CuentosIE: Can a chatbot about "tales with a message" help to teach emotional intelligence?

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In this paper, we present CuentosIE (TalesEI: chatbot of Tales with a message to develop Emotional Intelligence), an educational chatbot on emotions that also provides teachers and psychologists with a tool to monitor their students/patients through indicators and data compiled by CuentosIE. The use of "tales with a message" is justified by their simplicity and easy understanding, thanks to their moral or associated metaphors. The main contributions of CuentosIE are the selection, collection, and classification of a set of highly specialized tales, as well as the provision of tools (searching, reading comprehension, chatting, recommending, and classifying) that are useful for both educating users about emotions and monitoring their emotional development. The preliminary evaluation of the tool has obtained encouraging results, which provides an affirmative answer to the question posed in the title of the paper.

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25   Abstract

26   In this paper, we present CuentosIE (TalesEI: chatbot of Tales with a message to develop
27   Emotional Intelligence), an educational chatbot on emotions that also provides teachers and
28   psychologists with a tool to monitor their students/patients through indicators and data
29   compiled by CuentosIE. The use of "tales with a message" is justified by their simplicity and easy
30   understanding, thanks to their moral or associated metaphors. The main contributions of
31   CuentosIE are the selection, collection, and classification of a set of highly specialized tales, as
32   well as the provision of tools (searching, reading comprehension, chatting, recommending, and
33   classifying) that are useful for both educating users about emotions and monitoring their
34   emotional development. The preliminary evaluation of the tool has obtained encouraging results,
35   which provides an affirmative answer to the question posed in the title of the paper.

36   1. Introduction

37   The first approach to the definition of emotion emerged a century ago, proposed by William
38   James (1884; 1890). Since then, various authors (e.g., Goleman, 1995; Mayer and Salovey, 1990;
39   Morgado, 2007; Cantón, Cortés & Cantón - Cortés, 2011) have concurred with James that
40   emotion is an innate mechanism that allows individuals to adapt to their environment.
41   Specifically, the popularization of the term "emotional intelligence" is attributed to the work of
42   Goleman (1995), which analyzes the ability to motivate oneself, persevere in the face of
43   frustration, delay gratification, control one's impulses, regulate one's moods, prevent distress
44   from interfering with one's rational faculties, and empathize with and trust others.

45   Neuroscience has enabled the direct and in-depth study of brain areas involved in emotional
46   processing, both involuntary and controlled. These emotions arise in the first months of life and
47   gradually change due to the maturation of other cognitive processes, as well as learning (Cantón,
48   Cortés & Cantón - Cortés, 2011) in social interaction situations, which facilitates the development
49   of self-regulation strategies that enable individuals to adapt to their environment (Thompson,
50   Lewis & Calkins, 2008).

51   Throughout development, children are exposed to peer relationship situations that require them
52   to balance their emotional and cognitive processes in order to respond effectively to the
53   demands of their environment. The development of social cognition, which is the ability to
54   identify and understand social situations (Uekerman et al., 2010), requires the coordinated
55   functioning of cognitive and affective elements (Roselló et al., 2016). The coordinated work of
56   these elements allows individuals to acquire and improve more complex skills (social skills), which
57   promote the generation of specific responses in situations of interaction with peers.

58 However, emotional education remains a pending issue in our society, despite its potential
59 benefits in addressing many current problems, such as bullying, suicide, gender violence, stress,
60 anxiety, depression, anorexia, discrimination, and autism.

61 Chatbots are programs that simulate having a conversation with a person, and their use has
62 become widespread in today's digital society. Their expansion and implementation as a
63 communication channel is justified by their intrinsic characteristics of wide availability and
64 anonymity in their interaction through the web. People enjoy talking to chatbots because they
65 do not judge and are always patient, even when people talk for a long time or repeat themselves
66 (Fryer & Carpenter, 2006; Hill, Ford & Farreras, 2015). Well-known virtual assistants (e.g., Siri,
67 Alexa, etc.) are widely used in different domains, such as education and customer service.

68 In this paper, we present the web chatbot CuentosIE (TalesEI: chatbot of Tales with a message to
69 develop Emotional Intelligence), which has educational purposes on emotions. Addressing this
70 aim through "tales with a message" is justified by following the millenary tradition of the human
71 being, which has been shown to be highly effective in transmitting and understanding knowledge
72 in a way that is easily understood thanks to its simplicity through its moral or associated
73 metaphors.

74 Regarding the target and beneficiary groups of CuentosIE, both students, teachers, patients, and
75 mental health professionals would be included, since one of the main difficulties encountered by
76 psychologists in their consultations is getting patients to truly express what they feel (and
77 sometimes think) and to get to the root of their problems (Chan et al., 2016; Wallin, Mattsson &
78 Olson, 2016). Thanks to the anonymous nature of the internet, this chatbot is intended to help
79 any type of user.

80 This paper presents the following *contributions*:

81 (C1) The design and development of a chatbot for the teaching of emotions (CuentosIE), which
82   uses tales with a message as its knowledge core. CuentosIE was initially developed for
83   Spanish tales, but it can be ported to other languages since its components are widely
84   available.
85 (C2) The proposal of an architecture that overcomes the hallucination issue in modern chatbots
86   such as ChatGPT and BARD, which could be critical in healthcare, particularly in mental
87   health. For example, Eshghie & Eshghie (2023) use ChatGPT as a therapist assistant
88   "without providing explicit medical advice"; they highlight ChatGPT's limitations in terms
89   of "recalling conversations from previous sessions" and its inability to "read non-verbal
90   cues such as body language or facial expressions." The latter limitation is also corroborated
91   by Carlbring et al. (2023), who conclude that "a conversational agent mimicking empathy
92   and responding appropriately may not be enough."
93 (C3) This architecture coordinates the interaction of the chatbot with an information retrieval
94   system (to allow the user to search for tales), a reading comprehension question generator
95   (to help the user understand the tales), and an emotion classifier system (to detect the

96   user's emotions based on how they interact with CuentosIE, in order to recommend tales
97   related to these emotions). Transformer technology is used in a controlled way in the
98   interaction with the user in the reading comprehension question generator and the
99   emotion classifier.

100   (C4) The selection, classification, and labeling of tales according to emotions and psychological
101   themes carried out by our psychologist authors, all of which were selected from the wide
102   variety of websites dedicated to the publication of tales, as well as scientific works that
103   support the usefulness of these tales (Färber & Färber, 2015; Odabasi, Karakaus & Murat.,
104   2012; Kulikovskaya & Andrienko, 2016). In this way, we avoid the hallucination problems
105   of ChatGPT and BARD, since the conversations will be restricted to these pieces of
106   knowledge.

107   (C5) We also overcome the previously mentioned issue about "recalling conversations" since
108   all the user's interactions with the chatbot are stored as XML files, which can be used to
109   detect sensitive situations of depression (Havigerová et al. 2019), suicide (Boggs & Kafka.
110   2022), or bullying (Bayari & Bensefia, 2021).

111   (C6) The evaluation of the tool has obtained encouraging results.

112   The remainder of this paper is organized as follows: Section 2 contains an overview of related
113   literature. In Section 3, our proposal is fully described. Section 4 presents the experimentation
114   carried out. The main conclusions and future lines of research are drawn in Section 5.

115   2. Background

116   In this section, we focus on the study of emotions, particularly through tales. Subsequently, we
117   analyze previous work on chatbots that address this topic.

118   2.1. Background on dealing with emotions

119   Emotions are an innate mechanism triggered by environmental stimuli, which generate a specific
120   physiological response in the form of involuntary and automatic processes (Damasio, 1996).
121   However, it is possible for such processes to be triggered after our brain has carried out a
122   conscious and voluntary evaluation of the situation in which we are immersed. This is not the
123   case for all emotional reactions or behaviors experienced by humans.

124   According to this way of understanding emotions, we can differentiate between primary and
125   secondary emotions. Primary (innate) emotions: These emotions are present from birth or the
126   first months of life due to their biological conditioning (Cortés, Cantón & Cantón-Cortés, 2011).
127   The mechanism that activates these emotions is basic: environmental signals or stimuli are
128   detected by the sensory cortex and processed by the limbic system (specifically by the amygdala),
129   which is responsible for activating a physiological state and altering cognitive processing
130   according to the emotion that matches the information generated by the external stimulus. The
131   goal of these emotional responses is often linked to survival. The reactions experienced by the
132   body can be associated with the specific object that caused them, creating a propositional
133   representation of the relationship between the emotional state and the stimulus that triggered

134 it. This would help us to predict the presence of that stimulus in a given context and even
135 anticipate our response in future scenarios (Damasio, 1996). Primary emotions include
136 happiness, anger, sadness, and fear.

137 Secondary (non-automatic) emotions: These emotions are initiated in the same brain
138 mechanisms as primary emotions, but they also require thought processes that occur in parallel
139 to them. According to Damasio (1996), the person already has a series of mental images of stimuli
140 related to emotional reactions, which have been organized by thought, after carrying out a
141 cognitive evaluation of previous situations or experiences. These are emotions like shame, blame,
142 pride, and hatred.

143 Research on Natural Language Processing (NLP) techniques in emotion processing mainly deals
144 with the detection and classification of emotions in multimodal (e.g., Pepino et al., 2020) and
145 written texts (e.g., Mihalcea & Liu, 2006; Li & Xu, 2014) using machine learning approaches (e.g.,
146 Support Vector Machine or k-nearest neighbor). The classifiers vary across the emotion class
147 taxonomy, from simple taxonomies as the ones used in sentiment analysis applications (e.g.,
148 Chaumartin, 2007), to fine-grained emotion classification (e.g., the 10 emotions in Tokuhisa, Inui
149 & Matsumoto, 2008; or the 14 emotions in Santos, Ong & Resurrección, 2020). The machine
150 learning processing and evaluation is run on a variety of datasets tagged with emotions, such as
151 the Emognition dataset specialized in emotion recognition with self-reports, facial expressions,
152 and physiology using wearables (Saganowski et al., 2022); or the K-EmoCon, a multimodal sensor
153 dataset for continuous emotion recognition in naturalistic conversations (Park et al., 2020).

154 The use of tales with morals as a tool for working with emotions has proven to be effective for
155 teaching social, affective, emotional, and moral aspects, allowing users to establish cause-and-
156 effect links and develop resilient behaviors, among other things (Färber & Färber, 2015;
157 Kulikovskaya & Andrienko, 2016; Odabasi, Karakus & Murat, 2012). If we digitize and dynamize
158 this process, giving the user a leading role by allowing them to interact with the tool and select
159 the most appropriate tale for their current emotional state, we believe that the value of the
160 activity will increase substantially. Furthermore, we can design this tool with universal learning
161 design in mind, i.e., guaranteeing participation and accessibility to all individuals. Similarly to
162 Sánchez, Benítez & Aguilar (2018), we consider that using this type of resource allows us to show
163 tales to the user through texts that can be translated into different languages, and can be shown
164 both visually and audibly, with supports such as pictographs and videos.

165 ## 2.2. Background on chatbots used for emotion processing
166 The 'Turing Test,' introduced by Turing, serves as a pivotal benchmark for determining whether
167 a robot can exhibit human-like behaviour. In this test, an evaluator engages in a conversation
168 with two interlocutors—an AI bot and a human—through an interface. If the evaluator cannot
169 distinguish which is the bot within a five-minute time interval, the machine is considered to have
170 passed the test. Alan Turing's ground-breaking 1951 theoretical postulate not only tested the

171   intelligent behaviour of machines against humans but also laid the foundation for the
172   development of virtual assistants and chatbots (Turing, 1951; Turing et al., 1952).

173   The Loebner Prize competition, initiated in 1991, allows various robots to compete in the quest
174   to pass the renowned Turing Test. For many years, prizes were awarded to the best-performing
175   robots, but as recently as 2014, over two decades after the competition's inception, that a
176   machine successfully passed the test (Khan & Das, 2017; Mauldin, 1994; Warwick & Shah, 2014;
177   Warwick & Shah, 2016). This evolution marked a significant milestone in the field of artificial
178   intelligence as the Loebner Prize competition serves as a testament to the persistent pursuit of
179   human-like conversational abilities in machines. This historical backdrop provides essential
180   context for understanding the subsequent development and application of chatbots, particularly
181   those designed for emotion processing in educational settings.

182   The origins of chatbots are intricately linked to the field of psychology, with the initial strides in
183   their development attributed to Weizenbaum (1966). Weizenbaum created the pioneering
184   program ELIZA, often regarded as the first chatbot in history. ELIZA simulated conversations with
185   a psychologist by identifying keywords in user input and generating relevant questions. Despite
186   its predefined answers, ELIZA conveyed a remarkable sense of understanding to users, serving as
187   a catalyst for subsequent advancements. Building on the foundation laid by ELIZA, Colby
188   introduced PARRY in 1971 (Colby, Weber & Hilf, 1971). PARRY adopted a similar architecture but
189   took on the persona of a paranoid patient. Armed with approximately 6,000 patterns for
190   recognizing input elements and a set of open-pattern stock answers, PARRY showcased the
191   diverse applications of early chatbots. Alicebot, created by Wallace in 1995, emerged as another
192   significant milestone. Winning the Loebner award several times (Wallace, 2009). Alicebot
193   boasted over 40,000 categories of knowledge, significantly surpassing ELIZA's capabilities. These
194   categories, organized in a tree diagram, facilitated dynamic and engaging dialogues.

195   Lately, there has been a remarkable development of animated virtual agents—avatars possessing
196   human-like appearance, gestures, and expressions that engage with users. This form of
197   presentation serves to enhance the chatbot's perceived sociability and overall user experience
198   (Klopfenstein et al., 2017). These agents have pioneered the way for the design of a diverse array
199   of conversational entities. Among the most widely recognized are those embedded in our
200   everyday devices, including Google Assistant (developed by Google), Siri (developed by Apple),
201   Cortana (developed by Microsoft), and Watson (developed by IBM). These advanced agents
202   seamlessly interact with users through both text and voice, facilitating a range of tasks such as
203   music activation, medical appointment scheduling, answering inquiries, and even ordering food
204   orders for home delivery (Khan & Das, 2017). Concurrently, a growing number of companies are
205   integrating chatbots into their websites and social media platforms to provide customers with
206   streamlined access to products and services. For example, in the banking sector, Blue is a
207   customer assistant chatbot in personal banking for the use of the BBVA app. It is based on
208   predefined questions, and the responses cover both inquiries related to the handling and usage
209   of the application, as well as obtaining personal information about the client's banking status

210   (https://www.bbva.es/finanzas-vistazo/ef/banca-digital/como-es-blue-el-nuevo-asistente-
211   [virtual-de-bbva.html](https://www.bbva.es/finanzas-vistazo/ef/banca-digital/como-es-blue-el-nuevo-asistente-virtual-de-bbva.html)). Lowe's, the home improvement retailer, has a chatbot on its website that
212   can primarily assist with product-related inquiries, aiming to locate them within the extensive
213   catalog available on the web; it also enables users to find physical stores
214   (https://www.lowes.com/).

215   While the majority of chatbots have been designed for commercial applications, their utility
216   extends beyond other areas, such as telecommunications, security, tourism promotion or health.
217   DroidPerf, a lightweight Android profiler, develops a communicable bot to perform analysis to
218   uncover memory inefficiencies in Android apps running on the Android Runtime platform (Li et
219   al., 2023). EMMA is a virtual assistant developed for the U.S. Citizenship and Immigration Services
220   that assists individuals with requests related to immigration services, green cards, passports, and
221   any services offered by the department (https://www.uscis.gov/tools/meet-emma-our-virtual-
222   [assistant](https://www.uscis.gov/tools/meet-emma-our-virtual-assistant)). Turisme Comunitat Valenciana (Spain) has included a marketing and promotion
223   chatbots to attract tourists and provide information about its destinations, events, and tourist
224   activities   (https://www.turismosantapola.es/sp/web_php/index.php;
225   https://turisme.vinaros.es/ es). With respect to health area, a noteworthy non-commercial
226   application lies in their potential as support tools for psychological evaluation and intervention
227   tasks. Regarding mental healthcare, the use of chatbots can be categorized into three primary
228   areas within the psychotherapeutic context: prevention, treatment, and follow-up/relapse
229   prevention of psychological problems and mental disorders (Bendig et al., 2019).

230   In the domain of prevention and detection of mental health-related disorders, two noteworthy
231   works stand out. SentinoBot (Sentino, 2016) is specifically designed for psychological evaluation
232   tasks with a focus on assessing personality traits. This virtual agent collects information on key
233   traits—extraversion, responsibility, kindness, neuroticism, and openness to experience—through
234   multiple-choice questions, employing a Likert-type scale for responses. It operates as a virtual
235   evaluator, conducting a structured assessment with closed questions and predefined answers.
236   Another significant contribution is Replika (Replika, 2021), a conversational chatbot designed for
237   an initial psychological evaluation (pre-evaluation). Functioning as a virtual friend, Replika
238   engages users in a friendly interaction, prompting discussions about daily activities, hobbies,
239   aspirations, and emotions. Notably, Replika possesses the capability to identify keywords
240   associated with psychological distress. Importantly, it includes a critical feature of referring users
241   to specialized care services when it detects a potentially suicidal attitude. This dual focus on
242   evaluation and intervention showcases the versatility of chatbots in addressing mental health
243   concerns.

244   In the area of treatment or intervention of mental disorders, we highlight the following works.
245   WOEBOT (Fitzpatrick, Darcy & Vierhile, 2017) is a conversational chatbot that performs an
246   interaction like a therapeutic conversation. The authors used the chatbot in a personal
247   development program for students addressing depression and anxiety disorders, grounded in
248   cognitive-behavioral principles. The experiments showed a substantial decrease in depressive

249   and anxiety symptoms in students who tested the chatbot compared to those who used an eBook
250   on depression. SHIM chatbot (Ly, Ly & Andersson, 2017), also rooted in cognitive-behavioral
251   therapy and positive psychology elements, serves as a self-improvement initiative to enhance
252   mental health and reduce perceived stress. The evaluation proved the practicability of the
253   chatbot with a high adherence to intervention completion and noteworthy impacts on mental
254   health and stress levels. GABBY chatbot (Gardiner et al., 2017) is a personal development
255   program designed to aid in altering behavior and handling stress independently, drawing
256   inspiration from mindfulness-based stress reduction principles (Gardiner et al., 2013). The
257   experimentation demonstrated no significant difference related to perceived stress between the
258   different groups. However, an important conclusion about differences in stress-related alcohol
259   consumption was extracted. The experiments corroborated the practicability of GABBY with
260   respect to adherence, user satisfaction, and the proportion of users from ethnic minorities. MYLO
261   (Bird et al., 2018; Gaffney et al., 2014) is another chatbot specialized to cope with stress
262   problems; its foundation lies in the principles of Perceptual Control Theory. It offers a self-
263   improvement program for problem solving related to depression, anxiety, and stress. In the
264   experiments, MILO was compared with ELIZA, with both chatbots leading to the relief of the
265   mentioned disorders. However, MYLO was deemed more beneficial for effective problem-
266   solving.

267   With regard to other self-improvement programs aimed at promoting of mental well-being, we
268   can mention the following. SABORI (Suganuma, Sakamoto & Shimoyama, 2018) is a chatbot for
269   this purpose, Including concepts from cognitive-behavioral therapy and behavioral activation
270   principles. A prospective pilot study examined psychological health, psychological distress, and
271   behavioral activation for all the participants concluding the practicability of SABORI as a
272   prevention program. Kamita et al. (2019) proposed a self-mental healthcare chatbot course on
273   the LINE platform, commonly used as a smartphone communication tool. The experiment aimed
274   to compare the chatbot course with a web-based course. The results proved the stress reduction
275   effect and the improvement of user's motivation when using the chatbot course on smartphones.

276   To conclude the area of treatment/intervention, we mention two additional approaches. PEACH
277   is a chatbot (smartphone application) oriented to personality coaching (Stieger et al., 2018). It
278   employs diverse psychotherapeutic mechanisms and micro-interventions, requiring minimal
279   therapist interaction and facilitated by chatbots. It addresses issues such as change motivation,
280   psychoeducation, behavioral activation, self-reflection, and resource activation. A digital coach
281   in the form of a conversational agent will be presented to assist users in reaching their objectives
282   for personality change. The evaluation demonstrated the intervention's effectiveness in the post-
283   test assessment. Rose (De Gennaro, Krumhuber & Lucas, 2020) is a chatbot oriented to treat
284   social ostracism. It provides empathetic answers to help participants who experienced social
285   ostracism recover from the experience. Users predominantly engaged with the chatbot through
286   multiple-choice menus that may be updated depending on the conversation topic. In the
287   evaluation, after the chatbot intervention the participants reported an improvement in their
288   mood.

289   Finally, chatbots could be used in the future after classical psychotherapy is finished to support
290   follow-up and relapse prevention. They could help to stabilize the effects of the intervention,
291   facilitating the integration of therapeutic content into daily life, and diminishing the likelihood of
292   regression (D'Alfonso et al., 2017).

293   Regarding chatbots that deal with users' emotions, several examples can be mentioned.
294   Microsoft XiaoIce (Zhou et al., 2018) is designed as a social chatbot with the ability to recognize
295   human feelings and states. The emotion companion chatbot EREN (Santos, Ong & Resurrección,
296   2020) uses storytelling to elicit story details from children, by labeling emotions and facilitating a
297   discussion to help the child reflect on these emotions and their related events; and by analyzing
298   the child's narrative.

299   To conclude this section, we must highlight the emergence of modern chatbots such as ChatGPT
300   and BARD. As mentioned in the introduction section, these chatbots have been used as AI-
301   assisted therapist assistants (Eshghie & Eshghie, 2023; Carlbring et al., 2023), with the limitations
302   previously enumerated, which we have overcome with the proposed architecture for our
303   chatbot.

304   3. Architecture of CuentosIE

305   In this section, as our contribution (C1) outlined in the introduction, we provide a comprehensive
306   description of the chatbot CuentosIE. Currently, CuentosIE is solely available in Spanish, but it can
307   be readily adapted to other languages due to the availability of the natural language processing
308   (NLP) tools employed in the chatbot. These NLP tools encompass the POS-tagger, parsers, and
309   semantic resources from FreeLing (Padró & Stanilovsky, 2012); the Natural Language Toolkit
310   (NLTK, as cited in Bird, Klein, & Loper, 2009); the spaCy library (Honnibal & Montani, 2017); the
311   information retrieval tool (Ferrández, 2011); and machine learning classifiers, which are
312   contingent upon the presence of tagged corpora in the target language.

313   The next five subsections delve into the detailed architecture of the system. The first subsection
314   provides a general overview, while the remaining four subsections expound upon the most
315   crucial modules: 3.2 the Discourse Manager and Question Generator, which facilitate reading
316   comprehension; 3.3 the Information Retrieval module dedicated to selecting, classifying, and
317   labeling stories; 3.4 the Emotion Classifier module; 3.5 the Emotional Evolution Monitoring
318   module.

319   3.1. A Comprehensive Overview of CuentosIE's System Architecture

320   The architecture of CuentosIE is presented in Figure 1, which depicts its flow of information from
321   (1) to (5), as well as the distinct modules that will be elaborated upon in the ensuing subsections.
322   In flow (1), users access the chatbot through computers and mobile devices at the URL
323   https://oldgplsi.gplsi.es/cuentosIE/index.php, featuring a user interface crafted using HTML,
324   PHP, and JavaScrip. They can register to receive future information about their development in
325   their interactions, as well as to avoid being recommended tales that they have already read or

326 that are not appropriate for their age. The registration process does not require any personal
327 information to maintain the user's anonymity. Users are only asked for their age and gender to
328 collect statistics, data that is housed within a MySQL database. If a user does not register with
329 CuentosIE, they will be identified as a "non-registered user". Emotional evolution monitoring
330 (flows (3) and (5) that are explained in subsection 3.5) is only performed on registered users, and
331 their anonymity is preserved because no email address or other identification is required. If a
332 sensitive situation is detected after analyzing the user's interactions, as will be described in more
333 detail in contribution (C5), CuentosIE will activate and display the corresponding alarm signal the
334 next time the user enters the chatbot. In the case of using CuentosIE in a school or by mental
335 health professionals, users can allow teachers or psychologists to know their identification names
336 to monitor their progress.

337 After the user is identified, the chatbot will present the different functionalities in CuentosIE: (a)
338 The search for tales; (b) The chat about emotions; (c) The addition of new tales. User interactions
339 with CuentosIE are facilitated by the Discourse Manager, whose intricacies are elucidated in
340 subsection 3.2. Functionality (a), corresponding to flow (2), is implemented on tales carefully
341 selected, classified, and labeled by our team of psychologists based on emotions and
342 psychological themes to ensure their effectiveness in emotion education (contribution (C4)). This
343 functionality is comprehensively presented in subsection 3.3. Functionality (b) falls under the
344 purview of the Emotion Classifier module, extensively described in subsection 3.4. Finally,
345 functionality (c), pertaining to flow (4), enables users to contribute new tales to CuentosIE. These
346 tales, upon evaluation and approval by our psychologists, are incorporated into the Information
347 Retrieval module. This mechanism allows users to express their interests in novel tales and
348 emotions, potentially captivating other users.

3.2. The Discourse Manager and Question Generator for reading comprehension modules

351 The user's interactions with CuentosIE are managed by various NLP modules that collaborate
352 with each other. The Discourse Manager (DM), which is *contribution (C3)*, handles user intention
353 detection by running the appropriate NLP module, such as the Information Retrieval (IR) engine,
354 the Question Generator for reading comprehension, or the Emotion Classifier engine (all of which
355 are shown in the innermost box of Figure 1). The DM consists of a classifier developed in Python
356 that utilizes the textual input provided by the user and classifies it into one of the following five
357 categories: the three CuentosIE functionalities (from (a) to (c)), the "exit of the application" class,
358 and the "no_intention" class (which indicates that none of the previous classes were detected).
359 This classifier was trained in the same way as the emotion classifier, which will be described in
360 subsection 3.4. Additionally, to improve CuentosIE's usability, a help icon (❓ in Figure 2) is always
361 available. This icon opens a contextual menu with various options (such as switching to a different
362 functionality).

363 For example, when the user is in functionality (a), searching for tales, each user input is processed
364 by the Discourse Manager (DM) to determine the user's intention. If the user expresses a desire

365 to switch to functionality (b) (e.g., "I'm tired of looking for tales, I would like to talk to you about
366 emotions"), the DM will transfer control to the Emotion Classifier engine. Otherwise, if the
367 "no_intention" class is detected, the user input is redirected to the appropriate NLP module. For
368 example, in Figure 2, the IR engine will receive "I want to search for tales on mental illnesses" as
369 a search query.   After the chatbot presents a list of the most relevant tales on this topic, the user
370 posts a new search in order to refine it successively: "Better only on bipolarity."

371 When a user selects a tale to read (see (3) in Figure 1), CuentosIE posts the text of the tale in the
372 chatbot (🖻), along with its URL. Additionally, CuentosIE can read the tale aloud (🔊), which can
373 be helpful for users with accessibility issues. Finally, the chatbot stores statistics on the tales,
374 emotions, and psychological themes that CuentosIE users read. These statistics will be discussed
375 in *contribution (C5)* in subsection 3.5.

376 After CuentosIE presents the tale content to the user, a conversation begins with a set of
377 questions generated by the "Question Generator for reading comprehension" module in Figure
378 1. Some of these questions are pre-designed and compiled by our psychologists, based on criteria
379 related to their utility for improving emotion knowledge, improving the user's level of reading
380 comprehension, and making the user reflect on the emotions that the tale deals with. Some of
381 the questions are closed-ended (e.g., "Do you think that this tale deals with 'frustration and
382 strength' emotions?"), while others are open-ended to make the user think about the content of
383 the tale (e.g., "What are your feelings after reading the tale?"). In any question, new questions
384 are posed to achieve active listening in the chatbot conversation. For example, after the closed-
385 ended question, if the user's response is negative, the question "OK, then tell me which emotions
386 you think that tale deals with" is proposed. For the open-ended question example, the CuentosIE
387 emotion classifier analyzes the user's answer, questioning the user if their feelings are about the
388 emotion classes detected by the classifier: "I guess that your feelings are related to 'sadness', am
389 I right?". Other questions are automatically generated offline for each tale using the NLP tools
390 mentioned previously. For example, the named entities in the tale are detected and questioned:
391 "Who with his face downcast with regret, meets with his friend Marisa in a bar to have a coffee?".

392 During this conversation, active listening is also performed using large language models (LLMs)
393 from modern chatbots such as ChatGPT or BARD. We specifically used the Falcon LLM
394 (Almazrouei et al. 2023, https://falconllm.tii.ae/falcon.html). For example, for the conversation:
395 "[CuentosIE] Who would you recommend this tale to? [User] To my children, my friends, my
396 family, actually to all the people I know and even more so to the people who I consider interested,
397 empathetic and with little sensitivity", several prompts are sent to Falcon: "[Prompt 1]
398 Paraphrase the following sentence showing empathy: [user's response]"; or "[Prompt 2] How do
399 you feel about this sentence: [user's response]". Falcon generates the following question, which
400 is presented to the user: "I see empathy towards your loved ones, acquaintances, and strangers
401 alike, especially those who possess qualities of interest, empathy, and sensitivity, have I got that
402 right?". Falcon is also used to automatically answer questions related to the tale, in order to
403 challenge the user to contrast their answer. For example, for the CuentosIE question "What part

404 of the tale did you like the most?", Falcon would generate the following prompt: "[Prompt]
405 [CuentosIE_question] of this tale in quotes '[the content of the tale]'". These LLMs are also used
406 to leverage their great ability to summarize. For example, after the user has summarized the tale,
407 Falcon can be used to generate a summary of the tale using the following prompt: "[Prompt]
408 Summarize this tale in quotes '[the content of the tale]'". The summary generated by Falcon is
409 then presented to the user along with their own summary, and the user is asked to reflect on
410 both versions of the summary. This process helps to control the hallucination issue in modern
411 chatbots by restricting their operation to the pieces of knowledge that have been previously
412 chosen by psychologists: *contribution (C2)*.

413 The user can interrupt this question loop at any time by expressing their intention in natural
414 language (e.g., "I'd like to select a new tale"). This is detected and handled by the DM module.
415 The user can also interrupt the loop by clicking the help icon (❓) in Figure 2.

3.3. The Information Retrieval (IR) module: selection, classification and labeling of tales

418 The IR engine has previously indexed the tales that have been curated by our psychologist
419 authors (see (2) in Figure 1 and *contribution (C4)*). The user's search can refer to the titles,
420 content, emotions, or psychological themes of the tales. Additionally, the IR engine in CuentosIE
421 uses NLP techniques such as a POS-tagger, partial parser, and semantic knowledge, as described
422 in (Ferrández, 2011). These techniques are combined with traditional IR techniques such as the
423 Deviation from Randomness (DFR) measure (Amati, Carpineto & Romano, 2004).

424 Developed in C++ for optimal efficiency, this engine processes textual user queries and delivers
425 sorted, relevant tales, accompanied by the emotions and psychological themes they elucidate.
426 For example, in Figure 2, the tale "Los ingredientes del bizcocho (frustración, fortaleza)
427 (resiliencia, trabajo)" (translated as "The Ingredients of the Cake") has been manually tagged with
428 the emotions "frustration" and "strength" and the psychological themes "resilience" and "work".
429 We chose the taxonomy of 30 emotions proposed by Díaz & Flores (2001) to label the tales
430 because we consider it to have enough depth to cover the most significant emotions.
431 Additionally, Díaz & Flores (2001) proposes a set of terms associated with each emotion, which
432 we will use in our emotion classifier. We selected a subset of the psychological themes exposed
433 in the American Psychological Association (APA, https://www.apa.org/topics/) as representatives
434 of current problems that could be of interest to people (e.g., depression, resilience, stress,
435 addiction, abortion, sex, adolescence or bullying). Since the main aim of CuentosIE is to guide the
436 user in their knowledge about emotions, each emotion and psychological theme is accompanied
437 by their definitions, related terms, and explicative videos curated and tagged by our psychologist
438 authors.

439 Additionally, users can add new tales to CuentosIE (functionality (c) in Figure 1). Each added tale
440 is reviewed by our psychologists to ensure the quality and usefulness of the tales indexed in the
441 chatbot: *contribution (C4)*. These tales are also manually tagged according to our taxonomy of

442   emotions and psychological themes. This will create a corpus of tales tagged with emotion and
443   psychological knowledge, which will be made available to the scientific community in XML format
444   (🗄) in (5) in Figure 1. This corpus will be especially valuable for machine and deep learning
445   techniques, which require large and tagged datasets.

446   ### 3.4. The Emotion Classifier module

447   Regarding the (b) functionality in CuentosIE (the chat about emotions), it is implemented in the
448   Emotion Classifier module and primarily aims to achieve emotion education objectives. In this
449   functionality, CuentosIE poses a starting question to the user to encourage them to talk about
450   their current emotional state (e.g., "Hello, how are you today? Please, let's talk about whatever
451   you want. The more we chat, the better I can recommend a tale that's right for you"). After each
452   user post, the Emotion Classifier engine returns the most salient emotion in the post and answers
453   the user, asking for confirmation about this emotion classification. An example extracted from
454   the experiments in the following section starts with the user's post: "Tonight I had insomnia".
455   CuentosIE classifies the user's post as dealing with the "tension" emotion, so it answers: "Do you
456   know that the emotion 'tension' is defined as: 'Feeling of restlessness, discomfort'? Do you think
457   that your current emotional state is identified with this emotion?" followed by the quote: "An
458   interesting quote to reflect on: 'Insomnia is an extra time that life gives us, to keep thinking about
459   what hurts so much.'". These quotes have been previously curated by our psychologists and
460   indexed separately from the tales by the IR engine. After that, the conversation continues until
461   the user decides to end it (which is detected by the DM module) in natural language (e.g., "We've
462   talked enough, please, recommend me a tale") or by clicking the help icon ❓ in Figure 2. Then,
463   CuentosIE compiles the emotions that have been detected in the conversation and recommends
464   tales that deal with these emotions to the user.

465   Our emotion classifier has been evaluated using various machine learning models implemented
466   in Python, including the scikit-learn and TensorFlow libraries: Decision Tree, Random Forest,
467   Naïve Bayes, Support-Vector Machine (SVM) and the Transformer model
468   "tf_roberta_for_sequence_classification" (https://huggingface.co/PlanTL-GOB-ES with
469   124,644,866 parameters). Our evaluation revealed that the Transformer model outperformed
470   the remaining machine learning models. The classifier distinguishes between the 30 emotions
471   proposed by Díaz & Flores (2001). It was trained on: (1) The set of terms linked to each emotion
472   in Díaz & Flores (2001); (2) The Wikipedia pages of each emotion; (3) Definitions of each emotion
473   extracted from the web; (4) Synonyms of each emotion extracted from WordNet and
474   WordReference. The evaluation on these four sets of tagged corpora achieved an accuracy of
475   84.53%. The classification task is challenging due to the high number of classes (30 emotions) and
476   the fact that some emotion descriptions explain the relationships between similar or opposite
477   emotions. This makes the task more difficult for the classifier. The following passages from
478   Wikipedia illustrate the ambiguity between the vocabulary of close or opposite emotions:

479   - Sadness is an emotional ***pain*** associated with, or characterized by, feelings of
480   disadvantage, loss, despair, grief, helplessness, disappointment and sorrow. An individual

481 experiencing sadness may become quiet or lethargic, and withdraw themselves from
482 others. An example of severe sadness is depression, a mood which can be brought on by
483 major depressive disorder or persistent depressive disorder. Crying can be an indication
484 of sadness. (https://en.wikipedia.org/wiki/Sadness)

485 • In psychology, stress is a feeling of emotional strain and pressure.[1] Stress is a type of
486 psychological ***pain***. Small amounts of stress may be beneficial, as it can improve athletic
487 performance, motivation and reaction to the environment. Excessive amounts of stress,
488 however, can increase the risk of strokes, heart attacks, ulcers, and mental illnesses such
489 as depression[2] and also aggravation of a pre-existing condition. Stress can be external
490 and related to the environment,[3] but may also be caused by internal perceptions that
491 cause an individual to experience anxiety or other negative emotions surrounding a
492 situation, such as pressure, ***discomfort***, etc., which they then deem stressful.
493 (https://en.wikipedia.org/wiki/Psychological_stress)

494 • ***Comfort*** (or being comfortable) is a sense of physical or psychological ease, often
495 characterized as a lack of hardship. Persons who are lacking in comfort are
496 uncomfortable, or experiencing ***discomfort***… implies that the subject is in a state of ***pain***,
497 suffering or affliction (https://en.wikipedia.org/wiki/Comfort)

498 Table 1 shows some examples of user interactions in this functionality, which were obtained from
499 the CuentosIE experimentation to be reported in section 4. To ensure transparency, user posts
500 are first presented in Spanish as originally posed, followed by their English translation in
501 parentheses (in subsequent tables and examples, user posts will be presented only in English for
502 clarity). It is worth noting the high number of negations present in the sentences (e.g., numbers
503 2, 3, 4, 7, and 8). Additionally, some examples deal with contradictory emotions, such as snippet
504 8, which deals with negative initial emotions and positive present emotions. Furthermore, there
505 are some spelling errors in the sentences, which makes the classification process more difficult.
506 For example, in snippet 6, the adverb "yes" is misspelled, as "si" (which means "if" in English)
507 should be "sí" in Spanish. Finally, we highlight the need to address some complex linguistic issues,
508 such as anaphora, as these examples are embedded in a conversation with several interactions
509 (e.g., snippet 1, with the anaphoric reference "that" to previous interactions in its conversation).

3.5. The Emotional Evolution Monitoring module

511 In this final subsection, we describe the Emotional Evolution Monitoring module that deals with
512 the CuentosIE's ability to store user conversations and interactions: *contribution (C5)*, 🗄 in flows
513 (3) and (5) in Figure 1. These conversations are stored in XML files, along with the timestamp of
514 each interaction. This allows us to track the user's progress over time, which can be useful for
515 psychologists and teachers.

516 As an example, here is an excerpt from an XML conversation during the questions that analyze
517 the tale: <interaction> <date>25/05/2023 14:41:00</date> <user>atg9</user> <CuentosIE>Tell
518 me if you would have done the same or something similar</CuentosIE> <answer>Yes, sometimes
519 in some circumstances it is difficult for me to ignore harmful comments that do not add up, but

520 in many others I ignore them and I know that they do not add up to me and that they only want
521 to sink and see how you do not move forward</answer> </interaction>.

522 Table 2 shows other examples of real user conversations that demonstrate their engagement
523 with the chatbot and how they feel comfortable sharing their emotions without fear of being
524 judged, laughed at, or hurt. These XML files can be used to detect sensitive situations such as
525 depression (Havigerová et al., 2019), suicide (Boggs & Kafka, 2022), and bullying (Bayari &
526 Bensefia, 2021).

527 Another important piece of information that CuentosIE collects is statistics on the tales,
528 emotions, and psychological themes selected by users (shown in 📊 in (5) of Figure 1). These
529 statistics can be a valuable indicator of users' interests in the field of emotions, as will be shown
530 in the experimentation section.

4. Experimentation

532 In this section, we analyze the experiments conducted to test the benefits of CuentosIE:
533 *contribution (C6)*. The hypothesis behind these experiments is to answer the question posed in
534 the title of this paper: "Can a chatbot about 'tales with a message' help to teach Emotional
535 Intelligence?" This hypothesis will be evaluated by specifically evaluating the five remaining
536 contributions described in the paper.

4.1. Materials & Methods

538 In the experiments, we tested the applicability of CuentosIE with different ranges of users by
539 dividing them into three groups with different academic and age levels: (i) secondary school
540 students (under 18), (ii) university students (18-23), and (iii) post-graduate students (over 23).
541 None of the users received any monetary compensation. The studies involving human
542 participants were reviewed and approved by the Ethics Committee of the University of Alicante
543 (Exp. UA-2020-05-12). Written informed consent to participate in this study was provided by the
544 participants' legal guardian/next of kin. Group (i) consisted of students aged 13-16 from a private
545 Compulsory Secondary Education center in Malaga, Spain. The experiment was conducted at the
546 school as an educational activity during their tutorial subjects. There were 25 students per
547 classroom, and the class tutor, computer science teacher, and one of our psychologist authors
548 were present. The students first received a brief description of the experiment's purpose,
549 CuentosIE's goals and operating mode, and general concepts about emotional intelligence. Then,
550 they conversed with the chatbot individually using an iPad. The testing was carried out through
551 four face-to-face sessions, each lasting one hour and held every 15 days at the school. Groups (ii)
552 and (iii) were recruited in a similar way, as an activity during the subjects lectured by our
553 psychologists. They consisted of university students of Social Work in the first year, Education in
554 the first, second, and third years, and post-graduate students of the Master in Psychopedagogy
555 at the University of Alicante. Since the users were advised that all interactions would be stored
556 for further analysis, no user was forced to register in CuentosIE. As a result, only 360 users
557 registered, as shown in Figure 3, with a distribution of males, females, and ages. The following

558 experiments will be segmented by these parameters to draw significant conclusions, as per
559 *contribution (C5)*. All the users interacted with the chatbot while the psychologist answered any
560 questions they had about using the application and encouraged them to freely test the different
561 functionalities, especially those of "tale search and analysis" and "talking about emotions".

4.2. Results & Discussion

563 After users worked with CuentosIE, they were encouraged (not forced) to complete a survey form
564 that includes quantitative and qualitative feedback (Creswell, 2022). The quantitative results are
565 summarized in Table 3. The survey questions were designed to measure both the conversational
566 agent's efficiency, effectiveness, and functionality, as well as users' satisfaction with their
567 improvement in emotional intelligence. Users ranked the following issues from 0 to 10 (as shown
568 in Table 3): their overall feeling about the tool, their opinion on the search and suggestion process
569 for tales, their chat process about emotions, and their self-evaluation of their emotional
570 intelligence improvements after using CuentosIE. The 727 surveys reported in this table are more
571 than the 360 registered users because some users who did not sign up for CuentosIE also
572 completed the survey. After analyzing this Table, we can conclude that users achieved a
573 remarkable overall satisfaction (score of 7.82), with no significant differences between male and
574 female users, but slightly lower scores for users under the age of 18. These results hold for the
575 detailed scores of the tool's options, although the "talk about emotions" option (which runs the
576 emotion classifier) received a slightly lower score (7.52 vs. 7.90 for the tale search option). Finally,
577 the score given by users on how they feel the chatbot helps them improve their emotional
578 intelligence is slightly lower than the overall score (6.66 vs. 7.82).

579 Regarding the qualitative feedback from users, the overall impressions from the experiments
580 were positive, as participants freely chose to continue talking to CuentosIE after each session.
581 These impressions were corroborated by the quantitative results and the following textual
582 comments from the surveys: "I find it very useful and reading the tale you realize many things
583 that you feel"; "It seems to me to be a way to get a person to connect with their emotions, and
584 to know their interior and how they feel through a tale"; "I find it very useful and I would
585 recommend it to my friends". Negative feedback mainly focused on the lack of a greater variety
586 of tales and the instances in which the emotion classifier failed: "It is a useful and quite intelligent
587 application, it asks interesting curious questions but it needs to have a larger repertoire of
588 books"; "I would add drawings to associate the emotion with an image and so the little ones in
589 sixth or fifth grade could do it"; "When you are talking to the machine sometimes it gives
590 incoherent emotions".

591 Based on these results, we believe that *contributions (C2) and (C3)* have been met, as users have
592 not complained about the "hallucination" issues present in modern chatbots, the different NLP
593 modules interact correctly, and the survey scores have been satisfactory. Similarly, *contribution
594 (C4)*, which deals with the selection, classification, and labeling of tales according to emotions
595 and psychological themes as the core of the chatbot for teaching emotions, can be considered
596 complete. However, this contribution should be improved in the future, as only 50 tales were

597 indexed in CuentosIE during the experiments, which resulted in some emotions and psychological
598 themes not being addressed by any tales. This was also corroborated by some user comments:
599 "Perhaps the link between the tales and the emotions and psychological themes discussed should
600 be polished a little more. Regarding psychological issues, they could also be expanded further".

601 Regarding the *contribution (C5)*, as an example of the indicators and analysis that can be
602 extracted from the interactions stored in CuentosIE, Figures 4 and 5 present the percentage of
603 each emotion (the extensive spectrum of 30 emotions that CuentosIE effectively encompasses)
604 selected by users, segmented by gender (female in Figure 4, and male in Figure 5), and age
605 distributions (From 18 to 23; over 23; under 18). These percentages were calculated based on
606 the 5,624 emotions chosen by users to ask CuentosIE to show them tales that deal with those
607 emotions. We grouped positive emotions as "joy, desire, certainty, strength, enthusiasm, calm,
608 pleasure, love, courage, fun, liking, compassion, and satisfaction," and negative emotions as
609 "tension, phobia, boredom, humiliation, discomfort, sadness, apathy, doubt, pain, frustration,
610 hatred, exhaustion, emotional dependency, attachment, fear, arrogance, and anger". After
611 analyzing the grouped emotions, we observed that "positive" emotions are more in demand than
612 "negative" emotions: 56% vs. 44%. However, the difference shows comparable levels of interest
613 between them. The results obtained by females and males present interesting conclusions,
614 where the highest selected emotions are "joy and calm" for both, but there are differences in the
615 "tension, exhaustion, and doubt" emotions (higher for females). Concerning the analysis of the
616 age groups, we can highlight substantial differences. For example, the highest selected emotions
617 for users under 18 are "joy and calm," whereas for the remaining groups, "tension and doubt"
618 are the most in demand. Thanks to this data, which is linked to each registered user, CuentosIE
619 can obtain indicators about users' interests in specific emotions, as well as analyze the timeline
620 evolution of users' emotion interests at different points in time.

621 Based on these experimental results, we believe that the initial hypothesis is supported:
622 interacting with the chatbot has been beneficial to users, and tales have been an effective way
623 to teach emotional intelligence. As a future line of research, these results should be corroborated
624 by measuring the level of development of emotional intelligence in a group of users using a
625 psychometric tool (e.g., the one proposed by Mayer, Salovey & Caruso, 2016). After measuring
626 their level of development in emotional intelligence with the psychometric tool, we will carry out
627 a one-and-a-half-month intervention program using the CuentosIE tool. After this period, we will
628 again measure the level of development of emotional intelligence of the participants to verify
629 whether CuentosIE enhances the improvement of the metacognitive skills associated with
630 emotional intelligence.

631 ## 5. Conclusions

632 In this paper, we present the chatbot CuentosIE. It facilitates wide availability and anonymity
633 through its web-based interaction and specializes in "tales with a message," which have been
634 shown to be highly effective through their moral or associated metaphors (contribution (C1),
635 detailed in the Introduction section). CuentosIE includes an information retrieval system, a

636 reading comprehension question generator, and an emotion classifier system, all of which are
637 designed to develop users' emotional intelligence. It avoids the hallucination issue present in
638 modern chatbots such as ChatGPT and BARD, which could be critical in education fields, by
639 restricting their application to specific non-critical tasks and pieces of knowledge (contributions
640 (C2) and (C3)). Additionally, our team of psychologists has selected, classified, and labeled these
641 tales according to emotions and psychological themes to ensure their utility in teaching emotions
642 (contribution (C4)). All user interactions with the chatbot are stored in XML files, which allows for
643 further processing to detect sensitive situations (contribution (C5)). The CuentosIE
644 experimentation was conducted on users from three different academic and age levels to cover
645 a variety of user types, with encouraging results. These groups allow us to segment the data by
646 these parameters to draw significant conclusions (contribution (C6)).

647 Based on the preliminary results of this pilot study, in the future, we plan to evaluate the
648 personality profile of the participants to determine whether there are correlations between their
649 personality profiles and the types of emotions they are most interested in. Additionally, given
650 that there appear to be differences in interest in emotions according to gender, we will explore
651 this further in our new data collection, which will include a larger sample size.

6. Author Contributions

653 The authors with backgrounds in computer science (Antonio Ferrández, Jesús Peral, Ángel Lloret
654 and David Gil) contributed to the architecture, design, and construction of the chatbot. The
655 authors with backgrounds in psychology (Rocío Lavigne-Cerván, Ignasi Navarro-Soria and Carmen
656 Rocamora) contributed to the psychological aspects of the chatbot, such as the selection,
657 classification, and labeling of tales, and the design and compilation of the set of pre-designed
658 questions for the "Question Generator for Reading Comprehension" module.

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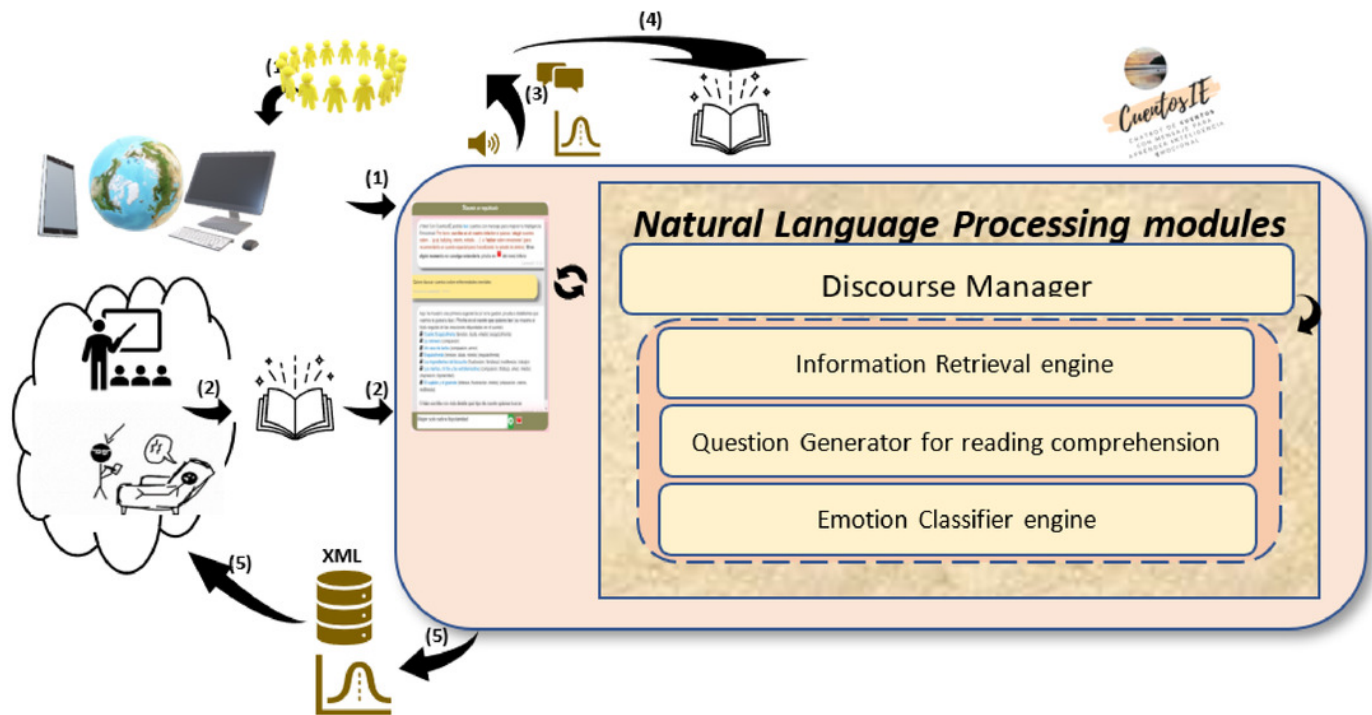
Figure 1

Architecture of CuentosIE

Figure 2

An example of user's searches that can be refined successively

Figure 3

Male and female distribution in the 360 registered users in CuentosIE
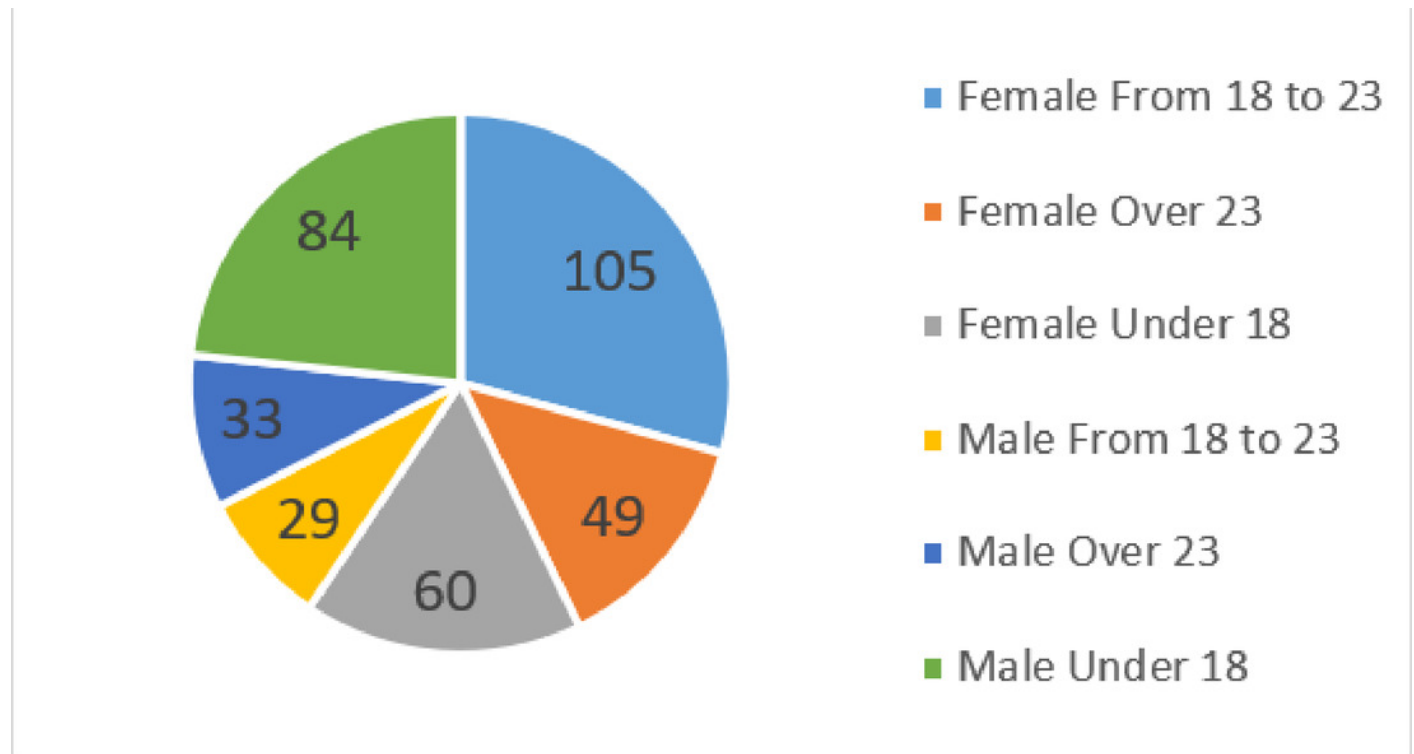
Figure 4

Emotions chosen to select tales by FEMALE users, for different age ranges
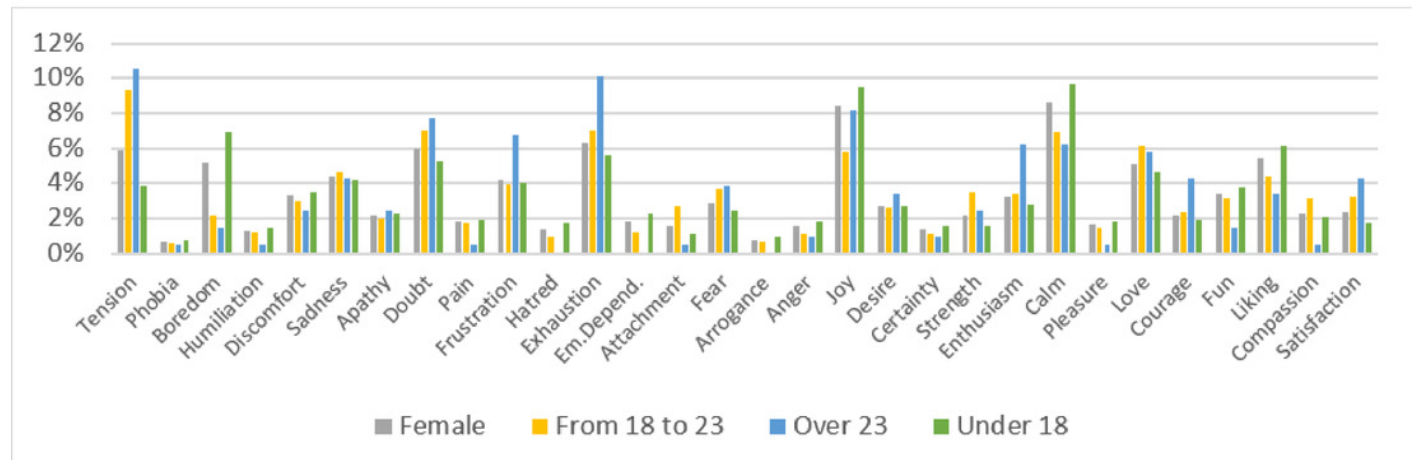
Figure 5

Emotions chosen to select tales by MALE users, for different age ranges
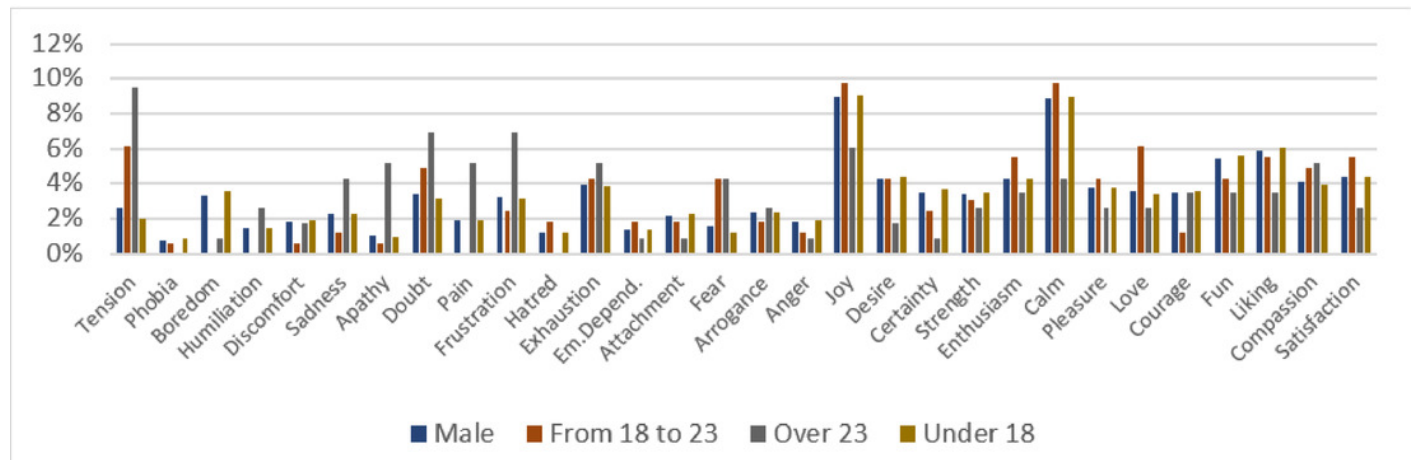
Table 1(on next page)

Table 1 . Examples of the users' conversations about "emotions".

1

1	Simplemente eso aunque he dormido poco (Just that although I have slept little)
2	No estoy teniendo muchas emociones de tristeza pero estoy teniendo poca energía últimamente (I'm not having a lot of sad emotions but I'm having low energy lately)
3	Yo estoy cansado porque ayer no dormí bien (I am tired because yesterday I did not sleep well)
4	No no hay algo que me preocupe, de momento el día me está yendo bien (No no there is nothing that worries me, for the moment the day is going well for me)
5	Pasar tiempo con mis amigos (Spend time with my friends)
6	Si, y si me gustan (Yes, and if I like them)
7	La verdad es que no, no tengo emociones de humillación, la verdad no se porque no siento que nadie me juzgue (The truth is that no, I do not have emotions of humiliation, the truth is I do not know because I do not feel that anyone is judging me)
8	Pues hoy me he levantado mejor que muchos días y de momento nada está siendo tan duro. Si fuera así siempre estaría mucho mejor (Well today I woke up better than many days and at the moment nothing is being so hard. If it were so, it would always be much better)

2 *Table 1. Examples of the users' conversations about "emotions".*

Table 2(on next page)

Table 2 . Examples of insightful excerpts of users' conversations.

1	I'm tired of living
2	Every day it is harder to continue
3	There are times I would like to end it all
4	I'm fine, the only thing that worries me is the grades, I know that my mother is happy and I'm happy about it, since my mother is the most important thing I have in this life, if she dies or something happens to her, I wouldn't be able to live with it
5	I am calm, and happy, and I am satisfied with the life I have, but deep down I am somewhat shy
6	The worst thing is that the last conversation with my father is that I yell at him, and he dies

1 *Table 2. Examples of insightful excerpts of users' conversations.*

Table 3(on next page)

Table 3 . 727 survey results (from 0 to 10) filled out by users after running CuentosIE.

	Overall	Opinion on the search process	Opinion on the chat process	Self evaluation on Em.Intellig. improvement	#Surveys
Male	**7.93**	**7.86**	**7.53**	**6.78**	**341**
From 18 to 23	8.29	7.53	7.71	7.35	17
Over 23	8.33	8.82	8.55	7.25	12
Under 18	7.89	7.85	7.48	6.73	312
Female	**7.73**	**7.93**	**7.52**	**6.56**	**386**
From 18 to 23	8.25	8.11	8.12	7.12	75
Over 23	8.67	8.94	9.06	7.78	18
Under 18	7.54	7.82	7.27	6.34	293
Total	**7.82**	**7.90**	**7.52**	**6.66**	**727**

1   *Table 3. 727 survey results (from 0 to 10) filled out by users after running CuentosIE.*

2