

Building “EVA”: Human-Centered Development of a Mental Health Chatbot for Adolescents Living with HIV: Tutorial

Diego Humberto Vasquez, Neil Rupani, Carmen Contreras, Lenka Kolevic, Molly Forrest Franke, Jerome Timothy Galea

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Building “EVA”: Human-Centered Development of a Mental Health Chatbot for Adolescents Living with HIV: Tutorial

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Abstract

Globally, the need for mental health care greatly surpasses the availability of services, especially in low- and middle-income countries (LMICs). Adolescents living with HIV (ALWH) are especially vulnerable because their developmental life stage predisposes them to higher rates of mental health morbidity compared to other age groups, which, left untreated, can also lead to suboptimal HIV outcomes. However, due to a lack of mental health services, most adolescent mental health morbidity—especially in LMIC—goes unaddressed. Among the most prevalent mental health conditions experienced by ALWH is depression, which often initially presents with mild to moderate symptoms that, if addressed early on, can prevent escalation to more severe presentations of depression. Such early interventions for depression include depression education, learning self-help skills, and understanding when depressive symptoms require specialized treatment by a mental health professional. Chatbots, which are increasingly used in both commercial and healthcare settings, present an opportunity to deliver depression education and self-help skills to ALWH in a highly scalable and cost-effective manner. As part of a larger study to explore the acceptability and feasibility of a mental health chatbot for ALWH, this tutorial explains the iterative, Human-Centered Design (HCD) and programming of a chatbot named “EVA,” which was co-developed with ALWH in Peru. Using the chatbot programming platform Smarbot360 and guided by the principles of HCD, we began by collecting preliminary data on the perceived acceptability of a mental health chatbot among ALWH. Next, we convened a Youth Advisory Board (YAB), comprised of six ALWH, who met monthly for five months to guide, test, critique, and finally approve a final version of the chatbot EVA for future testing. During the iterative development phase, ALWH identified key topics of interest and the preferred methods for presenting information in the chatbot. For example, in addition to depression information and self-help skills, ALWH requested that EVA include information on stigma, bullying, and eating disorders. Furthermore, emphasis was placed on using empathetic and friendly language that is both motivating and encouraging. Despite some challenges with meeting all the YAB’s desired chatbot characteristics, their participation allowed us to build a mental health chatbot that was highly responsive to their stated needs and preferences. We demonstrate that tailored chatbots like EVA can be easily and rapidly developed by teams with no specific expertise in chatbot programming and, importantly, may eventually be used to address the crucial mental health service gap experienced by ALWH.

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Original Manuscript

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Keywords: Chatbot; mHealth; adolescent; HIV; mental health; depression

Abstract

Globally, the need for mental health care greatly surpasses the availability of services, especially in low- and middle-income countries (LMICs). Adolescents living with HIV (ALWH) are especially vulnerable because their developmental life stage predisposes them to higher rates of mental health morbidity compared to other age groups, which, left untreated, can also lead to suboptimal HIV outcomes. However, due to a lack of mental health services, most adolescent mental health morbidity—especially in LMIC—goes unaddressed. Among the most prevalent mental health conditions experienced by ALWH is depression, which often initially presents with mild to moderate symptoms that, if addressed early on, can prevent escalation to more severe presentations of depression. Such early interventions for depression include depression education, learning self-help skills, and understanding when depressive symptoms require specialized treatment by a mental health professional. Chatbots, which are increasingly used in both commercial and healthcare settings, present an opportunity to deliver depression education and self-help skills to ALWH in a highly scalable and cost-effective manner. As part of a larger study to explore the acceptability and feasibility of a mental health chatbot for ALWH, this tutorial explains the iterative, Human-Centered Design (HCD) and programming of a chatbot named “EVA,” which was co-developed with ALWH in Peru. Using the chatbot programming platform Smarbot360 and guided by the principles of HCD, we began by collecting preliminary data on the perceived acceptability of a mental health chatbot among ALWH. Next, we convened a Youth Advisory Board (YAB), comprised of six ALWH, who met monthly for five months to guide, test, critique, and finally approve a final version of the chatbot EVA for future testing. During the iterative development phase, ALWH identified key topics of interest and the preferred methods for presenting information in the chatbot. For example, in addition to depression information and self-help skills, ALWH requested that EVA include information on stigma, bullying, and eating disorders. Furthermore, emphasis was placed on using empathetic and friendly language that is both motivating and encouraging. Despite some challenges with meeting all the YAB’s desired chatbot characteristics, their participation allowed us to build a mental health chatbot that was highly responsive to their stated needs and preferences. We demonstrate that tailored chatbots like EVA can be easily and rapidly developed by teams with no specific expertise in chatbot programming and, importantly, may eventually be used to address the crucial mental health service gap experienced by ALWH.

Introduction

In 2023, approximately 1.4 million children aged 0 to 14 years and 38.6 million adults aged 15 and older were living with HIV worldwide [1]. Adolescents living with HIV (ALWH) face unique challenges, including higher rates of mental health issues compared to both children and adults with and without HIV [2,3]. Left unaddressed, mental health problems—especially depression and anxiety—among ALWH are associated with suboptimal adherence to antiretroviral therapy (ART), leading to negative treatment outcomes [4]. At the same time, however, there is a global shortage of mental health services, with an estimated 70% of people in need worldwide lacking access [5]. For ALWH, who predominately live in low and middle-income countries (LMICs), this gap results in a severe lack of mental health services, which can, in turn, impact HIV treatment outcomes and overall health.

Multiple factors at the personal, health system, and national policy levels undermine ALWH's access to mental health services. At the personal level, stigma around both HIV and mental health can discourage adolescents from disclosing symptoms or seeking care [6,7]. Many ALWH also depend on caregivers or guardians to access treatment sites, adding layers of logistical and privacy concerns [8]. From a health system standpoint, mental health services for adolescents are typically not integrated with HIV care, and healthcare facilities may lack adequately trained personnel in adolescent mental health, resulting in delayed or suboptimal care [9]. Moreover, in many low- and middle-income countries like Peru, there is a notable shortage of mental health professionals, which, coupled with limited financial resource allocation and insufficiently integrated policies, further constrain the availability and accessibility of adolescent-focused mental health interventions [10,11].

Against this backdrop, depression emerges as one of the most common and pressing mental health concerns among ALWH [12]. Although many adolescents experience mild to moderate symptoms rather than severe depression, even low-intensity symptoms can snowball into more serious issues if left unaddressed [13,14]. Indeed, preliminary data in Peru indicate that up to 92% of ALWH presenting with depression have symptoms in the mild-to-moderate range [15]. These youth receive few—if any—routine mental health interventions, such as education, self-help strategies, or linkage to community-based resources, missing a critical opportunity to prevent progression to severe depressive episodes and further ART nonadherence [16].

Given these converging challenges, digital solutions have gained traction to fill the “pre-severe depression service gap” [17]. Among such solutions, chatbots—automated conversational agents—show promise for delivering accessible, anonymous, and scalable mental health support. Already, they have demonstrated feasibility in several contexts, requiring no special software and operating via widely used platforms such as SMS, WhatsApp, and Facebook Messenger [17,18]. In Peru, for example, chatbots facilitated mass depression screening among adults, with more than 20,000 users reached during the COVID-19 pandemic [19,20]. This success suggests the potential for a chatbot tailored specifically to the needs of ALWH, offering not only psychoeducation on depression but also coping strategies and timely linkage to care for moderate or severe symptoms.

Developing such a chatbot, however, requires the active participation of end users to maximize relevance and acceptability. Human-centered design (HCD)—also referred to as participatory or user-centered design—incorporates the voices of end users at every stage, including content creation, prototype testing, and refinement [21]. Previous digital mental health interventions have suffered from high attrition rates among young users when they fail to address factors such as cultural context, stigma, and interface usability [22]. By involving ALWH from the outset, we can better tailor the chatbot's functions and content, improving engagement and mitigating the risk of dropout

[23]. Yet, despite the growing popularity of chatbots in healthcare, few published studies describe a step-by-step approach to applying Human-Centered Design (HCD) in chatbot development.

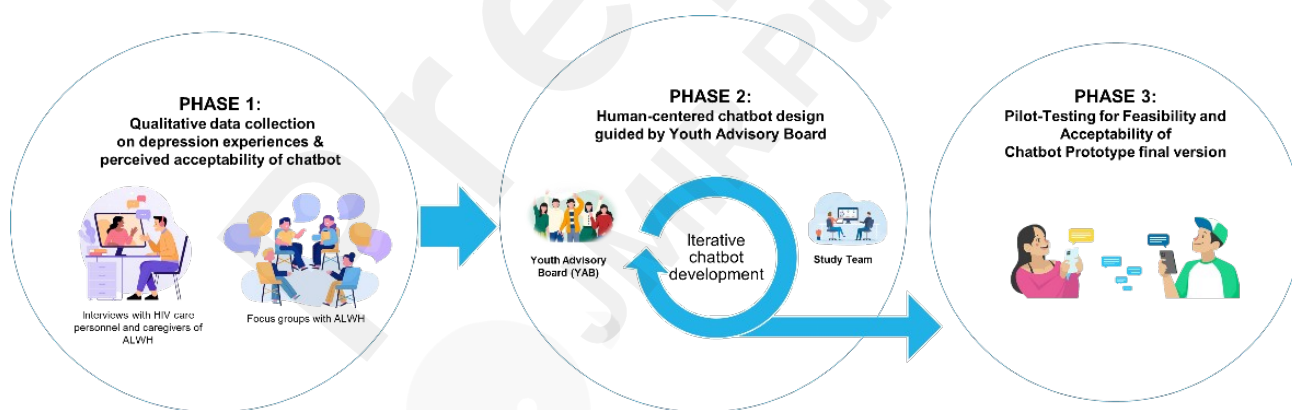
Here, we outline our human-centered approach to creating a novel chatbot designed to address mild to moderate depressive symptoms among ALWH in Peru. We detail each phase—needs assessment, co-designed workshops, iterative testing, and evaluation—to serve as a “recipe” for others seeking to build similar interventions. By sharing both our successes and challenges, we provide practical guidance on leveraging Human-Centered Design (HCD) principles in the fields of adolescent mental health and HIV care.

Methods

Principal Study

The development of the chatbot described here was part of a larger study examining the feasibility and acceptability of this type of intervention to increase ALWH’s access to mental health care, through building a chatbot focused on providing education, strengthening self-help skills, and facilitating linkage to depression care for ALWH [16]. The larger study comprised three phases (Figure 1): I. Qualitative data collection to understand how ALWH conceptualized depression and their initial views and opinions of a mental health chatbot; II. Human-centered development of the chatbot; and III. Feasibility and acceptability testing of the chatbot. Phase II, chatbot development, the focus of this tutorial, occurred during August- December 2023 and was further divided into three steps: A) Planning, B) Iterative development of the chatbot, and C) Review of the chatbot by professionals.

Figure 1: Phases of principal study.



The principal study, which includes the procedures described here, was reviewed and approved by an Institutional Research Bioethics Committee in Peru.

Youth Advisory Board

To identify key characteristics that could improve the acceptability of a chatbot for adolescents, it was essential to collaborate directly with this population. For this purpose, a Youth Advisory Board (YAB) was established to guide the development of the chatbot. YAB members were selected from the ALWH who participated in Phase I, prioritizing individuals who were particularly engaged during focus groups—those who openly shared their opinions, demonstrated an understanding of adolescent mental health, and recognized the challenges other ALWH face while living with HIV and

adhering to treatment. Ultimately, the YAB consisted of six Peruvian ALWH, ranging in age from 11 to 19 years.

The YAB's primary task was to test the chatbot during in-person sessions, providing feedback on its design, content, and functionality and suggesting ideas for improvement. Five group sessions were conducted between August 2023 and January 2024, with approximately 30-day intervals between sessions. All sessions took place on Saturdays to accommodate the participants' availability and were held at an institution that provides services to people living with HIV.

Each YAB session lasted between 90 and 120 minutes, including breaks. During the sessions, YAB members accessed the chatbot through a web link and spent an average of 20 minutes interacting with the content selected for that session. Afterward, they recorded their impressions and engaged in group discussions to share their perspectives. The group collectively reviewed the feedback, identifying points of agreement and disagreement, and reached a consensus on key modifications for the next version of the chatbot. With guidance from a study team member, the YAB then proceeded to evaluate the next feature or content area selected for that session.

Study Team and Software Tools

The study team consisted of 4 health professionals: 2 psychologists (CC and DV), a mental health researcher and clinician with experience in chatbot development (JG), and a medical student (NR). DV and NR were primarily responsible for software development, while CC and JG oversaw the content and construction of the chatbot.

The chatbot was developed using Smartbot360 software [24]. JG utilized this software for chatbot development in previous studies aimed at developing tools to improve mental health for other populations [25,26]. In June 2023, JG conducted virtual and face-to-face training sessions on the use of Smartbot360.

Project Outline

Human-Centered Design Methodology

The chatbot development process was conducted in accordance with the principles of the Human-Centered Design (HCD) methodology. HCD is based on designing conversational experiences focused on users' needs, expectations, and emotions. Its iterative approach enables the creation of more intuitive, efficient, and empathetic chatbots by adhering to four main principles: being people-centered, solving the right problem, considering everything as a system, and making simple and small interventions [27].

Applying these principles, the chatbot design was informed by findings from the first phase of the principal study, which identified the needs and preferences of ALWH, the intended end-users. This was followed by the creation of the YAB, which helped us better identify the key issues the chatbot aimed to address, as well as the most significant challenges to be solved from the adolescents' perspective during this development. We maintained a holistic view of the chatbot as an integrated system rather than a collection of disconnected components.

While each YAB meeting generated a wide range of ideas, our team was new to chatbot development, and the target population had high expectations for the technology. As a result, the study prioritized refining the prototypes to enhance functionality and implement practical solutions

in response to the challenges and suggestions that emerged during the development process

Step 1: Collect Baseline Information on Perceived Acceptability of a Mental Health Chatbot

The first phase of the study involved collecting information on the acceptability and feasibility of a mental health chatbot through focus groups and interviews with ALWH, healthcare professionals providing pediatric HIV services, and caregivers of ALWH [for details of this step, see 28]. In these focus groups, ALWH also provided suggestions for features and topics to include in the chatbot, with the most requested mental health topics to include being anxiety, depression, isolation, suicidal ideation, and stigma, with the latter being considered a major barrier to seeking help among ALWH. Participants noted that concealing emotional distress, often due to societal or sexual orientation-related challenges, was a common coping mechanism.

The preliminary findings on chatbot acceptability provided valuable insights into users' expectations and perceived challenges before development. Participants emphasized the importance of a secure, confidential, and easily accessible tool, which they believed could serve as an educational resource to strengthen self-help skills, given the long wait times for professional care in public health services, which can range from weeks to months. Therefore, the chatbot's mobile-friendly design was seen as advantageous, given that adolescents naturally engage with technology [28].

Regarding potential drawbacks or challenges of a chatbot, some adolescents felt that a chatbot could be perceived as impersonal, artificial, and with limited emotional scope for dialogue on sensitive topics that teens may wish to discuss. Furthermore, adolescents' limited access to the internet and mobile devices also needed to be considered, as many have limited resources. There were mixed views on the degree of parental involvement, with teens concerned about who might have access to the information they enter and whether parents or guardians would be monitoring their conversations. Adolescents' familiarity with technology could subsequently become a challenge. If they do not find the chatbot interesting or entertaining, they are unlikely to use it despite the useful information it may contain. With these strengths and challenges in mind, the structure and key functions of the chatbot were initially defined.

Step 2: Iterative Development Sessions

Session 1

The first YAB session introduced the study and fostered participant engagement. Group activities were utilized to foster rapport and establish a collaborative dynamic. The session also included an overview of the study goals and planned activities for future meetings. Finally, the team presented initial concepts for the chatbot and conducted a brainstorming session to identify the features the YAB members considered most important, such as the chatbot only asking for users to enter a name versus phone numbers or other personal information; that conversations with the chatbot should not be saved on the mobile device; that the chatbot should provide information on HIV and related myths and help the teenager deal with HIV stigma; and, that the chatbot should use images to explain ideas and not just contain text.

During this session, the YAB also provided feedback on the chatbot's avatar design, reviewed the script for a promotional video in development, and decided to name the chatbot "EVA", which stands for (in Spanish) *E*ducación, *V*inculación, *A*utoayuda (Education, Linkage to Care, Self-Help).

Following Session 1, the study team developed the first version of the chatbot, "EVA 0.1", which

was hosted on a web platform. Users accessed the chatbot via a web link that led directly to the interface, where they were greeted with a welcome message and presented with three main modules—Education, Linkage to Care, and Self-Help—accessible through interactive buttons. The Education module provided information on eight key mental health topics identified during the initial interviews, including depression, anxiety, sadness, HIV, and antiretroviral treatment adherence. Users could access these topics by entering the keywords into the chatbot's text box. The Linkage to Care module allowed real-time, text-based communication with a study team member through the development platform, demonstrating the chatbot's potential to connect users with mental health professionals when needed. The Self-Help module was not yet functional in EVA 0.1.; users were informed of its future availability and directed to explore the other two modules.

Session 2

In the second session, EVA 0.1 was presented to the YAB. Participants received a web link to access the chatbot on their mobile devices and were given 20 minutes to explore it freely. During this time, the session facilitator monitored the chatbot's performance, receiving feedback from the YAB of any navigation errors or technical difficulties encountered. All reported issues were documented, and after the browsing period, the YAB members were invited to share their opinions about the chatbot's content and functionality, along with any suggestions for improvement. The feedback was categorized into two main areas: Presentation (visual design and interaction) and Content (information and topics presented).

EVA's Presentation: The adolescents confirmed that only basic information, such as name and age, should be required to access the chatbot, noting that requests for additional details like gender could feel uncomfortable for some users. They also advised against collecting phone numbers and recommended that all conversation histories be automatically deleted upon closing the chatbot.

EVA's Content: The YAB prioritized anxiety and depression as core topics within the chatbot. They suggested expanding the content on depression and adding information on self-esteem, bullying, eating and nutrition issues, and HIV. Additionally, they proposed incorporating self-help resources focused on relaxation techniques, strategies for improving socialization, recreational activities to alleviate stress, and methods for managing negative thoughts. The group also recommended using less technical language to make the content more accessible for adolescents of different ages, reducing text density, and adding more visual aids to support the information.

Following each YAB session, the study team reviewed the feedback, highlighting key suggestions and identifying the main challenges. The team then proposed a revised version of the chatbot that incorporated the recommended changes. During these discussions, decisions were made regarding which suggestions to implement, modify, or exclude to maintain the chatbot's structure and objectives (Table 1). To enhance the chatbot's presentation and navigation, an interactive web environment was created using the Wix platform [29]. This transition gave the study team full control over the chatbot's interface, enabling real-time error corrections during subsequent sessions with the YAB.

Table 1. Development of key features of the EVA chatbot

Version	V0.1	V0.2	V0.3	V1.0
Reviewers	YAB (Session 2)	YAB (Session 3)	YAB (Session 4)	YAB (Session 5)
Chatbot presentation	No Welcome screen: Initially,	2 welcome screens were created on the	Screen 01: Improved by animating EVA's	Screen 01: Changed the

Version	V0.1	V0.2	V0.3	V1.0
Reviewers	YAB (Session 2)	YAB (Session 3)	YAB (Session 4)	YAB (Session 5)
	the chatbot displayed an image of the EVA avatar along with a description clarifying that it was a chatbot, not a human.	Wix platform: Screen 01: Displays EVA's avatar and a "Hello!" button, which can be clicked to proceed to the next screen. Screen 02: Introduces EVA through vignettes, images, and a video. Clicking the "Continue" button grants access to the chatbot.	full-body appearance. Screen 02: No change	"Hello!" button to "Start" Screen 02: No change
Modules built	Introduction: The chatbot greets users, asks for their name and age, and provides three options: Education, Linkage to Care, and Self-Help. Education: Users can choose between two topics (Depression and Anxiety) or enter a custom query. The chatbot recognizes eight keywords (Anxiety, Depression, Sadness, Treatment, HIV, Healthy Living, Alcohol, Stress) to provide more relevant information. Linkage to care: If users opt to speak to a professional, a real-time chat is initiated.	Introduction: The welcome greeting was simplified and made more conversational. Education: The module now introduces Depression and Anxiety, allowing navigation through buttons. Users are then presented with additional topics (Stress, HIV) with submenus containing key information. Linkage to care: Users can now access this feature via a permanent button on the chatbot screen, which indicates whether a live agent is available. Self-help: No content.	Introduction: After entering information, users are redirected to a new Introduction to Depression module. Introduction to depression: Provides basic information about depression in a conversational manner. Once completed, users can navigate through the three modules via swipeable cards. Education: Topics of Depression, Anxiety, and additional issues (Stigma, Adherence to Treatment) are now displayed on swipeable cards. Linkage to care: The permanent on-screen button was removed. Instead, users can access options like "Seek Professional Help" to start a real-time conversation or browse an Emergency Directory with contact information	Introduction: No changes. Introduction in depression: Content was refined to be more concise, with fewer images and more accurate information. Emojis were added. Education: Now includes Eating Disorders under additional issues Linkage to care: The number of steps required to start a real-time conversation was reduced. Self-help: A game about Facts and Myths regarding Mental Health in Adolescents was added.

Version	V0.1	V0.2	V0.3	V1.0
Reviewers	YAB (Session 2)	YAB (Session 3)	YAB (Session 4)	YAB (Session 5)
	Self-help: No content.		for crisis support. Self-help: Now includes three activities: Deep Breathing Exercises, Managing Emotions (with three sub-activities), and a game about Facts and Myths about HIV.	

Session 3

For the third session, the YAB received a link to EVA 0.2 and were informed that the facilitator would guide the chatbot's navigation to identify errors and gather more precise feedback on its content. For each section reviewed, YAB members recorded their observations, which were then discussed to identify common themes and gather the group's opinions. This structured review format was maintained for subsequent sessions, enabling the team to more effectively identify issues and collect targeted suggestions regarding navigation, presentation, and content.

EVA's presentation: While participants found EVA V0.2's initial screen more visually appealing than the previous version, they noted it was not intuitive (Figure 2). They suggested adding clear instructions to guide users on how to proceed. The YAB received and approved the welcome message and introduction video (Figure 3).

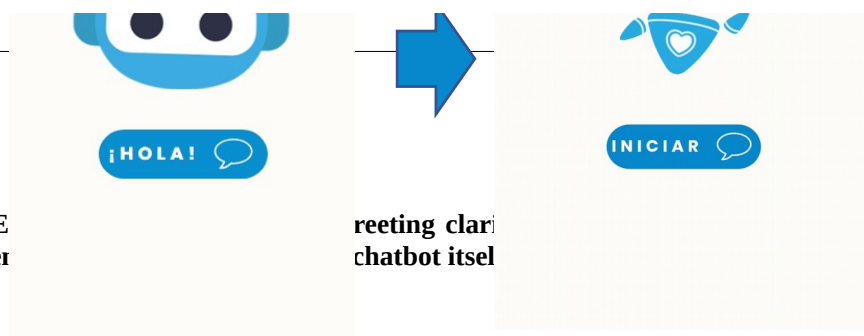
The use of buttons improved navigation; however, the YAB recommended reducing the number of buttons and using them only when text-based responses were less appropriate—for example, in yes/no questions—since repeatedly pressing buttons was described as stressful. The group also suggested increasing text-based interaction to give users a stronger sense of control and engagement by allowing them to communicate in their own words. Additionally, the YAB recommended including subtitles in all videos to improve information retention and accessibility.

EVA's content: The Education module received positive feedback; participants found the information useful, clear, and easy to understand. However, they suggested adjusting the narration style to be more engaging and optimistic, noting that a motivating tone could better support users experiencing depression or anxiety. The YAB also recommended incorporating short, relatable stories depicting scenarios familiar to adolescents, allowing users to interact with the content in a more personal and meaningful way.

The overall session evaluation highlighted positive perceptions of the chatbot's usefulness and educational value. However, participants raised concerns about the unintuitive design of some sections and the repetitive nature of the navigation, which they felt reduced usability and engagement.

Figure 2: Changes in the initial screen of the EVA chatbot. The start button changed from a greeting: "Hello!" ("¡Hola!" in Spanish), to an instruction: "Start" ("Iniciar" in Spanish).

Figure 3: E
video preser

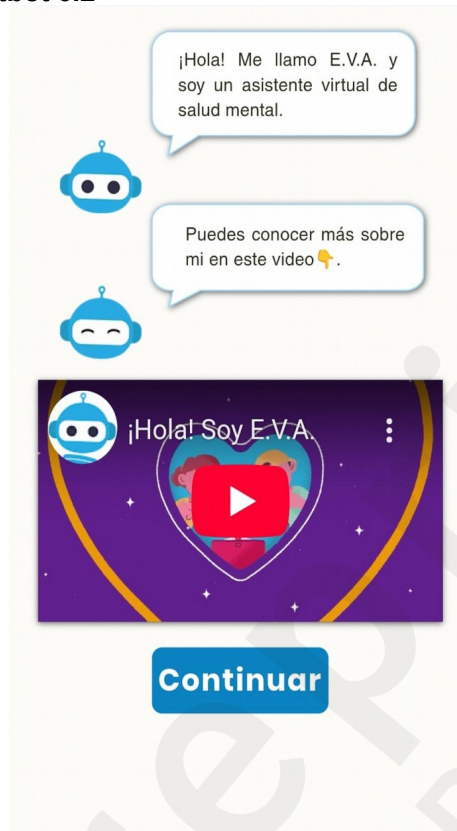


reeting clar
chatbot itself

t and includes a half-minute

EVA chatbot 0.2

EVA chatbot v1.0



Text box 1: Hi! My name is E.V.A, and I
am a mental health virtual assistant.
Text box 2: You can learn more about me
in this video

Session 4

In the fourth session, quick-access buttons were added to the main screen for each module to streamline testing of EVA's 0.3. The YAB also reviewed a newly developed module, *Introduction to Depression*, which appears immediately after users enter their information (Figure 4). This module was designed to ensure that all users testing the chatbot received foundational information about depression and anxiety. After completing this module, users could navigate freely through the chatbot's three core modules.

To facilitate feedback, the content of the *Introduction to Depression* module was provided to the YAB in printed form, allowing participants to write their comments directly on the materials. They then explored the module within the chatbot interface. Following this, the facilitator introduced new navigation options for each module, including sliding cards to reduce reliance on buttons (Figure 5). A sliding card is an information box that can contain an image, text and a button. By grouping

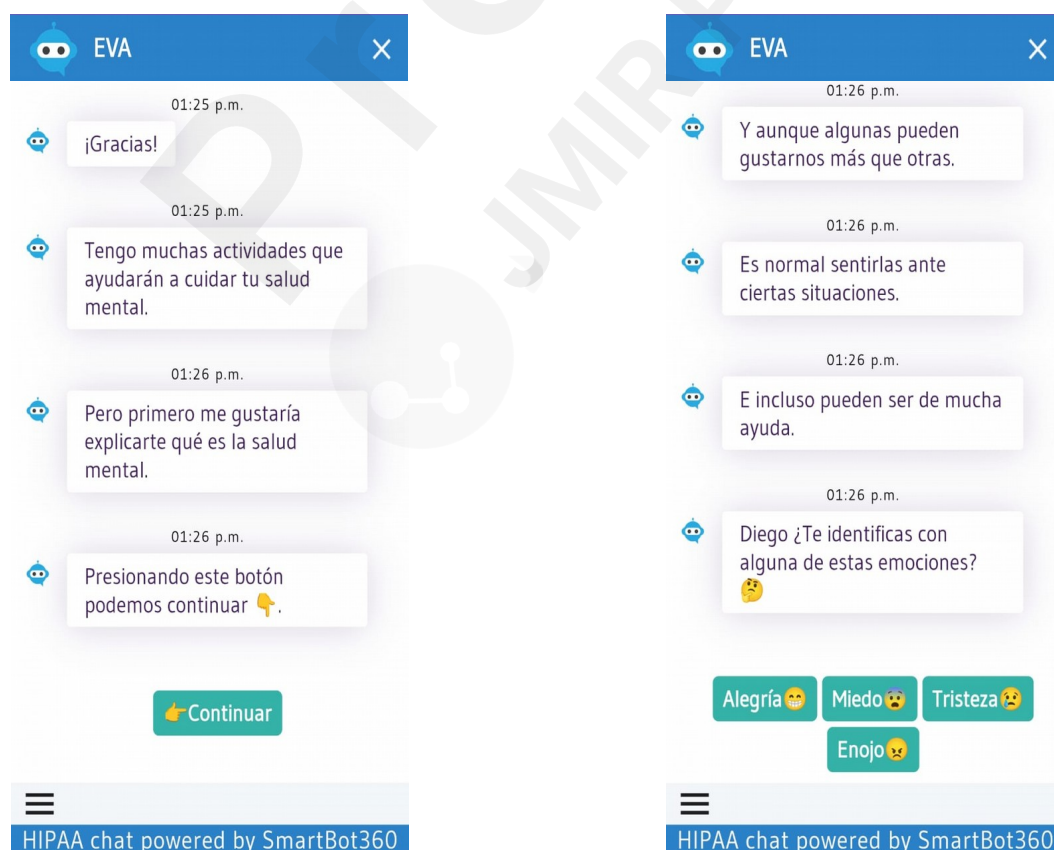
several sliding cards together, the user can only see one on the screen at a time, navigating between them by swiping horizontally on the screen. These sliding cards were used in the development of menus and submenus to enhance presentation and interaction, and to provide a brief description of the content before entering it. Finally, the YAB also reviewed the self-help module activities and the videos produced to date.

EVA's presentation: The YAB found the updated presentation screen more intuitive and appreciated the option to interact with EVA using text-based messages. They reported that this change made the interaction feel less monotonous compared to button-based responses, as long as the chatbot's replies remained consistent. The videos were well received, with participants highlighting the simplicity of the scripts and the clarity of the information, which made the content easier to remember. They also suggested adding more visual elements, such as emoticons, icons, and images, to enhance content descriptions and explanations of activities.

EVA's content: Participants considered the new depression module informative but noted that the content was overly lengthy. They recommended shortening the module to give users more control over accessing specific sections. The YAB validated the content of the self-help module but identified programming errors that disrupted interaction. Additionally, they suggested expanding the Education module to include more information on topics such as eating disorders, bullying, and the differences between psychologists and psychiatrists.

The overall evaluation of the session showed increased ease of navigation and positive feedback on the entertainment features. However, the identified programming errors hindered smooth interaction and needed to be addressed in subsequent iterations.

Figure 4: Introduction to depression module. In a conversational way, it introduces and connects basic notions about emotions, mental health and depression.



Text box 2: I have many activities that will help take care of your mental health.
Text box 3: But I would like to explain what mental health is.
Text box 4: By pressing this button we can continue.

more than others.

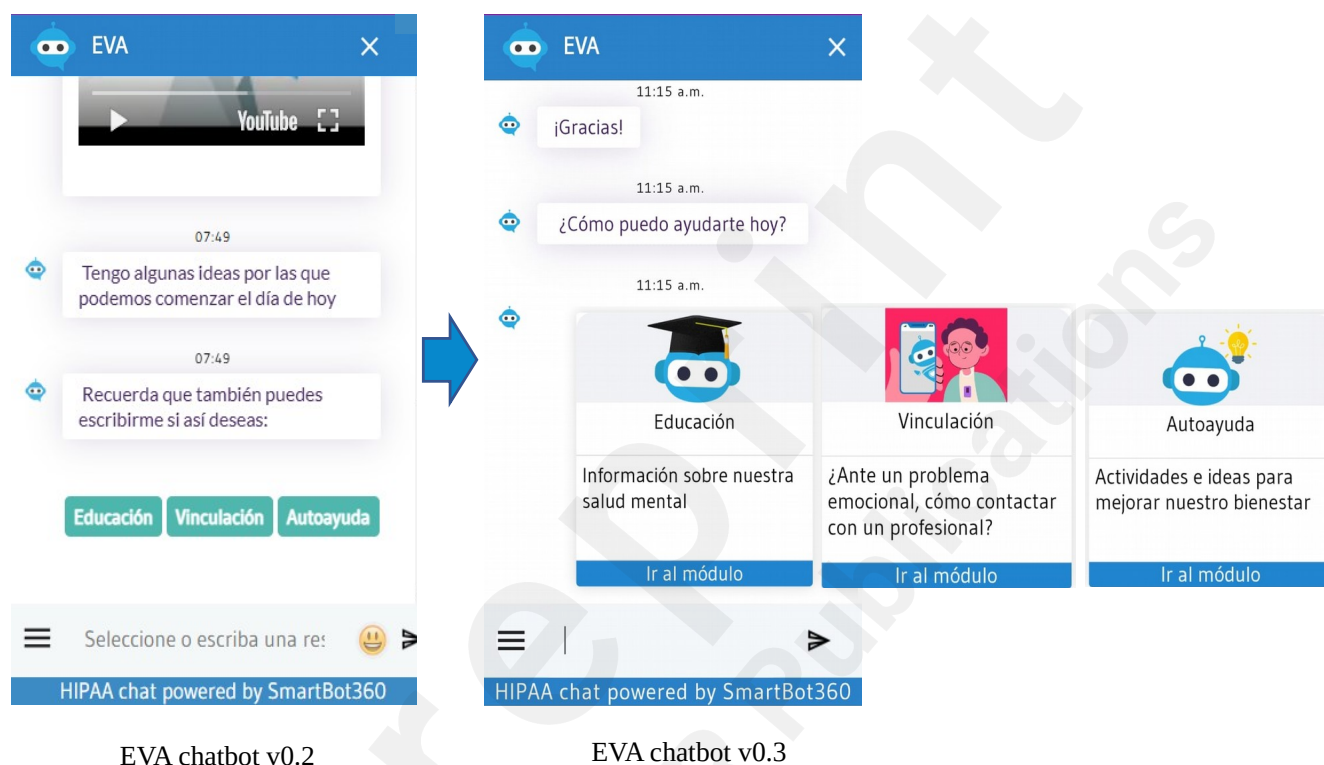
Text box 2: It is normal to feel them in certain situations.

Text box 3: And they can even be very helpful.

Text box 4: [username] Do you identify with any of these emotions?

Text box 5: Joy, fear, sadness, anger

Figure 5: Changes in the presentation of EVA chatbot modules. A cleaner and more pleasant appearance was achieved through shorter, more precise texts and using better visual resources (sliding cards).



Textbox 1: I have a few ideas that we can start with today.
Text box 2: Remember that you can also write to me like this if you wish.
Text box 3: Education, Linkage to Care, Self-Help

Textbox 1: Thank you!
Text box 2: How can I help you today?
Sliding card 1: Education. Information about our mental health.
Sliding card 2: Linkage to care. When faced with an emotional problem, how to contact a professional?
Sliding card 3: Activities and ideas to improve our well-being.

Session 5

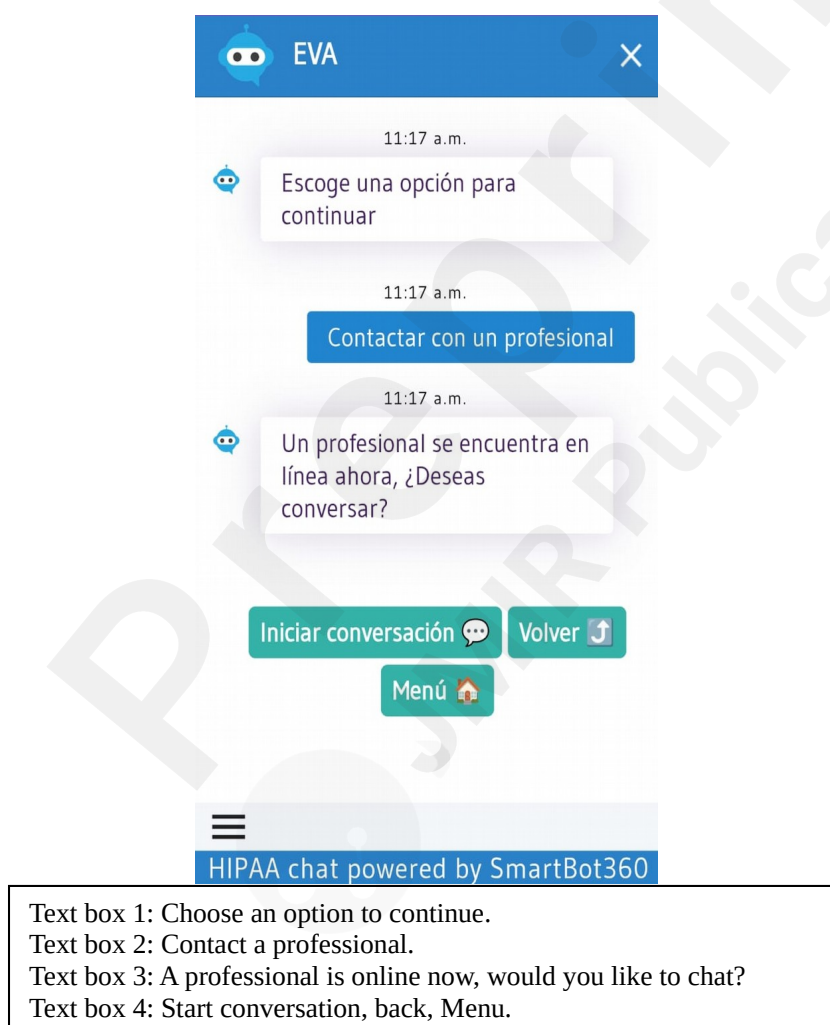
In this session, a complete review of the EVA chatbot was performed, module by module.

EVA's Presentation: The YAB approved the chatbot's interface and audiovisual materials but suggested adding descriptive labels to certain buttons to improve navigation. For instance, they recommended adding the word "*Back*" to buttons that displayed only an arrow icon, making the

interface more intuitive for users.

EVA's Content: The YAB expressed approval for the reduced length of the *Introduction to Depression* module, noting that the concise format delivered essential information while remaining distinct from the depression-related content in the education module. The self-help module's activities were also well received, with participants describing them as engaging, easy to understand, and sufficiently informative. They specifically praised an interactive story activity focused on emotion regulation, highlighting its immersive narrative and the engaging decision-making elements. Additionally, the YAB found the *Linkage to Care* module straightforward and easy to access (Figure 6).

Figure 6. Linkage to care module screen. After selecting the option to contact a professional, the EVA chatbot informs the user if a professional is connected in real-time and asks if they want to start a conversation. Via buttons, the user chooses whether to start the conversation, return to the previous menu, or return to the main menu.



Videos

An audiovisual consultant produced five informational videos for the chatbot, while the research team developed the scripts and visual style, which were subsequently reviewed with the YAB.

Access to these videos was provided through the chatbot itself, with each video lasting approximately 30 seconds. The voice present in all the videos was male and was presented as the voice of EVA, which is usually used as a female name. This detail was approved and validated by the YAB, who expressed feeling more comfortable with the voice used.

1. Hello! I am EVA (“¡Hola!, soy EVA”): An Introductory video that briefly explains the usefulness of the main modules: Education, Linkage to Care, and Self-Help. It is located on the welcome screen
2. Self-Help (“Autoayuda”): Accessible through the Self-Help module. This video explores how life events can impact thoughts and emotions, generating discomfort, and the usefulness of the module in providing ideas to help manage discomfort. It also invites the user to try the bonding module.
3. Why seek help? (“¿Por qué buscar ayuda?”): Accessible through the Linkage to Care module. Explains the importance of mental health professionals in managing emotions and encourages users to seek professional help.
4. Adherence (“Adherencia”): Accessible through the Education module. This video explores the impact of mood on healthy habits and treatment adherence, and invites the user to prioritize self-care.
5. Stigma (“Estigma”): Accessible through the Education module. Explains the meaning of stigma and encourages the user to discuss these issues with family members or professionals.

Additionally, a video was made in the final stage of the study involving the members of the YAB. This video, lasting one minute, explained the content of EVA’s three modules through animations and real-life shots of the chatbot in its final version. Not included in the actual chatbot, this video was intended to explain the EVA to outside audiences.

Lessons learned and challenges in the making of the videos

The main challenge was to convey, in under 30 seconds, ideas and concepts that could be new to adolescents clearly and understandably. As with the chatbot features, the YAB provided ongoing feedback on the video scripts, leading to multiple versions of videos (i.e., draft versions of videos were produced based on initial YAB feedback on desired content, after which the YAB viewed and critiqued the draft leading to a subsequent, improved version of the video).

The visual style used for the videos was decided in the first stage of the study, during the focus groups with adolescents and caregivers, in which adolescents were presented with three different/potential visual styles: use of real people, animations/cartoons, or an abstract style.

To maintain consistency between the visual style of the videos and the chatbot content, edited images of the videos were used as part of the chatbot content. The other images, used to explain ideas or concepts, were intended to maintain a similar style to that of the videos.

Coherence was also sought between the videos, with three adolescent cartoon characters appearing in the initial presentation video and reappearing as protagonists in the rest of the videos. Additionally, in the first video, a mental health professional who subsequently appeared in three other videos was used as the image for the linkage to care module.

Step 3: Testing before launch

Following the approval of version EVA 1.0 by the YAB, 20- to 30-minute test sessions were conducted in February and March 2024 with HIV healthcare professionals and service managers who were not affiliated with the study to gather additional feedback on the user experience and chatbot content. Six professionals participated in these sessions: four physicians, one nurse, and one psychologist, all of whom work with ALWH in various healthcare institutions.

Testing with external professionals provided a fresh perspective, contrasting with the insights from the YAB and the study team, who were already familiar with the chatbot's structure and content.

The professionals recommended improving the presentation of the slide-out menus by simplifying the button text and rewriting the brief descriptions of each sub-menu to make the options clearer. They also suggested shortening the welcome messages displayed at the start of each module to provide a more concise overview of the content.

EVA's Presentation: To improve navigation, the buttons and accompanying text were standardized. For instance, buttons containing questions or lengthy text, which previously interrupted the narration of longer concepts, were replaced with a streamlined "*Continue*" button. This adjustment simplified the navigation experience while preserving the core information of the affected topics.

EVA's Content: The chatbot's informational content underwent a thorough review, resulting in modifications that improved clarity and comprehension. This revision reduced redundancy and optimized word use within the text boxes.

The *Introduction to Depression* module originally opened with a general explanation of mental health. During the review, researchers identified a more relatable approach by using emotions as an entry point to explain depression, making the content even simpler and more practical for adolescents.

Feedback from researchers highlighted the need to tailor the content more specifically to adolescents living with HIV. As a result, the content related to prevention was condensed, while information more relevant to this population was expanded. These additions included topics such as sexual health, relationships, HIV transmission, and the importance of treatment adherence for long-term well-being.

Finally, in March 2024, the study team conducted three final internal test sessions to evaluate the chatbot's content and functionality in preparation for the next phase of the study: a formal evaluation of the feasibility and acceptability of EVA among N=50 ALWH who had not had any exposure to EVA's development (data not presented here).

Final structure of the chatbot:

EVA was developed entirely using the Smartbot360 software and comprises five sections: Introduction, Introduction to Depression, Education, Linkage to Care, and Self-Help (Figure 7).

EVA begins with two welcome screens, featuring a video titled *Introducing the Chatbot*. After these initial screens, users are directed to an introduction screen where the chatbot initiates interaction by asking for their name and age. A specialized module, *Introduction to Depression*, was implemented to provide clear, engaging information about depression, specifically tailored for adolescent users.

After completing this module, users gain unrestricted access to the chatbot's three core modules: *Education*, *Linkage to Care*, and *Self-Help*.

The *Education* module provides information about depression, anxiety, and other concerns commonly experienced by adolescents, as identified by the YAB. Key topics include eating disorders, adherence to HIV treatment, and experiences of discrimination. The *Linkage to Care* module offers a directory of emergency contact numbers and a text-based communication feature that allows users to connect directly with healthcare professionals. This functionality was demonstrated during the enrollment sessions to familiarize participants with its use.

The *Self-Help* module includes three core activities designed to support users' emotional well-being. The deep breathing activity introduces relaxation techniques to help users manage stress effectively. The emotional regulation activity includes three sub-exercises that guide users in understanding the connections between thoughts, emotions, and feelings through dynamic, interactive exercises. Finally, the "truth or myth" activity presents a true-or-false quiz to challenge misconceptions about living with HIV and provide accurate, accessible information about mental health during adolescence. Together, these activities aim to promote self-awareness, build coping skills, and empower adolescents to take an active role in their mental health care.

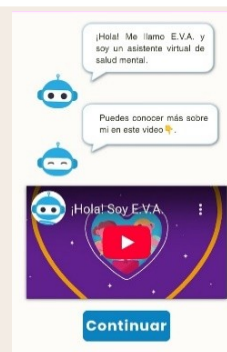
Figure 7: Structure of the EVA chatbot. EVA's initial screen and welcome screen were built on a web page as a portal for accessing the chatbot. The two introductory modules and the 3 main modules were built entirely in Smartbot360.

1 Initial Screen

EVA welcomes with 2 screens: An animated splash screen, followed by a welcome screen that includes an introductory video.



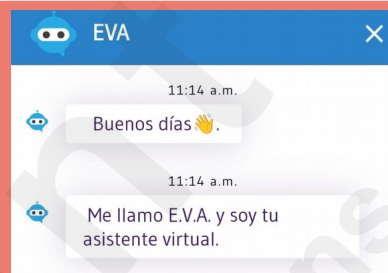
Screen 01



Screen 02

2 Introduction

EVA uses this first module to collect the user's name and age and starts with a different greeting depending on whether it is day or night. If the user name is 2 characters or less or is a number, it prompts to re-enter the name.

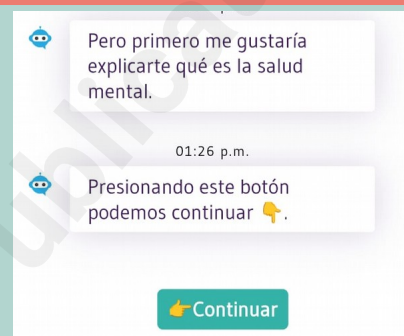


"Good morning 🙌"

"My name is EVA and I am your virtual assistant."

3 Introduction to Depression

EVA invites the user to receive basic information about mental health and depression, with a pleasant and brief language that includes varied images for a better visual presentation. This module appears only once to the user.



"... But first I would like to explain what mental health is"

"By pressing this button we can continue 🙌"

4 EVA core modules

Once the introductory path to depression is completed, EVA displays the 3 core modules to the user via sliding cards



"Education"
"Information about our mental health"

"Linkage to care"
"When faced with an emotional problem, how to contact a professional?"

"Self-Help"
"Activities and ideas to improve our well-being"

Discussion:

This tutorial describes the development of a mental health chatbot for ALWH, called “EVA,” and the experiences and lessons learned during its construction. By involving adolescents throughout the design process, this approach aimed to produce a user-centered, contextually relevant intervention that could potentially enhance acceptability, feasibility, and engagement.

Unlike many digital interventions that omit direct user input during early conceptualization, this project prioritized adolescent perspectives from the outset, resulting in a tool more likely to resonate with their lived experiences and preferences [30,31]. Prior interviews, focus groups, and formation of a YAB were instrumental in defining the chatbot’s functions, its conversational style, interface aesthetics, and overall tone [32]. Although some user suggestions—such as highly complex artificial intelligence components—were beyond the initial technical scope, openly discussing these limitations helped maintain transparency and trust with the YAB. This collaborative environment not only ensured that essential features were refined to be more intuitive and relatable but also highlighted the importance of addressing user requests promptly, a strategy consistent with other successful participatory digital health interventions [17,33].

The iterative development process enabled the systematic refinement of the EVA chatbot’s interface, navigation, and content across multiple sessions. Continuous feedback cycles led to improvements in readability, the introduction of more engaging and empathetic language, and adjustments in module length and structure to accommodate user preferences for autonomy and brevity [30]. This user-driven refinement was crucial, as adolescents must perceive the intervention as not only useful but also motivating and hopeful, particularly when discussing sensitive topics like depression and stigma associated with HIV. Ensuring that the chatbot’s tone remained encouraging, supportive, and culturally sensitive aligns with evidence underscoring the importance of fostering a sense of optimism and self-efficacy in adolescent users [34].

Giving the development team full control over the design tools, including the capacity to make real-time corrections, was another key success factor. This autonomy enabled immediate responses to YAB feedback and facilitated a more transparent dialogue about technical possibilities and constraints, allowing the adolescents to understand how software limitations influenced the final product. In addition, the inclusion of health professionals with expertise in HIV and adolescent mental health care validated and refined EVA’s informative content, ensuring accuracy, clinical relevance, and practical utility [35]. Linking educational components with direct directories of support services and integrating self-help modules further strengthened EVA’s potential as a resource that could be both informative and empowering.

Challenges and limitations

Despite these strengths, ongoing challenges and limitations highlight areas for future enhancement. Although the participatory approach and iterative testing of EVA with the YAB yielded significant improvements, some limitations—such as software constraints and initial reliance on button-based navigation—could not fully meet adolescents’ desires for more advanced, AI-driven conversation that can be found in current freely available digital products with which they are already familiar. Future research should explore more sophisticated platforms that offer greater flexibility, interactivity, and personalization, as well as improved data collection methodologies to track and prioritize user feedback systematically. Standardizing evaluation methods for each development stage and expanding content on related issues, such as bullying, eating disorders, and the distinctions

between mental health professionals, may increase the chatbot's relevance and uptake.

Conclusions:

The EVA chatbot represents a product of synergistic collaboration between adolescents, researchers, and clinicians, reflecting a holistic understanding of ALWH needs and preferences. This approach underscores that meaningful adolescent engagement, clear goal setting, and continuous refinement are fundamental elements in producing digital tools that are acceptable and feasible for end-users. While challenges persist, the lessons learned throughout this developmental process can guide future interventions, ultimately improving the quality and impact of digital mental health support for adolescents living with HIV and beyond.

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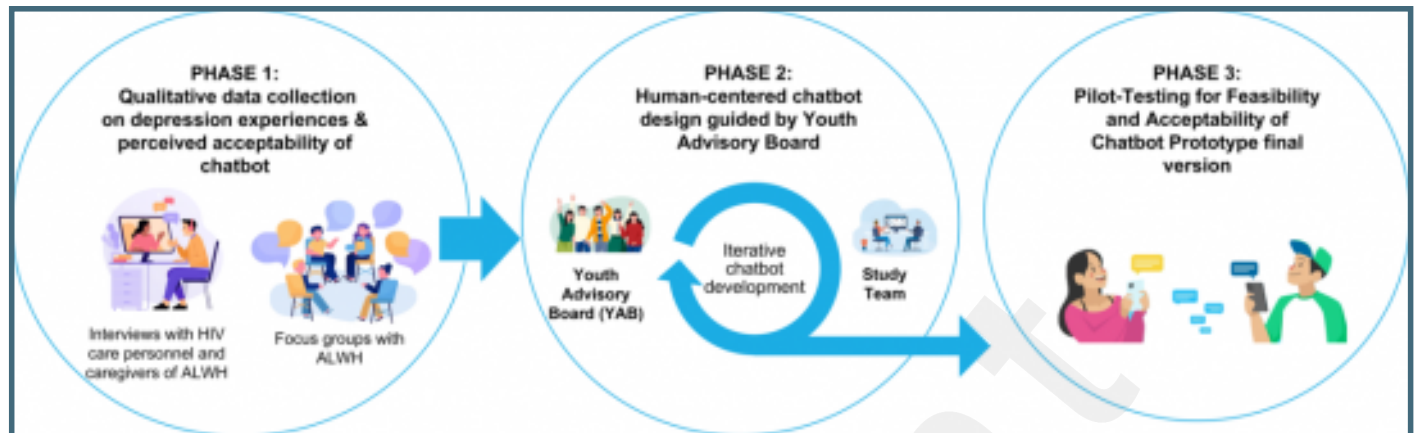
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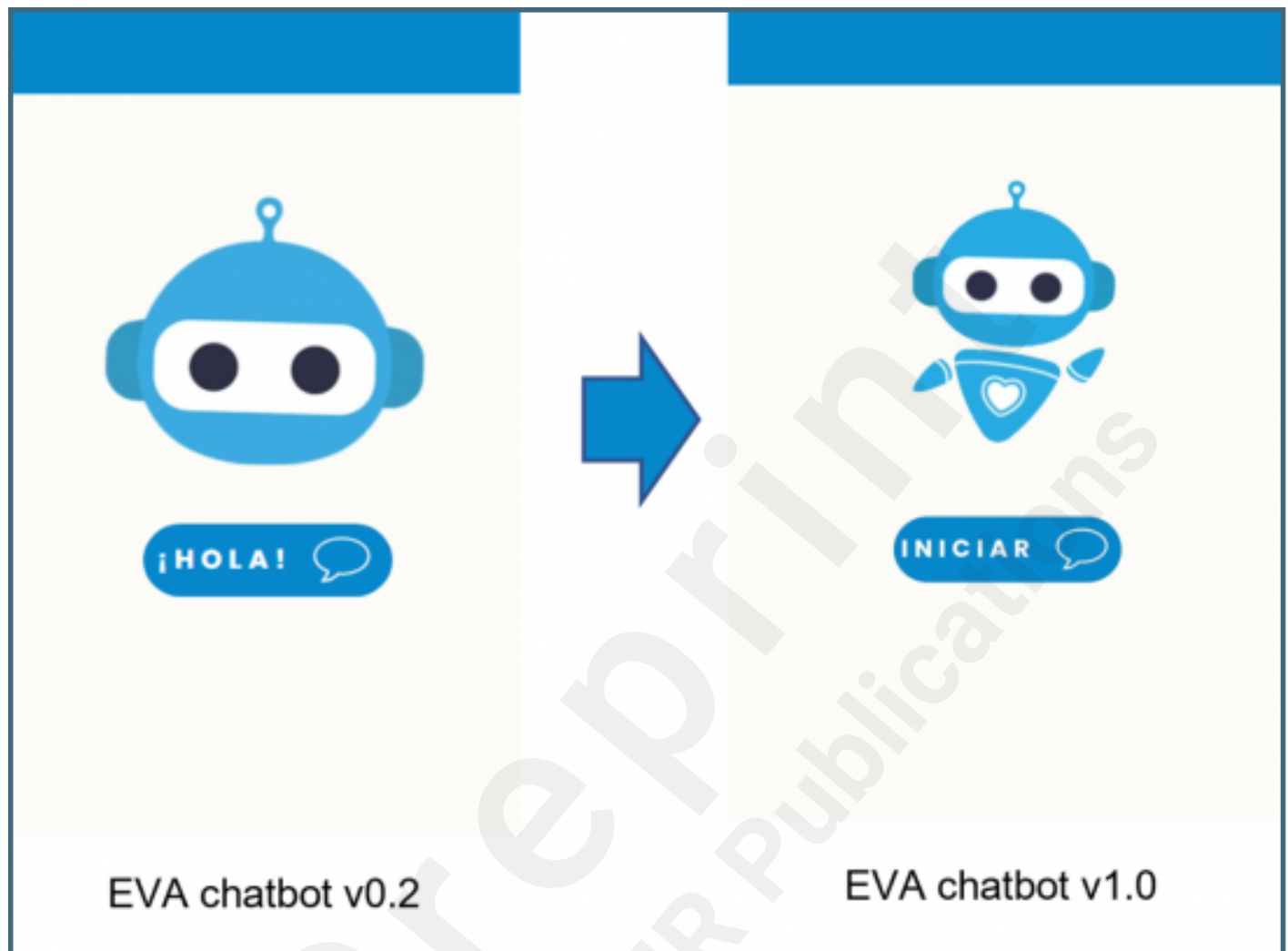
Supplementary Files

Figures

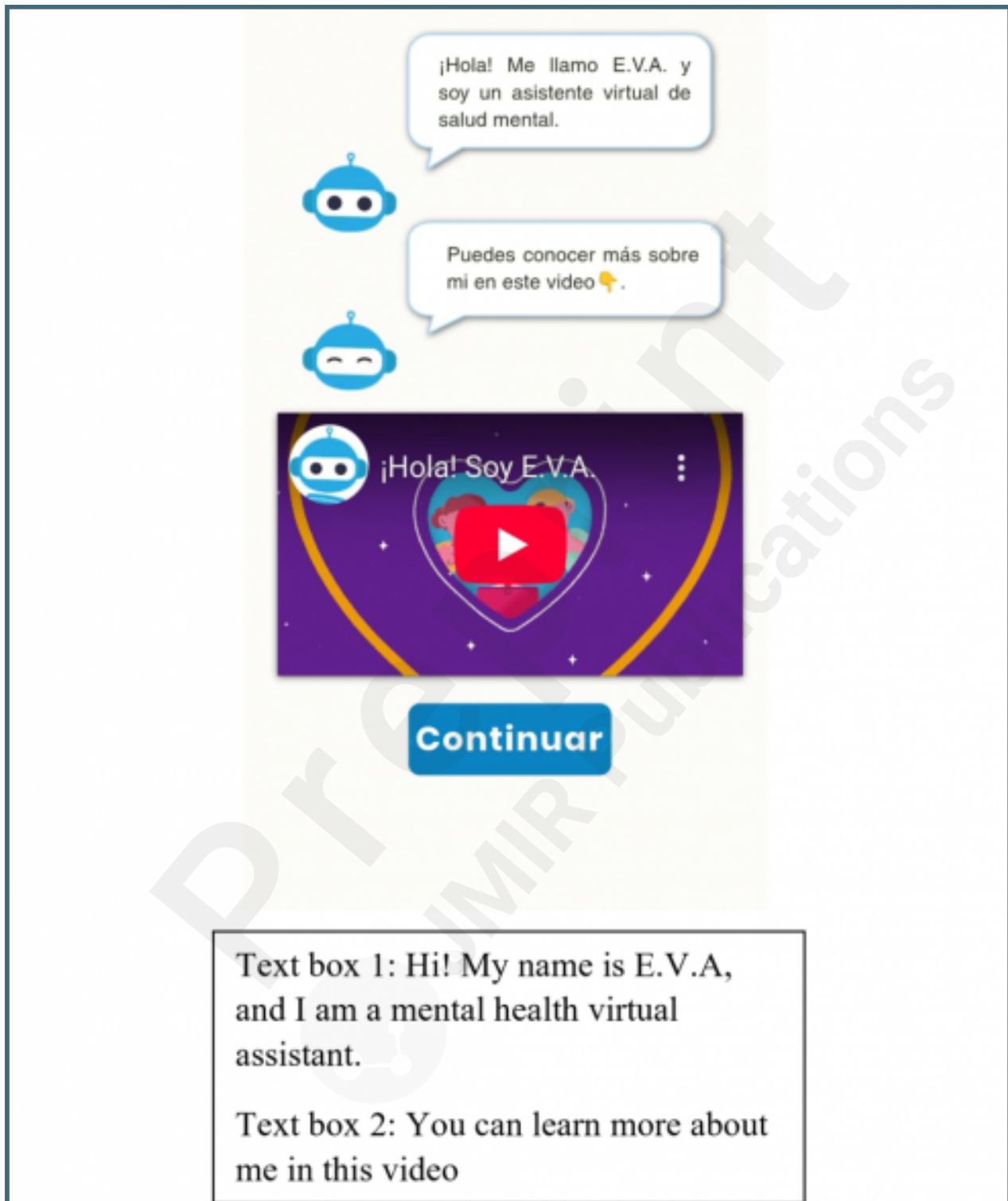
Phases of principal study.



Changes in the initial screen of the EVA chatbot. The start button changed from a greeting: “Hello!” (“¡Hola!” in Spanish), to an instruction: “Start” (“Iniciar” in Spanish).



EVA welcome screen. EVA's greeting clarifies that it is a virtual assistant and includes a half-minute video presentation that is playable in the chatbot itself, with subtitles.



Introduction to depression module. In a conversational way, it introduces and connects basic notions about emotions, mental health and depression.

Left Screenshot:

- 01:25 p.m. EVA: ¡Gracias!
- 01:25 p.m. User: Tengo muchas actividades que ayudarán a cuidar tu salud mental.
- 01:26 p.m. EVA: Pero primero me gustaría explicarte qué es la salud mental.
- 01:26 p.m. User: Presionando este botón podemos continuar 📌.
- Continuar button

Right Screenshot:

- 01:26 p.m. EVA: Y aunque algunas pueden gustarnos más que otras.
- 01:26 p.m. User: Es normal sentirías ante ciertas situaciones.
- 01:26 p.m. EVA: E incluso pueden ser de mucha ayuda.
- 01:26 p.m. User: Diego ¿Te identificas con alguna de estas emociones? 😊
- Options: Alegría 😊, Miedo 😨, Tristeza 😞, Enojo 😡

Text boxes below:

Text box 1: Thank you!

Text box 2: I have many activities that will help take care of your mental health.

Text box 3: But I would like to explain what mental health is.

Text box 4: By pressing this button we can continue.

Text box 1: And while some emotions may appeal to us more than others.

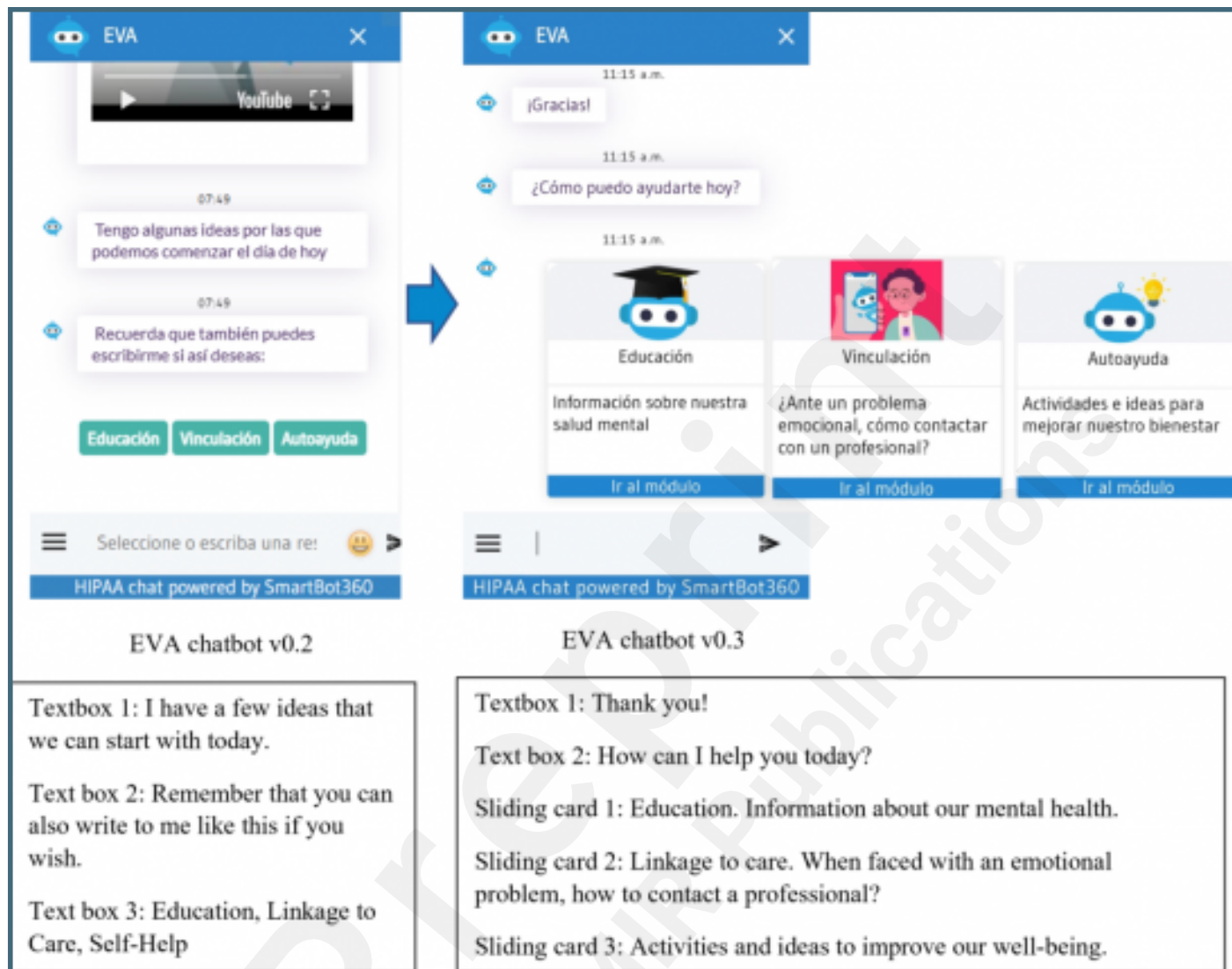
Text box 2: It is normal to feel them in certain situations.

Text box 3: And they can even be very helpful.

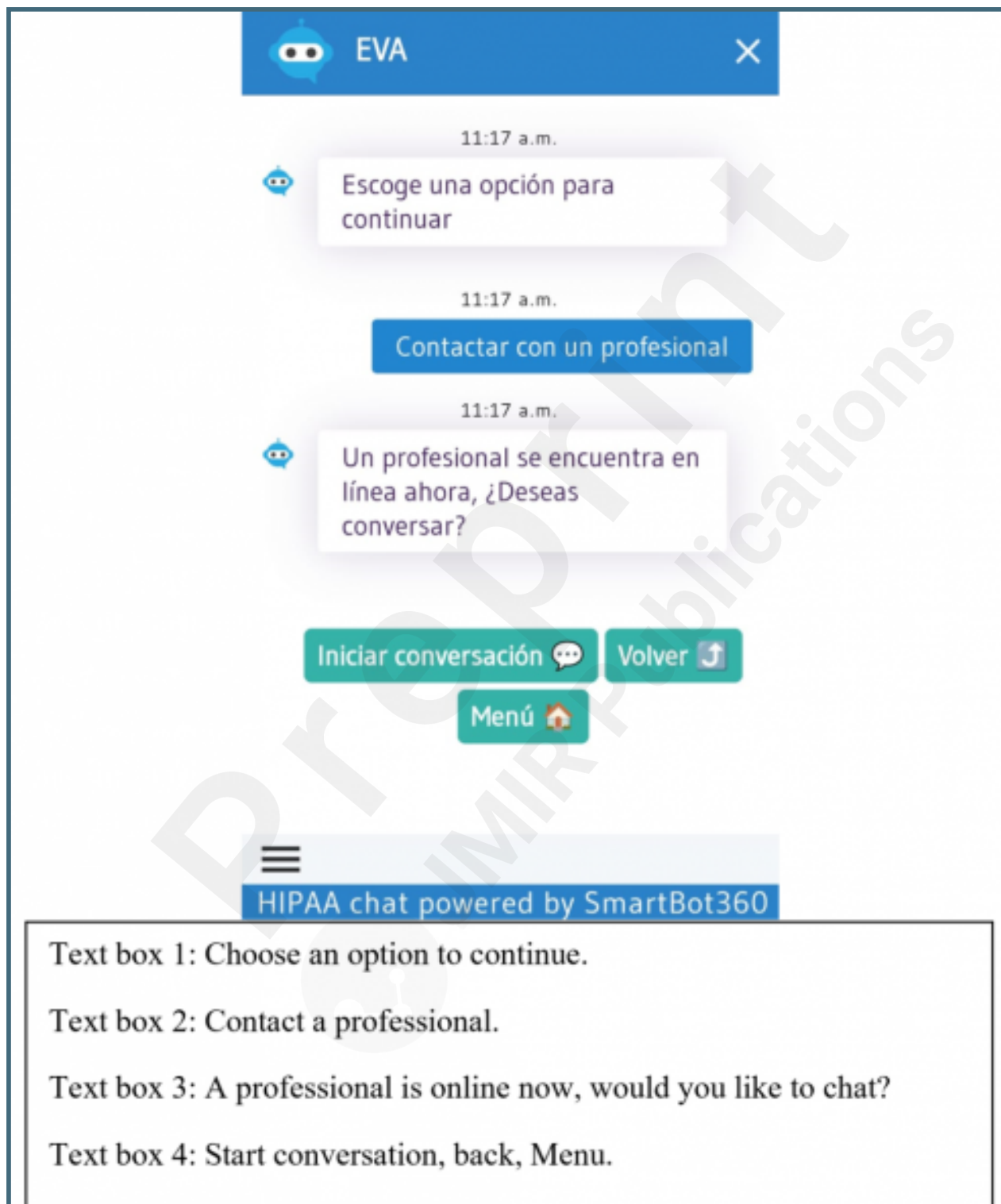
Text box 4: [username] Do you identify with any of these emotions?

Text box 5: Joy, fear, sadness, anger

Changes in the presentation of EVA chatbot modules. A cleaner and more pleasant appearance was achieved through shorter, more precise texts and using better visual resources (sliding cards).



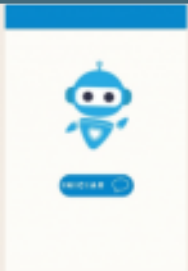
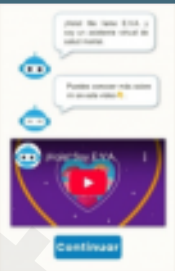
Linkage to care module screen. After selecting the option to contact a professional, the EVA chatbot informs the user if a professional is connected in real-time and asks if they want to start a conversation. Via buttons, the user chooses whether to start the conversation, return to the previous menu, or return to the main menu.



Structure of the EVA chatbot. EVA's initial screen and welcome screen were built on a web page as a portal for accessing the chatbot. The two introductory modules and the 3 main modules were built entirely in Smartbot360.

1 Initial Screen

EVA welcomes with 2 screens: An animated splash screen, followed by a welcome screen that includes an introductory video.

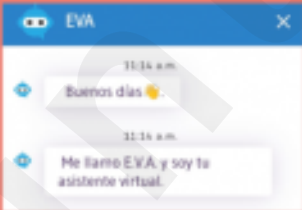



Screen 01

Screen 02

2 Introduction

EVA uses this first module to collect the user's name and age and starts with a different greeting depending on whether it is day or night. If the user name is 2 characters or less or is a number, it prompts to re-enter the name.

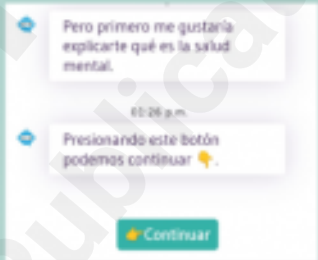


"Good morning."

"My name is EVA and I am your virtual assistant."

3 Introduction to Depression

EVA invites the user to receive basic information about mental health and depression, with a pleasant and brief language that includes varied images for a better visual presentation. This module appears only once to the user.



"... But first I would like to explain what mental health is"

"By pressing this button we can continue"

4 EVA core modules

Once the introductory path to depression is completed, EVA displays the 3 core modules to the user via sliding cards.

 Educación Información sobre nuestra salud mental Ir al módulo	 Vinculación ¿Ante un problema emocional, cómo contactar con un profesional? Ir al módulo	 Autoayuda Actividades e ideas para mejorar nuestro bienestar Ir al módulo
"Education" "Information about our mental health"	"Linkage to care" "When faced with an emotional problem, how to contact a professional?"	"Self-Help" "Activities and ideas to improve our well-being"

Multimedia Appendixes

Video made at the end of the study to explain the content and operation of the EVA chatbot.

URL: <http://asset.jmir.pub/assets/9d6921ce78ded5b2eccf4168af50409e.mp4>

