysis of participants' responses to allow codes to emerge from the data [Denzin and Lincoln, 2008; Creswell, 2007].
- II. Evaluation and discussion.
- III. A code corpus is then defined for each question.

4.2 Research ethics aspects

We prioritize the protection of the rights and preservation of the dignity of research participants. In studies involving human subjects, our procedures align with the ethical standards in the Regulatory Guidelines for Research Involving Human Subjects - Resolution CNS nº 510/2016 [CNS, 2016].

All participants signed a Free and Informed Consent Form (FICF), and their identities were kept anonymous throughout all publications using an identifier (P). We made it clear that participants had complete freedom to withdraw from any activities at any time without providing justification. Their participation was limited to discussing topics related to the study via questions or filling out post-it notes.

All participants were informed that there were no costs or financial incentives for their participation in the study. The risks of taking part in the study were minimal. The only potential risk involved equipment failure or loss of internet connection during the session. In the event of any technical difficulties, participants had the option of rescheduling for another date. It should also be noted that, in case of any discomfort or embarrassment, participants could withdraw their consent at any time and discontinue participation without fear of negative consequences.

We would like to emphasize that, although there was no direct short-term benefits for participants, their involvement in this study provided them with a unique opportunity to learn about politeness while contributing to advancements in chatbot design. In terms of data privacy and confidentiality, we treated all data confidentially, anonymized them, and shared them only with our research team. We also ensured the highest level of privacy by using data collection techniques that did not identify each participant.

Finally, due to the small number of participants and for ethical reasons, the raw data from this research is not publicly available. This decision was made to protect the privacy and confidentiality of our research participants, as the data, even if de-identified, could potentially be used to identify individuals or groups. Access to protected systems was limited to the research team.

5 Step 1 - Parameters Evaluation

To evaluate the utilization of the politeness parameters, Step 1 was divided into four substeps:

- (1) Recruitment - Inviting potential participants, sending the pre-workshop form, and applying inclusion and exclusion criteria.
- (2) Preparation - Preparing and defining the scenarios for the workshop. As substeps: (a) Defining the context, (b) Identifying chatbots in that scenario, and (c) Applying the politeness parameters.
- (3) Workshop - Exploring the research questions through a live online session. As sub-steps: (a) Introduction, (b) Scenario presentation and discussion, and (c) Reflection.
- (4) Analysis - Utilizing the workshop outcomes to conduct qualitative analysis.

5.1 Recruitment

Potential participants with a connection to the research lab, including students and industry practitioners, were individually invited to take part in the study, which focused on two types of participants:

- (1) designer participants with knowledge in User Experience (UX), User Interface (UI), HCI, conversation design, chatbots, and front-end professionals with experience in the design process, and
- (2) user participants with a minimum level of previous interaction with chatbots.

The study's exclusion criteria encompassed professionals who lacked experience in the areas specified in the inclusion criteria, those under 18 years of age, and individuals unable to participate in the workshop remotely using a personal computer. The recruitment process for the workshop selected designers and other professional with no distinction of gender or age. After accepting the invitation, participants were sent a pre-workshop form. Along with the survey, participants received the Informed Consent Form, ensuring their understanding and agreement to participate in the study.

First, the survey contained questions on demographic information, including age, occupation, level of education, and place of residence. Additionally, participants were asked

about their familiarity with technology in general, previous experience with chatbots, frequency of using chatbot services, their level of trust in chatbot accuracy, preference for interacting with either a chatbot or a human to solve problems, belief in chatbots' potential to enhance customer service efficiency and quality, expectations regarding chatbot performance, and perceived advantages of using chatbots compared to human assistance. These questions aimed to provide a comprehensive understanding of participants' background, technological knowledge, and attitudes toward chatbot interactions.

5.2 Preparation

The process of designing the dialogues for each scenario followed three steps: (1) defining a context, (2) finding existing chatbots in that scenario, (3) applying the politeness parameters to the existing chatbots. To facilitate the process of applying the politeness parameters, we defined an intent statement. That designer's intent statement comprised who the expected user was, what the context of use was, and how and why the politeness parameters would be applied.

Table 1. First scenario presented to the participants.

Scenario	Imagine that you are a bank customer and have recently received a notification stating that your credit card invoice is overdue, but you are certain that you have already made the payment. Concerned about this incorrect information, you decide to contact the bank's chatbot to understand the reason behind this discrepancy in the invoice.
Existing chatbot inspirations	App BB [2], Bia [3], Santander [4]
Relationship	Between customer and the bank's virtual customer service assistant
Dialogue	**User:** Hello, I need help. **Chatbot:** Hello @name, how can I assist you? **User:** I received a notification that my invoice is overdue, but I'm certain that I have already paid it. **Chatbot:** Alright, may I have the card number, please? **User:** 1234 5678 9012 3456 **Chatbot:** Let me check that for you. Please wait a moment! **User:** Sure. **Chatbot:** It seems that there was an error in the system, and it generated an incorrect indication of a delay. **User:** Okay! **Chatbot:** Do you need assistance with anything else? If you have any more questions, don't hesitate to contact us again.

5.2.1 Scenario 1

As seen in Table 1, this scenario involves a user interacting with a bank chatbot. The intended users have the objective of resolving an issue with an invoice. During their interaction with the chatbot, which operates within an administrative/customer-service relationship, the chatbot assumes the role of an attendant responsible for addressing customer inquiries. This scenario used the following parameters:

- Indirectness parameter: indirect speech act.
- Language function parameter: informative, phatic.
- Brief explanation on the usage of parameters: Indirect speech act occurs when the speech does not directly convey the intended meaning. For instance, the phrase "Hello @name, how can I assist you?" not only signifies offering help but also serves to establish a connection in a polite manner, a language function parameter called phatic. On the other hand, a sentence like "Let me check that for you" lacks indirectness parameters and simply aims at providing information, a language function parameter called informative. Each parameter, whether indirectness or language function, may occur multiple times or in various combinations throughout dialogues.

[2]https://www.bb.com.br, accessed: 05 June 2024.

[3]https://banco.bradesco/bia/, accessed: 05 June 2024.

[4]https://www.santander.com.br/atendimento-santander/, accessed: 05 June 2024.

Table 2. Second scenario presented to the participants.

Scenario	Imagine that you are a customer of an electric utility company and need to transfer the account ownership for your electricity bill. However, after multiple attempts to contact the company via phone, you have been unable to receive proper assistance. Frustrated with the situation, you decide to turn to the company's chatbot in hopes of resolving the issue and completing the account ownership transfer more efficiently.
Existing chatbot inspirations	Enel assistant [5]
Relationship	Customer and the electric utility virtual customer service assistant
Dialogues	**User:** Hello, I need to transfer the ownership of my electricity account. I would like to know if you can help me with this matter. **Chatbot:** Of course, I'm here to help. For that, I'll need the address and name of the current account holder. **User:** The address of the property is 123 Flower Street, and the current account holder is João da Silva. I need to transfer the ownership to the name of Maria Santos. **Chatbot:** Here is the direct link to the form for transferring the ownership of the electricity account: link. When you access the form, please fill it out with the requested information, including the details of the new account holder, in this case, Maria Santos. After you submit the form, our team will contact you to proceed with the process. **User:** Ok, thank you. **Chatbot:** I'm glad I could help! If you have any more questions or need any further assistance, I'm here to assist you.

The chatbot's objective is to provide assistance, which aligns with the formal approach typically expected in banking contexts. By doing so, users can maintain a consistent communication routine and enhance their relationship with the bank, fostering a positive customer experience.

5.2.2 Scenario 2

As seen in Table 2, this scenario involves a customer of an electric utility company. The intended users have the goal of transferring responsibility for their electricity bill account. Their interaction with the chatbot takes place within an administrative/customer-service relationship, where the chatbot acts as an attendant to address customer queries. This scenario used the following parameters:

- Language function parameter: phatic, informative, metalingual.
- Brief explanation of the usage of parameters: Phatic in some of the dialogues refers to incorporating small talk throughout the conversation, such as "Of course, I'm here to help,". Additional instances may include phrases like "I'm glad I could help." "Metalingual" is exemplified in a sentence like "When you access the

[5]https://www.enel.com.br/, accessed: 05 June 2024.

form, please fill it out with the requested information [...],” indicating when the chatbot discusses its service and provides instructions on actions within its system.

The chatbot's objective is to provide assistance while aiming to create a sense of closeness between users and the service, particularly during the potentially stressful process of transferring the electricity bill.

Table 3. Third scenario presented to the participants.

Scenario	Suppose you are a patient diagnosed with a chronic condition, such as type 2 diabetes, and you are enrolled in a treatment program that involves diet control, regular exercise, and medication management. However, in recent weeks, you have been struggling to adhere to the treatment routine due to a lack of motivation and discipline.
Relationship	Patient and the chatbot assistant in the hospital's “nursing” department.
Existing chatbot inspirations	Work from Monteiro *et al*. [2020].
Dialogues	**User:** Hello, I'm having difficulties following my treatment routine. **Chatbot:** Hello, @name! I understand that sticking to a treatment routine can be challenging, but I'm here to support you. Let's find ways to regain your motivation and discipline together? **User:** How? **Chatbot:** First, it's important to remember the benefits. By following the routine, you'll be taking care of your health and reducing long-term risks. Do you want to deal with eye, kidney, and nerve problems? **User:** No, I don't! **Chatbot:** I'm here to support you throughout this journey. But you need to make an effort. Shall I remind you that you are capable? **User:** No, thank you. **Chatbot:** I'm glad to hear that! I'm confident that you are capable of getting back on track with your routine and achieving the best results for your health.

5.2.3 Scenario 3

As seen in Table 3, this scenario involves a user patient interacting with a health chatbot. The targeted users in this scenario have the objective to utilize the chatbot as a tool for monitoring their health activities. During their interaction with the chatbot, which operates within a nurse/patient relationship, the chatbot assumes the role of an assistant to the NCD (Non-Communicable Diseases) [Organization, 2023] support team. This scenario used the following parameters:

- Indirectness parameter: indirect speech act, pre-sequence.
- Language function parameter: informative, phatic.
- Brief explanation of the usage of parameters: The dialogue demonstrates different parameter combinations and individual uses. For instance, indirect speech acts do not always need a question sentence, as seen in “I understand that sticking to a treatment routine can be challenging,” which informs and aims to establish rapport. Through pre-sequencing, the chatbot offers engaging sentences like “Let's find ways to regain your motivation and discipline together?”

5.3 Workshop

The workshop was carried out using the collaborative online platform FigJam[6]. Participants were not required to register or have an account on FigJam. The workshop took place synchronously, using Microsoft Teams for interaction and audio recording purposes. The anticipated duration of the workshop was approximately 1 hour. The workshop had the following key steps:

- (a) Introduction: An overview of the workshop objectives was provided, followed by an icebreaker activity to encourage engagement and create a comfortable environment for participants.
- (b) Scenario Presentation and Discussion: Participants were presented with different scenarios relevant to the research topic. For each scenario, participants were asked to consider and respond to three specific questions.
- (c) Reflection: The workshop was concluded with a summary and wrap-up session, allowing participants to share any final thoughts, insights, or concerns they had regarding the workshop or the topic under investigation.

5.3.1 (a) Introduction

In (a), participants were introduced to the concept of politeness. They were also reminded of the objectives of the workshop and informed about each of the following steps.

5.3.2 (b) Scenario presentation and discussion

This step aimed to allow participants to discuss the use of politeness parameters in three different scenarios presented in Section 5.2. We focused on scenarios that closely resembled the participants' anticipated experiences in common situations in Brazil.

During the workshop, participants were not introduced to the politeness parameters and the designer's intent statement. This approach was expected to allow participants to naturally understand the designer's intent through the dialogues presented in mock-ups of the chatbot dialogues in Section 5.2. Tables 1, 2, and 3 present the scenario, users, and the mock-up dialogues.

The process involved presenting the scenarios to the participants and allowing them to read and become familiar with the content from the Tables. Next, participants were requested to answer three questions on post-it notes:

- Q1 - What is your opinion on the communication strategy employed by the chatbot?
- Q2 - Would you classify it as polite?
- Q3 - What do you believe was the intention of the designer when utilizing this communication strategy?

After the participants responded to the three questions on post-it notes, the answers were discussed during the workshop.

5.3.3 (c) Reflection

Participants were given four questions to answer about the (b) Scenario presentation and discussion:

- Q4 - Did you notice different strategies used in the scenarios, and if so, what were they?
- Q5 - Did you observe different intentions associated with the strategies?
- Q6 - Which strategy resonated with you the most?
- Q7 - Do you believe that different strategies can lead to different interaction outcomes?

[6] www.figma.com, accessed: 15 October 2025.

Participants were instructed to provide their answers on the post-it notes. After they answered the four questions, their answers were discussed.

6 Step 1 results

The results from Step 1 will be presented in the following sections.

6.1 Participants

Fifteen individual invitations were sent for the study, but after the screening process some participants were unable to attend the synchronous workshop on the available days. A pilot study was conducted with two participants, and no structural changes were required for the final application.

For the final study, we selected six participants (Table 4). Due to participants' availability, we divided the sessions into three days, with two of them attending each day. In the following sections, we will describe the results of the final study.

Table 4. Demographic profile of participants.

Session	#	Age Range	Occupation	Residence	Familiarity with Technology
Session 1	P1, designer	25-34	UX Designer and Ph.D. candidate	Niterói, Rio de Janeiro	Very familiar and comfortable
	P2, designer	25-34	HCI researcher	Rio de Janeiro	Very familiar and comfortable
Session 2	P3, designer	35-44	Professor and UX Writer	Rio de Janeiro	Familiar but occasional difficulties
	P4, user	25-34	Ph.D. candidate in Visual computing	Niterói - RJ	Moderately familiar but frequent difficulties
Session 3	P5, designer	25-34	Conversational designer	Rondonópolis - MT	Very familiar and comfortable
	P6, user	25-34	Ph.D. candidate in Economics	Niteroi, Rio de Janeiro	Familiar but occasional difficulties

Participants' ages ranged from 25 to 44, with five in the 25-34 age group and one in the 35-44 range. Their occupational backgrounds included PhD candidates, professors, UX writers, and conversation designers. Three participants were from Niterói (RJ), Peru, and Rondonópolis (MT) but resided in Rio de Janeiro (RJ). In terms of tech familiarity, three were very comfortable, two were familiar but occasionally faced difficulties, and one was moderately familiar but often encountered challenges.

Regarding their preference for interacting with a chatbot or a human to resolve problems or obtain information, one participant would rather talk to a human, two preferred chatbots, and three answered it depends on the context. When asked whether they believed chatbots could improve customer service efficiency and quality, four participants responded affirmatively, and two were uncertain. Regarding their expectations of a chatbot, four participants selected quick and accurate responses, and two emphasized understanding their needs.

Finally, in response to a question about the advantages of using chatbots when compared to human assistance (multiple answers allowed), four participants highlighted quick responses, five mentioned 24/7 availability, five mentioned reduced waiting time, and three emphasized easy access to information. Two participants added their own responses: one mentioned the possibility of reviewing obtained information in conversations with chatbots, and the other mentioned that kind of interaction is not subject either to bureaucracy or to the interlocutor's mood swings.

6.2 Scenario presentation and discussion

The following subsections describe the participants responses to questions Q1, Q2, and Q3. To analyze the responses from participants on the post-it notes, we employed a bottom-up approach. Furthermore, we utilized the audio recordings to determine if additional information was provided about the responses on the post-it notes.

Table 5. Participants' responses to Q1 grouped by scenario.

Scenario	Category emerged	Post-it from
Scenario 1	Formality	P1
	Different communicative expectations	P2, P3
	System and its inner workings	P4, P5, and P6
Scenario 2	Less formality	P1, P3
	Human-likeness	P2
	Bad efficiency	P3
	Efficiency	P4, P5, P6
Scenario 3	Frighten	P1, P2
	Dark pattern	P2
	Helpful	P4
	Role attribution in bot strategy	P3, P5
	Rudeness	P6

6.2.1 (Q1) What is your opinion on the communication strategy employed?

As seen in Table 5, in Scenario 1, P1 described the chatbot's approach as formal and direct when interacting with the customer. P2 acknowledged that, although the strategy achieved its objective, it failed to meet different communicative expectations, such as promoting comfort in the error situation of Scenario 1. P3 shared the same impression, noting that the informative dialogue failed to provide comfort to the user because it focused solely on presenting data on an existing error. P4's perspective differed slightly, as their main concern revolved around the privacy of the user's data, which P2 felt was not adequately addressed by the chatbot's communication strategy. On the other hand, both P5 and P6 believed that the communication strategy effectively met their objectives as users.

In Scenario 2, P1 described the communication strategy as less formal than in the previous scenario, as if the chatbot aimed to be closer to the customer. P2 described the strategy in Scenario 2 as more human, giving the impression that there was someone on the other end of the communication process. P3, with a background in Linguistics, described that, "in communicative terms, the dialogue is less formal, but still polite and shows care for the customer, although it is a bit time-consuming." Similarly, as in Scenario 1, P4, P5, and P6 focused on efficiency and goal achievement.

As for Scenario 3, P1 disagrees with the strategy, stating that it aims to terrify the user despite its supportive objective. P2 describes the strategy as a dark pattern, also intended to frighten the user. In contrast, P3 finds it welcoming and user-centered but questions the appropriateness of certain engagement strategies for a chatbot compared to a real health professional. P5 criticizes the dialogue's rigidity, particularly given the fragility of the end-users, and agrees with P3 that the role portrayed in the strategy is unsuitable for a chatbot.

Table 6. Participants' responses to Q2 grouped by scenario.

Scenario	Category emerged	Post-it from
Scenario 1	Polite and formal	P1, P3
	Polite and cold	P2
	Polite	P4, P6
	Polite, but something is missing	P5
Scenario 2	Polite	P1, P5, and P6
	Polite and kind	P2, P3
	Overly polite and suspicious	P4
Scenario 3	Polite	P3, P4
	Impolite and blunt	P1, P5, and P6
	Impolite and hostile	P2

Additionally, P6 considers the strategy rude, predicting that the user would not like to use the chatbot again.

6.2.2 (Q2) Would you classify the dialogue as polite?

As seen in Table 6, in Scenario 1, P1 expected a less formal approach, but acknowledged that, in a bank context, a formal tone may be appropriate. P2 agreed with P1's perspective but felt that the chatbot might come across as cold and formal. However, P2 noted that in banking contexts, interactions tend to be overly formal. P3 also found the chatbot's tone to be formal. P4 thought that the chatbot employed the right approach to politeness. P5 and P6 viewed politeness in terms of clarity, although P5 felt that the chatbot lacked phatic language, such as saying "Good morning" or "Have a nice day," which are considered standard in conversation design theory. This was the first indication by a participant of the politeness parameters used in this research, and may be related to P5 background as a conversation designer. However, P5 neither used any formal terminology nor explained why the language function parameter should be used in this dialogue.

In Scenario 2, P1 appreciated the politeness of the strategy. P1 also considered the context in which the strategy could be applied, allowing for a lighter tone in the conversation. P2 described that strategy as polite and pleasant, noting that the dialogue format strikes a good balance between sympathy and formality, which was lacking in Scenario 1. P3 mentioned that the strategy evoked a sense of politeness and also showed kindness and care for the customer. On the other hand, P4, who saw in Scenario 1 a proper level of politeness, considered the communication strategy in Scenario 2 to be overly polite. Coming from a different background than the other participants, P4 noted that excessive politeness can raise suspicion. P5 and P6 agreed that the strategy was polite.

In Scenario 3, P1 saw the chatbot as "formally" polite, but found it somewhat blunt. P2 did not consider the bot polite and went further by stating that it sounded hostile. P3 considered the chatbot polite and accessible, but questioned how the communicative strategy was applied, suggesting the role of advising a patient on their health should not be played by a chatbot. P4 considered it polite but "overly" direct, although indirectness is used in the dialogue. The term "(in)direct" in this participant's answer has to do with the chatbot's tone rather than any politeness parameter. P5 and P6 agree with P1 in considering the chatbot impolite and blunt.

6.2.3 (Q3) What intention do you believe the designer had in mind when utilizing this strategy?

As seen in Table 7, in Scenario 1, P1 felt that the designer's intention was to be efficient, provide direct answers, and maintain a formal tone suitable for a bank context. P2 viewed the designer's intention as geared toward reducing service time. P3 perceived the designer's intent as keeping the interaction formal and distant from the user, which might have been due to the absence of phatic utterances. P4 described the designer's intent as aiming to build trust with the user while being efficient. Similarly, P5 and P6 believed that the designer's intention was to be efficient.

Table 7. Participants' responses to Q3 grouped by scenario.

Scenario	Category emerged	Post-it from
Scenario 1	Efficient	P1, P2, P5, P6
	Trustworthy	P4
	Distant	P3
Scenario 2	Informal	P1
	Empathetic	P2, P3, P4
	Efficient	P5, P6
Scenario 3	Awareness by fear	P1, P6
	Punitive	P2
	Improve attachment to treatment	P3, P4, P5

In Scenario 2, P1 described the designer's intent as less formal and more solicitous. P2 mentioned that public services are usually "annoying" and believed the designer aimed to sound more empathetic and efficient. Similarly, P3 and P4 considered the strategy sensible and receptive. P4 also believed the designer's intent behind their communication strategy was to promote trust. As in Scenario 1, P5 and P6 thought the intent was to be efficient.

In Scenario 3, P1 believed that the designer's intent was to help using fear or "reverse psychology," while P2 described the intent as punitive. Similarly, P3 believed the intent was to assist with the most important parts of the healthcare routine. P4 believed the designer's intent was to help, acknowledging that the strategy could be effective in the long term if a relationship with the user is first built. Also, P4 noted that this communication strategy might not be effective for users meeting the chatbot for the first time, underscoring the need for a health professional to collaborate with the chatbot. P5, although strongly disagreeing with the strategy, believed the designer's intent was to help the patient with the routine to avoid suffering later. Similarly, P6 also believed the intent was to help by inducing fear.

6.3 Reflection

In the following subsections, we address the responses to research questions Q4, Q5, Q6, and Q7. Since participants' answers to these questions were straightforward, we chose not to include the code corpus for them.

6.3.1 Q4 - Did you notice there were different strategies used in the scenarios, and if so, what were these strategies?

All participants agreed that the chabots used distinct communication strategies. Some participants noted similarities between the strategies in Scenarios 1 and 2. For example, P1 described the communication in Scenario 1 as more direct and formal, while in Scenario 2 it was less formal but more detailed. Similarly, P3 mentioned that the communication in Scenario 1 was more formal, whereas in Scenario 2 it was less formal and the chatbot sounded more approachable. P2, P4, and P5 mentioned that the strategies in Scenarios 1 and 2 were similar, emphasizing efficiency and objectivity. Lastly,

P6 observed that, in certain scenarios, the chatbots prioritized closer communication, while others prioritized quickly resolving the problem with minimal interaction. Regarding Scenario 3, participants mentioned that the strategy in Scenario 2 would be more effective, as its current version could be considered rude or negative.

6.3.2 Q5 - Did you observe different intentions associated with those strategies?

P1 noticed that, in Scenario 3, the designer's intention does not focus on the user's needs and attempts to scare them into finding a solution. P2 also had a negative view of Scenario 3, stating that Scenarios 1 and 2 provided objective responses, while Scenario 3 listed the disadvantages of not following a program instead of highlighting its benefits. Similarly, P5 mentioned that, in Scenarios 1 and 2, the designer's intention was to help the user by being objective and clear, while in Scenario 3, the designer's intention was to demonstrate the importance of following the treatment. P4 noted that, in Scenarios 1 and 2, the dialogues were more polite, courteous, and formal, providing clear instructions to the user. However, in Scenario 3, the interaction was quite rude. P3 mentioned that the designer's intention was to maintain a tone of professionalism and distance, whereas Scenario 2 aimed for a receptive interaction, and the third sought to encourage and persuade.

6.3.3 Q6 - Which strategy resonated with you the most?

Participants had a near-unanimous preference for the strategy in Scenario 2. P1 found it interesting, while P2 mentioned that it would be more aligned with their expectations because it felt closer to human-like attributes. P1 also stated that "[...] it would make me feel like there is a person behind the machine." P2 noted the more elaborated answers in Scenario 2, as it gave them the feeling that the user's input mattered. P6 mentioned that the strategy in Scenario 2 used a friendly, accessible, polite, and helpful language, which resonated with them. On the other hand, P4 preferred the strategy of Scenario 1 due to its objectivity.

6.3.4 Q7 - Do you believe that different strategies could lead to different interaction outcomes?

Participants generally agreed that different strategies could lead to different interaction outcomes. P1 mentioned that it would depend on the context and motivation for the interactions. P1 also emphasized that different strategies could lead to more effective interactions and pointed out that the strategy used in Scenario 3 may not be appropriate due to its rudeness. P3 agreed, stating that each context requires adaptation to achieve successful communication. Both P4 and P5 emphasized the effectiveness of the strategy used in Scenario 2, suggesting that it could work in Scenario 3 as well. Similarly, P6 mentioned that the outcome would depend on the specific context in which the strategies were applied. P2 expressed the viewpoint that what matters most is providing the correct answer to the user, regardless of the communicative strategy.

7 Step 2 - Card development

The results of our workshop highlighted the challenge of managing politeness parameters in chatbot design. To enhance designers' interaction, reflection, and utilization of conversational-linguistic politeness parameters, we propose a card-based design approach, which can enhance the design process by helping inspire, organize, and communicate ideas more effectively [Carneiro *et al*., 2012].

As politeness is contextual and influenced by culture, we had to specify a context. We chose Education, a domain highly influenced by manners [Chaves and Gerosa, 2021]. To design the cards, we organized a set of predefined politeness parameters in contexts commonly found in educational settings. For instance, in learning environments, politeness is most evident when instructors face the challenge of helping, correcting, or supporting students who may be struggling. Reducing negative emotions in learning can be achieved, at least in part, through politeness [Lane, 2016].

We propose that such cards can support conversation designers during the dialogue design phase. These cards aid in addressing a critical issue with the politeness parameters by encapsulating and organizing them based on the linguistic and conversation analysis theories and concepts that underpin them. Designers who lack prior knowledge or experience with suggesting, indicating errors, checking for understanding, and incorporating small talk now have a helpful starting point to guide them in designing and adapting dialogues. Additionally, we believe that using these cards can ensure that designers' discourse is aligned and easily understandable when deploying their dialogues for user feedback.

The cards are organized as illustrated in Figure 1.

- Their first section indicates the type (Indirect suggestion, Softened indication of error, Check for understanding, Small-talk).
- Their second section outlines the context (e.g., Learning context) for which the card was developed along with three defined values (e.g., Empathy, Support, Understanding). Given that designers may interpret politeness differently based on the context defined during the analysis phase, it is crucial to clarify intent through these values.
- Their third section provides an example dialogue between a user and the chatbot. Modal expressions (i.e. words or phrases that convey possibility, necessity, permission etc., indicating the speaker's attitude toward the content of their utterance) are highlighted in yellow, and the choice of the politeness parameters is indicated in parentheses.

The four types of cards presented in Figure 1 feature unique designer intentions and a combination of language functions and indirectness parameters, with modal expressions highlighted in yellow. Each type is developed to address situations where politeness is important in the educational context [Lane, 2016]. The parameters in each card are customized for the example in Figure 1 to showcase how the type can be applied. We will describe these cards in detail in the following subsections. For more information about the steps, cards, resources, and examples, please visit our tool's website [7].

[7] Check the following link for the Polite deck page: Click here

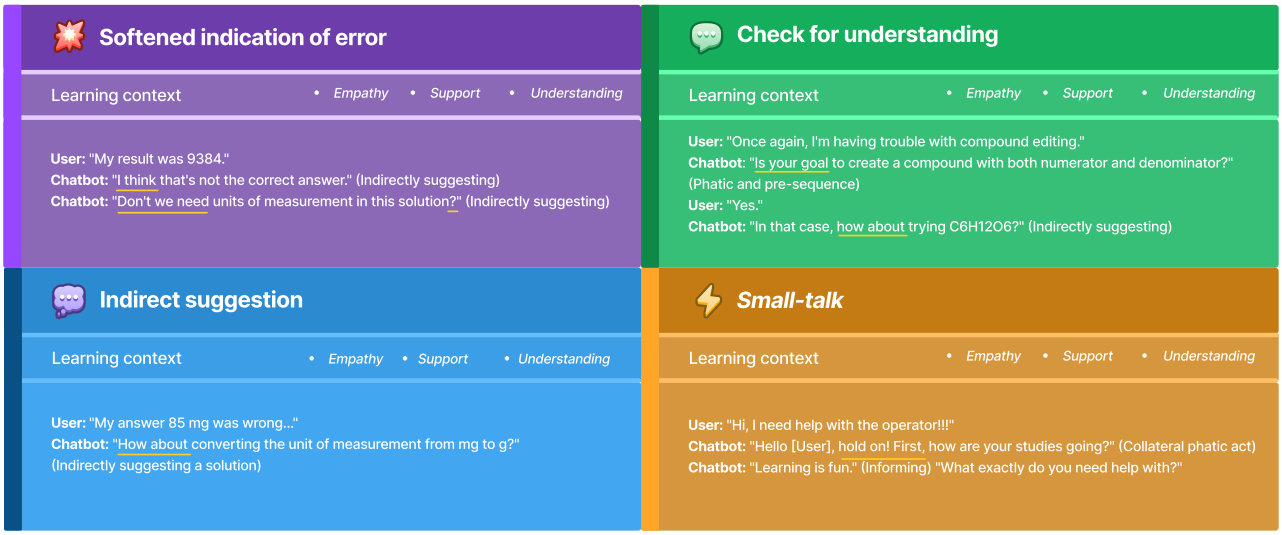

Figure 1. The *Softened indication of error*, *Check for understanding*, *Indirect suggestion*, and *Small-talk* cards (Translated from Brazilian Portuguese).

7.1 Softened indication of error

A crucial aspect of communication within an educational context is how messages are delivered when indicating a student's error/mistake. Therefore, the purpose of this card is to first indirectly suggest an error to the user and then provide an indirect suggestion on how to fix it. This mirrors an approach often used by teachers when guiding students through the learning process.

- ***Indirectness parameter***: indirect speech act.
- ***Language function parameter***: informative.

7.2 Check for Understanding

This card is intended to ensure that the chatbot accurately understands the user's intentions before proceeding with suggestions or responses. In the example in Figure 1, the chatbot employs the strategy described in this card by first confirming with the user whether their goal is a compound. Only after receiving a positive response from the user does the chatbot proceed with the indirect suggestion. This approach helps prevent the chatbot from making assumptions or errors regarding the user's intentions, leading to a more effective and user-centered interaction.

- ***Indirectness parameter***: pre-sequence, indirect speech act.
- ***Language function parameter***: informative, phatic.

7.3 Indirect suggestion

Previous studies have shown that providing tips or suggesting in a polite manner can minimize negative emotions during learning. Therefore, although the chatbot knows that "converting the unit of measurement" might actually help the user, the card shows a chatbot responding with an indirect suggestion that this could be an alternative solution to the user's query.

- ***Indirectness parameter:*** indirect speech act.
- ***Language function parameter:*** informative.

7.4 Small-talk

The strategy in this card serves the purpose of helping the chatbot establish a closer connection with the user by employing conversational functions that enhance social bonds. These functions include phatic expressions, which acknowledge the presence of the user and express goodwill, as well as collateral acts, such as joking or punning, which add a playful or lighthearted tone to the conversation. Small talk interactions like these are less about conveying specific information and more about fostering a sense of connection and rapport between the chatbot and the user. By using these expressions, the chatbot aims to create a more engaging and friendly interaction experience.

- ***Indirectness parameter***: collateral act.
- ***Language function parameter***: phatic, informative.

8 Step 3 - Card evaluation

To evaluate the dialogue tailoring process without the cards and to identify the potential benefits of using the cards, Step 3 was also divided into four sub-steps:

- (1) Recruitment - Inviting potential participants, sending the pre-workshop form, and applying inclusion and exclusion criteria.
- (2) Preparation - Preparing and defining the scenarios for the workshop. As sub-steps: (a) Defining the context, scenario and persona and (b) Identifying an existing chatbot in that scenario.
- (3) Workshop - Investigating the research questions using an online synchronous approach. As sub-steps: (I) Icebreaker, (II) Explanation and contextualization, and (III) Hands-on activity.
- (4) Analysis - Quantitatively analyzing the outcomes of the workshop.

8.1 Recruitment

Individual invitations were sent to potential participants who had a connection to the research lab, including students and

practitioners in the industry. This study defined participants as having the following profile:

- Inclusion criteria: professionals with experience in User Experience (UX), User Interface (UI), HCI, conversation design and chatbots, and front-end professionals with experience in design processes.
- Exclusion criteria: professionals who do not have experience in the areas defined in the inclusion criteria, under 18 years of age, and who cannot participate in the workshop remotely with a personal computer.

Once participants accepted the invitation, they received a pre-workshop form. This form detailed the research methodology, the informed consent form (as provided by the research ethics committee), the image transfer and usage agreement for the workshop (as provided by the Research Ethics Committee), a description of the data that would be collected, the risks and benefits involved, and limitations designed to ensure confidentiality.

The form collected demographic information, such as origin, age, profession, education, and technological knowledge, as well as specific information, such as experience with chatbots and digital product design. This information helped complement subsequent analysis and the application of inclusion and exclusion criteria.

8.2 Preparation

The integration of chatbots in educational environments can have positive impacts on students' academic performance [Lane, 2016] and is closely related to the capacity of building polite relationships between student users and chatbots [McLaren *et al*., 2011]. The use of politeness in interactions with educational chatbots is crucial to creating a conducive and supportive learning environment for all students. Benefits from this approach include minimizing negative emotions during learning [Lane, 2016] and improving performance on tests [McLaren *et al*., 2011].

These facts led us to conduct our study to evaluate the use of the cards in an educational scenario, building on the work of Essel *et al*. [2022], in which the authors present an educational setting involving the use of a virtual teaching assistant in higher education in Ghana. In our study, participants were given a persona and a scenario of a professor teaching Multimedia in a Brazilian university, a topic that the participants were supposed to know somewhat about:

> *Consider a scenario where you are a professor at the University of Brazil, teaching a Multimedia Programming course. This semester introduces an addition to the teaching methods - incorporating UniBot on WhatsApp. The chatbot is designed to enhance student engagement and motivation by providing a repository of standard queries related to HTML and CSS. Despite the innovative approach, there is concern about the efficiency of communication with UniBot. To address this, the university seeks the help of designers, teachers, and teaching assistants in developing a set of polite dialogue standards in the chatbot. These standards aim to manage conversational and linguistic components, ensuring that interactions with UniBot are not only informative but also aligned with the university's expectations.*
>
> *The expected user of the UniBot is Marcelo, a 23-year-old dedicated and organized student. Recently, he has been facing some difficulties in his Multimedia Programming class with developing front-end websites using HTML and CSS. He has a good theoretical understanding, but struggles to apply it in practice and feels frustrated for not being able to keep up with the practical classes properly. Additionally, he is interested in improving his programming skills, but feels insecure about his performance in the course.*

Based on the scenario and persona, participants were also presented with the following dialogues (inspired by the work of Essel *et al*. [2022]):

> **Marcelo:** Good morning.
>
> **Chatbot:** Good morning, my name is UniBot and I assist with questions related to HTML and CSS.
>
> **Marcelo:** I'm having difficulties creating a responsive layout using CSS. Can you guide me?
>
> **Chatbot:** To create a responsive layout, use media queries in your CSS. They allow you to apply different styles based on the device screen size.
>
> **Marcelo:** My web page looks strange and I keep getting an error in the console. What could the problem be?
>
> Chatbot: It seems there's a syntax error in your CSS. Check the console for error messages and review the specific lines mentioned. I suggest that you go over chapter 2.
>
> Marcelo: Thank you for your guidance, it worked!
>
> Chatbot: If you have more ideas or need help with anything else, feel free to ask.

8.3 Workshop

The workshop sessions were conducted individually and recorded. All activities took place remotely using the web-based FigJam tool, which was freely accessible and required no downloads. The workshop comprised four stages: I - icebreaker activity, II - explanation and contextualization, and III - hands-on activity.

The (I) icebreaker activity was optional, where participants could write their identification names, age, and a list of desires on post-it notes. This aimed to familiarize participants with the tool before the main activity to help them feel more at ease. The explanation and contextualization of educational chatbots (II) included information on the benefits of their use

and the application of politeness in the specific educational context from the preparation step.

Finally, participants did the hands-on activity (III). They started by reading the scenario and persona from the Preparation step. After defining the values, participants moved on to tailoring a chatbot to be polite. After tailoring the dialogues, participants were asked two questions: (Q1) What was your rationale for writing the new dialogues? and (Q2) Do you consider your dialogues polite? Additionally, at the end, participants were introduced to the cards (Section 7), leading to our final question (Q3): What potential benefits do you identify in using these cards?

9 Step 3 results

The results from Step 3 will be presented in the following subsections.

9.1 Participants

This study involved seven participants (Table 8) who did not participate in the Step 1 study. A total of 15 invitations were sent out, but not all participants could attend on the designated days. Five participants were from Rio de Janeiro, one was from São Paulo, and one was from Santa Catarina, with three falling within the 25-34 age range and four within the 35-44 age range. While most participants had previous experience with the design process, they had varying levels of experience due to their occupation.

P	City (State), Country	Occupation	Additional details
P7	Rio de Janeiro (RJ), Brazil	Product Designer	Lead
P8	São Paulo (SP), Brazil	HCI Researcher	
P9	Florianópolis (SC), Brazil	Chatbot developer	
P10	Rio de Janeiro (RJ), Brazil	Product Designer	
P11	Duque de Caxias (RJ), Brazil	Chatbot developer	
P12	Barra Mansa (RJ), Brazil	Professor	HCI Researcher
P13	Rio de Janeiro (RJ), Brazil	Professor	Experience with AI/ML products

Table 8. Final List of Study Participants. The table is organized by Origin (city, state, and country), Occupation, and additional participant details.

9.2 Tailoring

We analyzed the participants' tailoring of chatbot dialogue where, initially, participants tailored the dialogue without using the cards. The occurrences presented in this section are tailored versions of the original dialogues.

Option	Dialog 1	Dialog 2	Dialog 3	Dialog 4
Small-talk	7	6	3	7
Indirectly suggesting			4	
Softened indication of error				
Check for Understanding		3	1	
Adjusted text	2	3	5	4
Kept the text	3			2

Table 9. The table shows participants' use of politeness sequence card types to tailor the original dialogues, indicating whether they adjusted the wording or kept it the same.

The results indicate that small talk, such as "Of course," "Hm...," and "Let me check," were frequently used to precede indirect suggestions, particularly in Dialog 3. Participants only used indirect suggestions in Dialog 3, possibly due to their presence in the original dialogue. Participants replaced indirect suggestions in the original dialog with alternatives such as "Maybe" (P9), "Usually" (P12), and "It's possible" (P13).

P13 also mentioned about the "intensity" of the indirectness to make it subtler. No participant intuitively used a Softened Indication of Error. Checking for Understanding was mainly used by product designers and one professor to see if users needed more help. The exception was P7, a designer with extensive chatbot experience, who used the question "Do you know how to find this information?" instead.

9.3 Rationale, politeness, and benefits

This section presents the answers from participants to "What was your rationale for writing the new dialogues?" (Rationale, Q1), "Do you consider your dialogues polite?" (Politeness, Q2), and "What potential benefits do you identify with using these cards?" (Benefits, Q3).

9.3.1 Rationale

When analyzing participant responses to "What was your rationale for writing the new dialogues?" (Q1), participants also referred to values to express their understanding of politeness. Participants focused on humanizing the chatbot to counteract its original robotic and impersonal tone. P7 sought to make the chatbot sound more available and useful, while P10 aimed to reduce negative feelings and enhance a sense of collaboration. P8 prioritized creating a sense of closeness, as if conversing with a real person. P9 opted for informal language to make interactions friendlier. P11 worked to avoid generic responses, and P12 used everyday speech to create a more informal tone. Finally, P13 aimed to strengthen the connection between the chatbot and the student through small-talk.

9.3.2 Politeness

Participant's responses to "Do you consider your dialogues polite?" (Q2) showed varying perspectives on politeness. Some believed politeness involved formality, kindness, and empathy (P7, P8, P12), while others focused on specific linguistic features, positive language, and engagement (P8, P10, P12, P13). Finally, some participants emphasized the importance of using less robotic language to enhance politeness (P9, P13).

9.3.3 Benefits

In this section, participant's responses to the question "What potential benefits do you identify with using these cards?" (Q3). P7 mentioned that, while intuition can sometimes be useful, it often occurs in an unstructured manner, and a systematized process would be beneficial, which is in tandem with what Chaves *et al*. [2019] states about relying solely on intuition when designing chatbot daialogues. Similarly, P10 noted that having the cards to define the chatbot's tone would serve as a structured checklist to identify what works well and what does not.

This guidance is especially helpful when the process is collaborative. P7 noted that having this guidance could help ensure consistency in conversations among those designing the dialogues. P12 echoed a similar sentiment, stating: "...imagine if each person is going to develop part of the chatbot... they might lose the pattern because people speak and program differently... But, if you have the card, you tend to standardize these answers...".

P12 also mentioned that using the cards helps translate

complex knowledge, such as linguistic and conversation analysis theories and methods, into practical applications. This is supported by P13, who, after being introduced to the cards, was able to grasp the concepts effectively. In their response, P13 identified potential intuitive uses, saying: "I would include Small talk regardless... I would also incorporate the Checking for understanding because I do it in my class almost every time...". P13 also reflected on the Softened indication of error, noting: "...I didn't use it... I found it odd that I didn't... I usually do." Furthermore, P13 discussed the cultural correlation between indirect suggestions and Brazilian Portuguese, stating: "...it makes a lot of sense because indirect suggestions avoid accusations [directness], and for Brazilians, it [directness] is very negative...".

10 Discussion

The results from the analysis of steps 1 and 3 will be presented in the following sections.

10.1 About the use of parameters

In this section, we discuss our findings and their implications for designing polite human-chatbot interactions during Step 1.

10.1.1 Discussing the workshop

Initially, only one participant possessed the necessary technical linguistic background to formally identify the use of politeness parameters as part of chatbots' communication strategies. However, they did not explicitly acknowledge the politeness parameters as a component of the strategies. Indirectness and language function variability were incidentally mentioned by the participants in their answers and interactions during the workshop. For instance, P4 highlighted the absence of phatic function in the chatbots' dialogues, such as greetings like 'good morning,' 'have a nice day,'and 'have a good week,' or expressions of gratitude for engaging with the chatbot (P4). Conversely, indirectness was mentioned but with an opposite connotation. For example, P6 remarked that the responses were excessively direct, even in Scenario 3 where indirectness strategies had been employed. In this case, being 'direct' referred to quickly changing topics during turn-taking, rather than the speech act itself. This observation demonstrates that the utilization of politeness parameters as a strategy is not readily apparent to those interacting with them.

Although the politeness parameters were not explicitly identified by participants, the identification of designer's intent and communication strategies produced interesting results. In terms of communication, the politeness parameters can serve as good indicators for an effective interaction. Both Scenario 1 and Scenario 2 aimed to provide a positive customer experience. Participants associated them with concepts such as 'problem-solving' (P4), which aligned with the objective of addressing bureaucratic and administrative issues for clients. However, it was in Scenario 3, designed for intentionally overt persuasion, that participants were more assertive when discussing the designer's intent. Some described it negatively as 'help based on fear and reverse psychology' (P1), 'punitive,' and 'sadistic' (P2), while others positively depicted it as 'building closer relationships with patients' (P3) or emphasizing the patient's importance (P5).

However, when the designer's intent is combined with communication strategies, it adds another layer to the communication process. P3, who expressed that the designer's intent was to be 'closer to the patient,' noted that the strategy of 'reprimand' through indirectness should only be used in situations involving human relationships. P3 emphasized that, even if the chatbot acts to support a health professional, their roles are not the same. P5 mentioned that the strategy is impolite and might lead them to go as far as reporting the chatbot.

Hence, the politeness parameters proved valuable in comprehending user reception when it comes to communication strategies in chatbots. Additionally, participants observed that each scenario featured a chatbot designed with specific strategies, despite the similarities between the strategies in Scenarios 1 and 2.

The concept of politeness was associated with other abstract nouns by participants, like 'formality', 'efficiency', 'clear communication', 'friendliness', and 'rudeness'. Notably, in contexts where strategies were deemed as less evident, as in Scenario 3, where the chatbot was mostly perceived as rude, formality becomes a more significant value in the interaction. However, as the participants pointed out, being formal does not necessarily equate to being impolite; rather, the context determines the appropriate balance. In Scenario 2 (high language function variability, with no indirectness), the communication strategy was seen by the participants as having achieved this balance.

When considering the feasibility of using politeness parameters, participants highlighted that communication is more effective when the context and designer's intent are aligned (P1 and P3). Participants also noted that strategies employed in Scenario 2 could potentially yield better results compared to Scenario 3. For example, P3 mentioned that Scenario 2 shows '[...] a language that is close, accessible, polite, and helpful.' Using politeness parameters offered several advantages, such as enabling discussions on communication strategies with participants without prior technical experience in linguistic theory.

10.1.2 Lessons learned

This opens up the opportunity for designers and users to engage in discussions aimed at achieving more effective communication. In conclusion, three learning outcomes emerged from the workshop:

- (I) As politeness is a subjective concept, participants often associated it with other values, such as clarity, friendliness, verbosity, formality, and efficiency. Sometimes, participants posed politeness as the opposite of rudeness, formality, efficiency, or directness, indicating a possible trade-off between politeness and other values. Participants mentioned that an overly polite chatbot can be considered rude in some contexts. In other words, there is a non-descriptive scale for politeness.
- (II) Participants highlighted the impact of communication strategies in chatbot design. In Scenario 3, participants were concerned about the designer's intent and strategy. According to them, the current use of politeness parameters could cause more harm than a positive user experience. One participant even mentioned that they

would report the chatbot due to its perceived rudeness. Additionally, the designer's intent lacked a caring and supportive communication strategy that is expected in healthcare professionals' discourse. Participants argued that politeness could promote adherence to treatment.

- (III) Politeness parameters are efficient but not transparent to those who interact. Participants identified distinct strategies in Scenarios 1, 2, and 3 and provided positive feedback on the strategies used in Scenarios 1 and 2 but negative feedback on Scenario 3. Participants generally agreed that these strategies can lead to different interaction outcomes and emphasized the effectiveness of the strategy used in Scenario 2 and its potential applicability to Scenario 3. However, the lack of explicit identification of politeness parameters as part of the strategies, despite participants' incidental observations on indirectness and language variability, was noteworthy, as identified by the answer provided by P4.

As highlighted in our first lesson learned (I), politeness is subjective and culturally dependent. Incorporating these values can assist designers in discussing and designing chatbots, offering a better understanding of politeness within a particular context. Furthermore, as seen in the second lesson learned (II), the parameters effectively fostered different interaction experiences from participants across the three scenarios.

However, it is important to note that these politeness parameters are founded on a complex set of conversational-linguistic theories and concepts, making it challenging for designers without a theoretical background in Linguistics to understand and implement them. Typically, designers lack such knowledge since it is not frequently included in design courses. Additionally, as briefly discussed in the third lesson learned (III), these parameters alone are not adequate as a starting point. Based on our analysis, we concluded that, although politeness parameters can support polite experiences, they are difficult to grasp for IT professionals without a background in Linguistics to use during the design process.

10.2 Tailoring polite chatbots and cards

In this section, we discuss our findings and their implications for designing polite human-chatbot interactions during Step 3.

10.2.1 The tailoring process without the cards

As previously stated by Chaves *et al*. [2019], due to the lack of a formal process for reflecting on linguistic preferences, designers rely on their individual preferences, often influenced by their language habits and socio-cultural environment. During the workshop, drawing upon their think-aloud process, participants relied on intuition to tailor dialogues, prior experience, and cultural influences. This intuition is usually characterized by imagining themselves in the dialogue. For example, P7 says, '...if I were chatting with this chatbot... it would be very helpful if...' (P7). P10 uses a counter-example to illustrate how the dialogue should be: '...if it were a person answering me like this, I would think that the person is a little angry...' (P10)

The influence of previous experiences on design varies with the designer's familiarity with conversation design, the domain, or chatbots. For instance, one of the participants used small talk in Step 3 based on intuition and classroom experience, saying: "At the end, I added 'How can I help you?' to make it clear that I am here to help." Conversely, P8, an HCI researcher with no formal chatbot design experience, noted that interacting with chatbots that use Checking for Understanding influenced their approach: "From my experience, I've seen this… it leads you to ask more questions beyond just question and answering." P13 also employed Checking for Understanding, explaining: "I added a question because the initial answer seemed too vague. I asked, 'Is there a more specific difficulty?' to continue the interaction."

Another factor that influences decision-making is consideration of how human dialogue works. For example, P7 suggested, "Hm...." it could be something that is expected of people. P10 noted that students facing challenges during learning experience internal judgments and should receive positive communication. P11 recommended providing more information, stating: "Students in the process of learning should receive more information, like an example." These points emphasize the value of incorporating additional information, like examples, into a possible new card.

Relying solely on intuition can be challenging and may lead to contradictions. For instance, P7 felt that, even though the original dialogues were correct and polite, they seemed robotic, despite the tailoring. P12 initially perceived the original dialogues as too formal due to concerns with reliability, stating: "A very informal educational chatbot could give a vision that the explanation was not so reliable." However, P12 later favored a more informal and welcoming approach. Additionally, P8 found it challenging to determine the appropriate phraseology, noting: "The use of certain words... would help here... to consider what is more polite."

The cards can potentially offer several benefits, including an epistemic approach that allows participants to reflect on and support the writing of dialogues. They also provide guidance on how to verify whether the dialogues can be improved and how to establish a defined tone of voice for the chatbot. With collaborative processes, this guidance can ensure consistency in conversations by having the cards to standardize answers in situations where multiple people program and speak differently.

10.2.2 The importance of conversational context

The characteristics of chatbots can vary across different domains, as noted by Chaves *et al*. [2019]. For P7, while formality can be polite in some contexts, it can also be intimidating in others. For example, in a court setting, addressing the judge with the proper formalities is a matter of protocol and not inherently politeness. However, in a store, if the staff is excessively formal, it may not be inappropriate, but it would not promote a sense of empathy.

In education and customer services, values such as conscientiousness, damage control, manners, and emotional intelligence are considered important. In education, providing comfort and sensitivity is particularly critical, as it can minimize negative emotions and improve learning [Chaves *et al*., 2019; Lane, 2016; McLaren *et al*., 2011]. The majority of participants in the study aligned with this view and perceived Marcelo's (Step 3 persona) needs as being more focused on social bonds and connection with the chatbot. However, it is

important to note that politeness is dependent on the context and culture, and some participants felt that Marcelo would benefit more from clear, efficient, and objective interactions tailored with less emphasis on empathy.

10.2.3 Ethics in intention

Users have certain communication expectations from interactions with chatbots, based on the person represented by the artificial agent [Chaves *et al*., 2019, 2022]. According to Chaves *et al*. [2019], chatbots typically represent social roles associated with humans, such as tutors, healthcare professionals, salespeople, hotel concierges, or even friends. In our study, participants discussed various characteristics associated with social roles for human-chatbot interactions. In Step 3, participants who were also professors noted that their teaching style should be reflected in the chatbot's dialogue, with a focus on facilitating learning and providing empathy.

For P11, talking to a chatbot that mimics emotions is not healthy. Despite its impressive capabilities, it remains fundamentally soulless. Engaging with something that has no real feelings or personal connection can be unsettling, especially if the user is seeking companionship. The potential persuasive power of chatbot utterances [Lorda and Zabalbeascoa, 2012] impacts the dynamic power relationship between chatbot designers and users. It is important to note that assigning a social role to a chatbot does not involve deceptive intentions to portray software as human [Chaves *et al*., 2019]. However, when a chatbot is structured to encourage specific responses that align with the designer's objectives, it becomes difficult to ignore the intentional nature of chatbot utterances [Lorda and Zabalbeascoa, 2012].

10.3 Challenges and limitations

In Step 1, our objective was to assess politeness parameters, revealing and explore their effectiveness as indicators of politeness. A subsequent step could entail testing a single chatbot with varied parameter uses to determine which aligns most closely with participants' cultural and politeness expectations.

Further investigation into interaction possibilities could involve leveraging parameters to customize the politeness level for chatbot users in real-time interactions, as seen in the research of Firdaus *et al*. [2022] and more recently Zhou and Hu [2024]. Additionally, for the design process, future work could evaluate whether the proposed approach for text-based chatbots would be applicable to voice-based chatbots and identify any supplementary parameters necessary for voice interactions.

In Step 3, our participants were introduced to a tailoring process without using design resources. Subsequently, at the end of the workshop, participants were presented with the cards developed in Step 2. Feedback from participants indicated that the cards could facilitate reflection on customizing dialogues, aiding in the dialogue-writing process, supporting design practices, among other benefits. Future work could explore the application of the cards during the design process for tailoring polite chatbots.

Lastly, both the politeness parameters and cards were conceived within a specific context, with researchers and participants based in Brazil. This inherent contextual bias cannot be disregarded, since their evaluations are influenced by socio-cultural and language factors [Keesing, 1974; Haugh, 2015]. Future work should involve broadening the participant pool to examine different user profiles assessing politeness parameters when interacting with chatbots.

11 Conclusion

It is clear that the future of technology will be multimodal, involving interaction contexts that we have yet to fully envision. Chatbots, as precursors to this future, have been evolving since the 1950s and continue to advance, playing an increasingly important role in our daily lives [Monteiro and Salgado, 2023].

To address our research questions about the use of politeness parameters (RQ1, RQ2, RQ3) and cards (RQ4, and RQ5) in supporting the definition and design of politeness in human-chatbot interactions, we conducted three steps. First, to evaluate the definition of politeness strategies using parameters, we created fictional chatbot-user scenarios. Participants identified politeness based on intention and experience, but struggled with the theoretical concepts. Then, to support the design process, we developed a card-based approach featuring four types of cards proposed in step 2 for an educational context: indirect suggestion, softened error indication, checking for understanding, and small talk. Finally, we evaluated these cards in a workshop, finding the cards to be useful for tailoring dialogues, aiding design, and supporting the tone definition.

Our contributions center on three main aspects: (1) evaluating the use of politeness parameters as design tools and sharing insights gained from their application; (2) introducing a set of four cards designed to assist in developing politeness strategies (currently used in educational settings); and (3) exploring a tailoring process for chatbots to promote politeness without relying on design resources. To do so, we analyzed practitioners' feedback on the cards, and delved into the ethical considerations associated with designing dialogues intentionally.

Given that we are still in the early stages of mapping linguistic parameters in human-chatbot interaction, there is much more to be discovered and explored. Politeness is inherently culturally-dependent [Searle, 1979], and other cultures most certainly have different ways of expressing politeness in the educational context. This difference arises because some cultures use indirectness as a way to respect a person's individual agency and freedom of choice [Haugh, 2015]. Similarly, the structure of a question can also affect politeness by how much it constrains a person's response. In some languages, open-ended questions are preferred over polar (yes/no) questions because they are less controlling [Clift, 2016]. Therefore, a chatbot's perceived politeness depends on whether its use of indirectness and language functions aligns with the user's cultural expectations. Finally, the findings of this research are expected to impact conversational products and researches by enabling conversation designers to progressively incorporate principles of polite chatbot design into their communication strategies. These methods aim to improve user experiences and encourage broader adoption of chatbots.

Declarations

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Authors' Contributions

All authors read, contributed equally, and approved the final manuscript.

Competing interests

The authors declare they have no competing interests.

Availability of data and materials

There are no complementary materials.

Further relevant information

This research adheres to the ethical guidelines established by the ACM and our institution with approval from the Research Ethical Committee of the university, under protocol CAAE 78981324.2.0000.8160. The authors acknowledge the use of generative AI for grammar refinement and language improvement during the preparation of this manuscript.

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