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HOW TO CREATE A PSYCHOLOGIST-CHATBOT

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El desarrollo de agentes conversacionales o chatbots se ha visto incrementado en las últimas décadas, especialmente en el sector comercial. No obstante, si bien el primer bot conversacional de la historia presentaba una apariencia de psicoterapeuta, son pocos los agentes virtuales con este tipo de funciones construidos hasta la fecha. En el presente trabajo, exponemos las bases para diseñar un chatbot psicólogo, concretamente, un bot con funciones de evaluación psicológica. Para ello, revisamos las herramientas disponibles para diseñarlo y configurarlo, y los conceptos básicos para su construcción. Asimismo, proponemos una serie de objetivos de evaluación que habrían de guiar el diálogo del agente conversacional. Finalmente, exponemos una reflexión acerca de las ventajas e inconvenientes de los chatbots y sobre las líneas de actuación que serían necesarias para desarrollarlos con garantías científicas.
Palabras clave: *Chatbot, Agente conversacional, Evaluación psicológica, Tecnología, Inteligencia artificial.*

In recent decades, the development of conversational agents or chatbots has increased, especially in the commercial sector. Although the first chatbot in computational history was presented as a psychotherapist, few virtual agents with this type of function have been built since then. In the present article we describe the fundamental aspects of designing a psychologist-chatbot and, more specifically, a bot with psychological assessment functions. We review the available tools and the basic concepts for its construction. We also propose a series of assessment objectives that would guide the conversational agent's dialogue. Finally, we discuss the advantages and disadvantages of chatbots and the scientific guarantees that they need to fulfill.
Key words: *Chatbot, Conversational agent, Psychological assessment, Technology, Artificial intelligence*

A virtual assistant or chatbot is a computer program with which it is possible to have a conversation and from which information or some type of action can be obtained (Hill, Ford, & Farreras, 2015; Khan & Das, 2017; Shawar & Atwell, 2005). To understand the history of these machines and the human efforts to improve them, it is imperative to talk about Alan Turing. In the middle of the twentieth century, Turing proposed a theoretical postulate in which he tested the intelligent behavior of a machine against that of a person (Maudin, 1994; Turing, 1951; Turing, Braithwaite, Jefferson, & Newman, 1952). The "Turing Test" or "Imitation Game" is intended to elucidate whether a robot can show a behavior similar to that of a human. To do this, an evaluator has a conversation, through an interface, with two interlocutors: a bot and a human person. If the evaluator is not able to distinguish which is the bot in a time interval of five minutes, it is concluded that the machine has passed the test. In the *Loebner Prize* competition, which first took place in 1991, various robots compete to pass the famous test. In this competition prizes have been distributed to the best robots for many years, but it was not until 2014—more than two decades after the first competition—that a machine managed to pass the Turing test (Khan & Das, 2017; Maudin, 1994; Warwick & Shah, 2014, 2016).

The origins of chatbots are necessarily linked to psychology. The first steps in the development of these machines are attributed to Joseph Weizenbaum (1966), who built a program that simulated a conversation with a psychologist. This program, called ELIZA, can be considered the first chatbot or virtual agent in history (Khan & Das, 2017). ELIZA is responsible for identifying keywords in the text that the user enters, from which it generates questions. When it is not able to identify them, it uses set phrases that encourage the user to speak more: "Why do you say that?", "Can you go into more detail?" (Weizembaum, 1966). Although the answers are predefined, this robot conveys the feeling that it is capable of understanding the user (ELIZA, 2018).

ELIZA served as the inspiration for subsequent works (Khan & Das, 2017). An example of this is the chatbot Alicebot—created in 1995 by Richard Wallace, who has won the *Loebner* award several times—which was created with more than 40,000 knowledge categories. (ELIZA had around 200). These categories were composed of a question and an answer, and were integrated into a tree diagram to facilitate dialogue. By design, this virtual agent was thought to be in continuous development and improvement: in charge of this was the *botmaster*, who created new content to adjust Alicebot's responses (Wallace, 2009). A few years later, the SmarterChild bot was created, which not only allowed the possibility of having a conversation, but also offered

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information on various topics (sports, movies, weather, etc.) (Klopfenstein, Delpriori, Malatini, & Bogliolo 2017; Khan & Das, 2017). Subsequently, animated virtual agents have also been developed, that is, avatars with human appearance, gestures, and expressions that interact with users. Apparently, this type of presentation encourages the user to perceive the chatbot as more sociable and enjoyable (Klopfenstein et al., 2017).

These pioneer bots have established the basis for the design of a great diversity of conversational agents. The best-known ones are currently on our devices, such as *Google Assistant* (developed by Google), *Siri* (developed by Apple), *Cortana* (developed by Microsoft), and *Watson* (developed by IBM). They are able to interact with the user based on text and voice inputs, and are intended to help them perform multiple actions such as activating music, organizing medical appointments, solving questions of all kinds, or even ordering takeaway food for home delivery (Khan & Das, 2017). Also, every day there are more companies that include a chatbot on their website or in their social networks in order to offer products and services to customers. An example is Irene, the virtual assistant of the company Renfe, which makes it easy for the user to prepare his or her trip and also has an animated avatar.

Although most chatbots have been developed for commercial purposes, these machines are also useful in other areas: a potential case of non-commercial use could be as a support tool in the tasks of psychological assessment and intervention. We have only found one bot aimed at carrying out psychological assessment tasks so far. It is called Sentinobot (Sentino, 2018) and was built with the objective of evaluating personality traits (ELIZA and Alicebot are not specifically presented as tools to aid evaluation, even though they encouraged the user to reveal their psychological problems). Sentinobot collects information on the Big Five (extraversion, conscientiousness, agreeableness, neuroticism, and openness to experience) through multiple-choice questions and answers based on a Likert-type scale. In other words, it is a virtual agent that administers an evaluation test with closed questions and answers. Sentinobot is a tool with a different format from traditional assessment tests, but we have not found studies on the psychometric guarantees of this prototype. The best example of help in intervention work is Woebot (Fitzpatrick Darcy & Vierhile, 2017), a conversational agent based on elements of cognitive behavioral therapy. This bot administers a self-help program to users who have symptoms of depression. In a study with a sample of 70 students, it was observed that the group that received therapy from the virtual assistant reduced symptoms of depression, compared to the group that simply received information about this disorder. The authors of this study conclude that chatbots can be a tool of potential utility in administering cognitive behavioral therapy (Fitzpatrick et al., 2017).

Also worth mentioning is the chatbot Replika (Brandtzaeg & Følstad, 2018; Replika, 2018), which was designed with the objective that the user maintains a pleasant interaction and "feels better". Replika introduces itself as a virtual friend, and asks questions about the daily activities, hobbies, aspirations, and feelings of its interlocutor. Although it is not defined as a psychologist nor has it been built with that intention, it is able to identify keywords linked to psychological distress; and perhaps most remarkable is its role of referral to a specialized care service when it detects suicidal ideation. Regarding this virtual agent, we have not found controlled studies that offer evidence about its efficacy, effectiveness, or efficiency.

In our research team we are currently designing a psychologist-chatbot that has the purpose of conducting an initial psychological assessment interview. With this project, we intend to create a conversational robot with guarantees and scientific rigor that will help in psychological assessment work. In addition, once the tool has been built, it will be possible to study the differences between the interviews in which the user interacts with a chatbot (human-chatbot process) and the interviews in which the user interacts with a human psychologist (human-human process). This will allow us not only to improve the chatbot, but also to understand in depth what forms of interaction are most effective in achieving a certain objective. Furthermore, it will serve to establish the basis for the development of future tools, as well as to initiate a debate about the relevance and the necessary regulation of their use.

Next, we present the necessary foundations for developing a virtual psychological assessment agent, describing the basic concepts for its creation and design, and the necessary psychological considerations.

HOW TO CREATE A CHATBOT

Tools for developing conversational agents

Since the development of conversational agents has increased in recent years, the number of tools that enable them to be designed has also increased. Some of the most important platforms that offer services related to the development of chatbots are IBM Watson, API.ai, Dialogflow, and Microsoft LUIS. These tools facilitate the programming of conversational agents with apparent intelligence and are also under constant improvement (Khan & Das, 2017). The services provided by Chatfuel and Flow XO are also known. These are simpler tools than those mentioned above, but they are more limited (Janarthanam, 2017; Kothari, Zyane, & Hoover, 2017).

Within the scope of psychology, it will be necessary to use advanced platforms that allow a fluid and rich interaction with users since, if the chatbot does not appear to have a certain level of intelligence, the user's distrust of the tool will increase. In any case, in order to design a conversational assistant, it is necessary to know a series of basic concepts that work with the vast majority of platforms designed to develop them.

Chatbot structuring: intentions, entities, and dialogue

There are three essential concepts that must be considered for the construction of a chatbot: intentions, entities, and dialogue (Khan & Das, 2017).

Intentions refer to the actions or demands that the user requires (buying a train ticket, reserving a table, communicating a problem, asking a question, etc.). The first thing that a conversational agent must identify is what the human with whom it is interacting is requesting. However, since human language is broad and rich, there are multiple ways to communicate the same thing and it should be borne in mind that the chatbot can only identify the user's intentions if the different ways of expressing the same intention have been previously described in its programming.

Imagine this simple example: a study center offers online training and implements a chatbot on its website in order to understand the wishes of the visitors to the site and help them sign up to the course that most interests them. A user needs to enroll in a training course and, for this, he or she can tell the chatbot: "I need a course", "I want to sign up for a course", "I would like to attend a course at your center", etc. In this case, we need to have included all the ways to express that request in the intention #course_sign_up (it is usual to use the "#" symbol before each intention).

In addition, the same intention can have different nuances. For example, one user may be interested in enrolling in a clinical psychology course, while another may prefer a place on a human resources management course. The intention is the same, to enroll in a course, but the users are not referring to the same one. So, entities are what make it possible to make this type of distinctions related to the same intention. They could be considered "keywords" and are generally identified using the "@" symbol. Thus, in the example just mentioned, we could distinguish between @clinical_psychology and @human_ resources, and we could program it so that, if the chatbot recognizes the intention #course_sign_up, it will ask: "Are you interested in courses in the area of clinical psychology or in the area of human resources?" If the user replies "I want to find out information on clinical psychology courses", the chatbot will identify the intention @clinical_psychology and offer information about it.

Finally, the chatbot needs a set of questions or phrases for interacting with the user, in other words, a dialogue. This dialogue is programmed in detail according to the type of interaction to be carried out. In the process of creating it, the intentions and entities will be shaping and directing the dialogue: the system works like a decision tree, that is, according to the intentions and entities that it detects in the user's responses, it will decide what node to pass. Following the previous example, if a user shows interest in signing up to a course, and the chatbot "understands" his or her intention, it will ask questions (described in the dialogue) to try to identify what type of course he or she wants, the schedule, etc.

To ensure that the assistant does not get lost in the conversation, it is essential that all possible conversation options are contemplated in the dialogue tree.

In particular, the chatbots that are designed to perform a commercial function are built considering the concepts mentioned above. Their main purpose is to provide the information requested by the humans with whom they interact. In other words, the users require a product or service, and what they say to the chatbot (whether spoken or written) will, in turn, direct the next question the bot will ask. So, if a customer indicates that he or she wants to buy a ticket, the chatbot will detect that it has to identify what type of ticket is needed (theater, cinema, etc.) and will, therefore, respond accordingly.

However, as will be indicated in the next section, this is slightly different when we are talking about a chatbot that is intended to do the work of a psychologist who performs the initial assessment of a clinical case. In this use, the psychologist-chatbot is the one that requires the necessary information from the human in order to assess his or her problem. The virtual agent will guide the conversation with the user so that he or she is able to describe it in the best possible way (Figure 1).

Therefore, when building a psychologist-chatbot, a series of aspects must be considered before defining the intentions, the entities, and the dialogue tree.

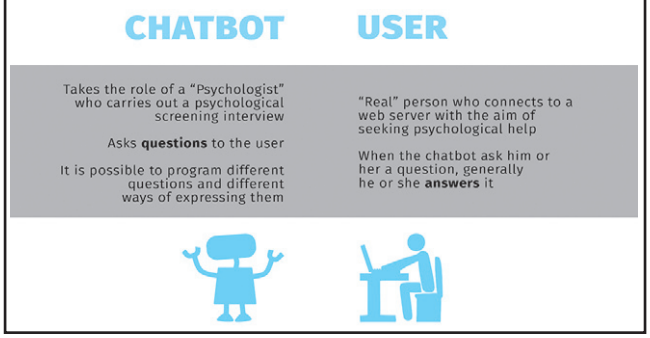
CREATING A PSYCHOLOGIST-CHATBOT

Previous considerations

Before starting to create the chatbot, it is necessary to consider what type of virtual agent we want to program and for what purpose. In our case, we will present the necessary elements to build a chatbot aimed at performing preliminary psychological assessment tasks, although it is true that the concepts and steps we will describe could be generalized to robots with similar functions.

It is important to be clear about the audience to which it is aimed. Many companies offer services through a chatbot hosted on their website or on their social networks, open to all

FIGURE 1
RELATIONSHIP PSYCHOLOGIST-CHATBOT AND USER



audiences with unspecified objectives. In our case, we believe that the psychologist-chatbot should only be available to clients of health centers where preliminary psychological assessments are required.

It is also necessary to consider the information that the chatbot will obtain from the users. In our case, given that psychologists work with confidential information, we must take maximum care of the processing of the data and their accessibility. The virtual agent must be built so that the access and custody of the information comply with all the requirements of the European Data Protection Regulation (EU) 2016/679 of April 27, 2016 (GDPR) and the Organic Law 3/2018, of December 5, on Protection of Personal Data and Guarantee of Digital Rights. Among other things, it must be hosted on a secure server and access to the data must be limited to the psychologists of the center where the case is treated. Of course, users who interact with the chatbot will be informed about the processing of their personal data and must consent to this before starting the conversation.

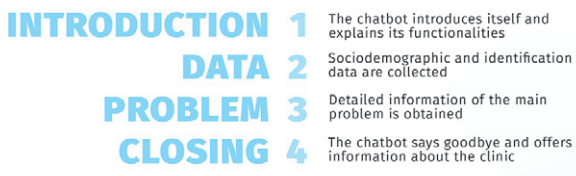
Once all these steps are clear, we can begin to consider the objectives that the chatbot or conversational agent will have.

Objectives of the chatbot with initial psychological assessment functions

When a human psychologist makes a pre-assessment interview (initial psychological assessment), he or she does so with a set of pre-established objectives. Firstly, it is necessary to know the user's basic data: name, age, occupation, etc. Secondly, the psychologist who conducts the interview collects data on the client's problem and guides him or her to describe it as accurately as possible. For example, if the client indicates that he or she has anxiety, the psychologist must determine the intensity of the symptoms, in what situations they occur, since when, how often, etc. In this case, it is not the client who asks the chatbot for a certain type of information (schedules, types of tickets, etc.), or requires certain actions (booking, buying, etc.), but instead it is the chatbot that asks the client, with the purpose of later providing the relevant information of his or her case to a psychological clinic.

To build a conversational assistant with psychological assessment functions, we must adequately specify the objectives of the interview in order to be able to transmit them to the tool through the flow of dialogue and entities. Remember that in this case the chatbot does not have to identify what the client wants, but instead it will be the predefined dialogue tree that guides the conversation. This means that it will not be necessary to define intentions, but instead entities or keywords that will allow the bot to identify if it is collecting the appropriate information.

FIGURE 2
STRUCTURE OF A CHATBOT WITH INITIAL PSYCHOLOGICAL SCREENING FUNCTIONS



The pre-assessment objectives that we propose below to integrate into the psychologist-chatbot are based on the behavioral interview proposed by Fernández Ballesteros (2015) and on the experience and criteria of the authors of this article. With this type of question, we do not seek to make a diagnosis, but rather to obtain general information that helps us both to analyze the problem later (that is, an explanation of why the user is failing to cope with their difficulties successfully), and to determine how the assessment phase must continue, if the user decides to start therapy. Also, as will be described later, this tool can be very useful for clinics that have different professionals, since the data collected in the conversation can help in deciding to which specialist the user will be referred.

Figures 2 and 3 reflect the structure and objectives that should pertain to a chatbot whose purpose is to pre-evaluate a user who seeks psychological help.

Dialogue and keywords

The keywords and dialogue will be established based on the objectives of the chatbot with psychological assessment functions. For example, regarding questions about sociodemographic data, if the objective is to know the user's occupation, the dialogue could be: "What is your current occupation?" or "What do you do for a living?". Likewise, the key words that indicate that the question has been answered and that, therefore, the chatbot can continue with the next objective would be "study", "work", "unemployed", etc., which would correspond to the entities @study, @work, @unemployment, etc.

In short, each chatbot objective must have a list of possible synonymous associated questions that would make up the dialogue. In addition, lists of keywords that the chatbot will have to identify in the response (via text or voice) will be recorded. However, it may be that in certain parts of the dialogue these keywords are not defined for detection, but instead the user will be allowed to respond more openly. Specifically, in almost all the questions designed to gather information about the client's problem, it is not very useful to make a list of keywords to be identified in the response, since the conversation must move forward without restricting the users' way of expressing themselves or the information they must provide.

In order to build an intelligent and efficient chatbot, the dialogue tree must have the following (outlined in Figure 4):

✔ Nodes with pre-assessment questions expressed in different ways.

- ✔ An explanatory node for the occasions when the client does not understand the question asked (e.g., "I meant that if there is any other problem that may be relevant or that you may have remembered during the conversation which also causes you distress").
- ✔ A node in which the user is required to complete the response when it is markedly brief (e.g., "Could you give me a little more detail?"), with the aim of expanding the information.
- ✔ Nodes that express understanding and support in relation to the problem posed by the user (e.g., "I am sorry that you are going through this situation").
- ✔ Nodes that reinforce the user by conducting the interview (e.g., "You are doing very well, let's continue").
- ✔ Nodes that remind the user that he or she is interacting with a chatbot and that it is likely that it does not understand everything he or she says (e.g., "You know I am a robot. Sometimes I don't understand everything").

For a more advanced development, it would be very useful to have a configurator that allows you to manage the questions, so the appearance of the questions would be associated with a certain probability or even with the tool's own machine learning. However, since these advances require more complex computer development, they are not essential in the initial phase of the chatbot.

User instructions

Once we have an overview about the dialogue and the keywords that the chatbot will "recognize", it will be time to consider how the conversation will begin. It will be useful to warn the user about the functioning of the virtual agent, indicating that it is a robot and that it needs them to interact with it using concise phrases. Otherwise, users could begin to describe their problem using long text entries, which would make it difficult for the virtual agent to "understand" the content (that is, recognize the appropriate entities). The user may also be advised that he or she may be asked for data that he or she may have already mentioned in previous messages. Sometimes, in the same text entry the client may report several data (e.g., the place where he or she had an anxiety attack and the people present). If the chatbot is not programmed to identify both data points in a single entry, it is likely that in other questions it will ask the user again for information that he or she has already given. If we do not warn the client that this may occur, he or she is more likely to become frustrated and leave the conversation without having finished the interview.

On the other hand, as we mentioned before, it is necessary to inform the client about the use of the personal data that he or she will provide. In our case, we consider that this information, in accordance with the current legislation, must be offered to the user before the conversation with the device begins. However, there is no harm in the virtual agent giving a reminder at the beginning of the interaction.

Synthesis of the information collected by the chatbot

Once the user has completed the interview with the chatbot, it will be stored on a secure server with restricted access. The information that identifies the user will be encrypted and separated from the rest of the information. For this type of chatbot, specifically, we have designed the data output so that the whole conversation can be obtained with the relevant words (e.g., "sad", "anxiety", "fear", "pain", " die" etc.). At the beginning of the conversation, a summary table will be generated that will collect these words in addition to the description of the user's request. Thus, from a first glance one can know the subject of the case.

As previously announced, the information collected by the chatbot may be useful in deciding which professional to assign the case to within a team of psychologists. This work will be streamlined thanks to the tool, since it will not be necessary to spend time personally evaluating each case. Likewise, the situation will be avoided where the user starts therapy with a therapist other than the one who made the

FIGURE 3
DETAIL OF THE OBJECTIVES OF THE PSYCHOLOGIST-CHATBOT. THESE ARE FORMULATED THROUGH QUESTIONS PRESENTED IN A CERTAIN ORDER TO THE USER

PSYCHOLOGIST-CHATBOT

1. **Introduction:** The psychologist-chatbot in charge of conducting the assessment interview introduces itself to the user and presents the purpose of the interview
2. **Sociodemographic data:** Basic identification data of the user is obtained:
   a. Age
   b. Gender
   c. Occupation
   d. Contact information
3. **Understanding the problem:** Obtaining an overview of the psychological problems presented by the user from his/her own perspective
4. **Specific symptoms:** Understanding in detail the complaints, discomfort, or distress he/she is experiencing:
   a. Intensity
   b. Duration
   c. Frequency (daily or weekly)
5. **Severity:** Exploring the user's opinion about the severity of the symptoms and how they affect his/her daily life
6. **Evolution of severity:** Obtaining information on the evolution of the problem from the moment of onset until the present moment in which the person is requesting help
7. **Origin of the problem:** Understanding the time and circumstances under which the problem began
8. **General frequency:** Frequency with which the problem occurs (e.g., several times a day, a week, once a month, etc.)
9. **Last time the problem ocurred:** Understanding when the problem last occurred, as well as a description of the circumstances in which it occurred
10. **Feelings linked to the problem:** Exploring the user's feelings and thoughts when the problem or symptoms that he/she is experiencing arise
11. **Behaviors related to the problem:** Understanding what the person does when he/she suffers the problem
12. **Places where it occurs:** Understanding the characteristics of the places where the problem has taken place
13. **People present in the situation:** Obtaining information on whether there are other people present when he/she has the problem
14. **Other possible problems:** Exploring if the user currently has any problems other than the main one
15. **Previous requests for help:** Asking if he/she has asked for help from the people in his/her environment or from professionals to solve the problem
16. **Motivation to solve the problem:** Asking what he/she is willing to do to solve the problem
17. **Previous psychological problems:** Exploring if the user has previously presented psychological problems and if professional help was received
18. **Administering assessment instruments:** Asking the user to complete assessment instruments that complement the information obtained in the interview (e.g., questionnaires, biographical history, etc.)

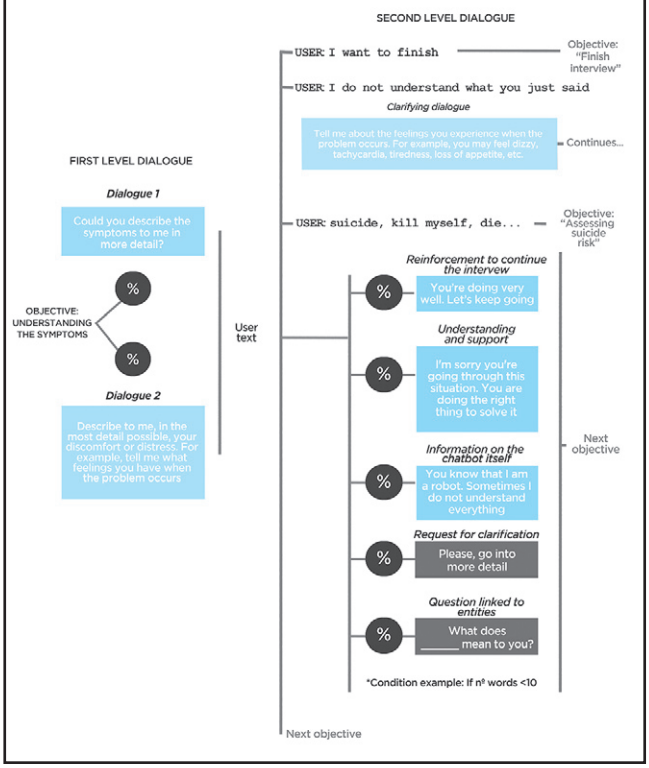
initial assessment. It must be said that the therapist assigned to the case will have the information collected by the chatbot, which will facilitate the analysis of the problem and the preparation of the face-to-face sessions. If this tool is used by one professional alone, the information collected will also help to plan the assessment and even make a first approach to explaining the problem.

Interdisciplinary development

From everything described above, it can be noted that collaboration among psychologists, computer engineers, and linguists is vital. Psychologists are responsible for indicating what the chatbot's questions should be and the type of information that should be collected. In addition, they are responsible for pointing out the situations that require priority referral to a human psychologist or even, more specifically, to a specialized emergency service (e.g., the user presents suicidal ideation and a set plan). The engineers and linguists are responsible for designing and building the chatbot so that it can understand the user (identifying certain words in the text or voice input), guiding the conversation, interacting with language that is as natural as possible, etc.

It must not be forgotten that a chatbot must be in continuous development. The ideal is to have machine learning tools, but not all people have access to this type of technology. In any case, this process will have to be supervised by a botmaster (and in the case of a psychologist-chatbot, this task must be performed by psychologists, engineers, and linguists).

FIGURE 4
GENERAL SCHEME OF THE TREE OF DECISION MAKING REGARDING THE CHATBOT'S QUESTIONS



DISCUSSION

Chatbots are a reality that is constantly increasing and developing. While their origins date back to more than half a century ago, it is now that their presence is beginning to emerge. This is possible, in large part, thanks to the latest advances in computational science and artificial intelligence (Brandtzaeg & Følstad, 2018). These machines are capable of offering us services of unquestionable potential: they help us with the management of daily tasks, with the acquisition of products and services, and they are even offered as a virtual friend. As for the field of psychology, although the first chatbot in history presented itself as a psychotherapist, there are few virtual agents of this type that have been developed since then and even fewer that have undergone controlled studies to obtain evidence about their efficacy, effectiveness, and efficiency.

We believe that the creation of chatbots dedicated to assessment and intervention work can be of particular interest and usefulness. The virtual psychological assessment agents have the potential to be just another tool for the psychologist who is in charge of the evaluation of a clinical case. One of their main advantages is savings in terms of time and use of physical spaces. First, since it is a tool available through a web service, an office is not necessary for carrying out the initial assessment. Second, if the chatbot manages to collect information, it can expedite the evaluation process, saving time for the psychologist in charge of assigning the case to the different therapists and, consequently, saving time for the user him- or herself. Likewise, virtual agents can serve as support during the treatment, facilitating the client's process of learning the guidelines and techniques required for their specific case.

It is important to reflect on the limitations of these conversational agents. First, they do not have intelligence as we understand this concept; their functioning will depend on how we have defined the intentions, the entities, and the dialogue. Obviously, an initial version of the bot will not be enough; it will be necessary to undergo a process of constant "learning" to facilitate its improvement. Second, the use of virtual agents requires users to be familiar with the new technologies. To interact with a chatbot you need to have a computer or mobile device, as well as an internet connection. Therefore, using a psychologist-chatbot for some sectors of the population (for example, children and the elderly) may not be the best option. Also, and in relation to the need to be connected to the Internet, the interaction with this tool is subject to possible connection problems, which can negatively affect the user experience.

Another aspect to consider is the type of information that the client receives in the interaction with a conversational assistant. Psychologists not only offer verbal information, but nonverbal language also plays an important role, so if the virtual agent does not have an avatar, the interaction can be impoverished. The same applies to the information collected by the chatbot, because for now the advanced and affordable technology that would allow us to understand the user's nonverbal language does not exist. Therefore, the type and amount of information obtained is clearly different from that which a human would collect. In any case, we must not forget that this is a support tool and will can never completely replace the psychologist.

On the other hand, and regardless of the discipline to which they are attached, chatbots must comply with the guidelines related to data protection regulations. These guidelines are even stricter in the case of psychology, since the data that are handled are personal, and must be treated confidentially and in accordance with the law. In the contact platform, the user must be guaranteed confidentiality, be informed of the use that will be made of the data obtained, and they must be asked for consent. In this case, the regulations require a high level of protection and this information must only be accessible to authorized psychologists. In addition to the above, we believe that it is important that chatbots dedicated to psychological assessment and intervention work have regulations that guarantee compliance with minimum guidelines regarding the ethical standards that are so relevant in this profession. On the other hand, it is also essential to be able to offer the user the information that has been obtained through the chatbot, in case they request it (just as a user can request a report about the data collected in the psychological center in the therapeutic process).

The designing of a virtual psychologist agent necessarily requires the contribution of knowledge from psychology, computer engineering, and linguistics. The machine requires an advanced programming base for its creation and must be constructed so that it is able to "understand" the natural language of the users. At the same time, it must take into account the assessment and intervention strategies recognized as efficacious and effective so that it achieves its purpose successfully.

One of the benefits of developing these conversational agents is the possibility of studying the characteristics of the chatbot-human therapeutic process and analyzing the differences that it presents with the human-human process. For example, we can study whether they differ in interaction time, in the number of sentences, in the subjective assessment of the degree of help, and in perceived satisfaction. We can also study whether there are expressions that are more effective in obtaining a certain type of information, etc. This, in turn, will allow us to optimize the conversational agent (Hill et al., 2015), implementing the possible improvements that we detect. We hope that the chatbot that is currently being developed and that has been described in this work will allow us to obtain this type of data, so that we can contribute to improving and expanding the use of these tools in the field of psychology.

The objective of this work has been to present in a summarized way the state of the question in relation to the development of chatbots and their link with psychology. It is also intended to encourage professionals to participate in the design and testing process of these tools to demonstrate their efficacy, effectiveness, and efficiency, and to ensure good practices. No doubt, in the coming years, technological advances will allow substantial improvements in the development of virtual agents, which will facilitate their creation and improvement. In the field of psychology, we hope that these advances incorporate elements that are relevant to the profession, such as the possibility of identifying the users' nonverbal language.

CONFLICT OF INTERESTS

There is no conflict of interest

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