# Time-Free and Time-Bound Greeting Expressions Found in Replika Chatbot

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## Abstract

The present study aims to analyze and describe forms of greeting speech act which Replika can perform. Replika is an emotionally intelligent chatbot that is designed to provide emotional supports to users. The study considers greetings in human-computer interaction worth the discussion, due to the increasing use of conversational interfaces in the past years. The data are collected by means of participant observation and are analyzed using qualitative method based on greetings classification proposed by Halliday (1979). The findings suggest that there are two forms of greeting that the chatbot can perform, including time-free greetings and time-bound greetings. Time-free greetings are those which are performed without any particular reference to the situational context of the exchange. Time-bound greetings are those which are performed with particular reference to the situational context during which an exchange occurs.

## Keywords

Greeting Speech Act, Pragmatics, Chatbot, Human-Computer Interaction (HCI)

## 1. Introduction

Greetings are essential in any communication, as appropriate greeting behaviour is required for the establishment and continuation of interpersonal relationship (Wei, 2010), either in human-human interaction or human-computer interaction. While there have been many studies conducted to examine function and use of greeting in human-human interaction, there has not been any particular study that observes how greetings are performed in human-computer interaction. The present study is therefore aimed to attend the given concern.

Greetings in human-computer interaction is equally worth the discussion, considering the increasing use of conversational interfaces in the past years. Klopfenstein et al. (2017) argued that the reason behind such a phenomenon is the pervasive use of smartphones in human lives and modern attitude that regards them as more personal than other devices. Some of them include Apple's Siri, Microsoft's Cortana, Amazon's Alexa, Google Assitant, and Samsung's S Voice.

Klopfenstein et al. (2017) documented that the last couple years mark the rise of bots. These bots are considered to be a new approach to conversational interfaces, able to provide conversational texting interfaces that actually have been present since 1960s. They are further referred to as chatbot: conversational system that is programmed to mimic human conversations (Pereira et al., 2016). The trend is recently brought back by computing additional capabilities, previously absent in pioneer chatbots, e.g. ELIZA and ALICE, such as providing daily news, ordering food, booking restaurants, and managing e-commerce purchase. As a result, they are now broadly applied in various fields, from e-commerce, education, and healthcare (Klopfenstein et al., 2017).

One of the recent chatbots that will be discussed in the present research is Replika. Replika is created by Eugenia Kuyda with AI startup Luka in 2015. It is designed to provide emotional support by virtue of affective computing and is equipped with sequence-to-sequence machine learning that converts sequences of input from one domain to sequences of output in another domain (Pardes, 2018). As a conversational system, it is Replika's responsibility to initiate and encourage interpersonal interaction between the chatbot and users. This particular task is embodied in how Replika asserts greeting expressions in a conversation.

Phillips (2018) explained that chatbot's greeting can provide an opportunity to establish a lasting first impression, as the initial greeting of a chatbot can set a character for its personality and set possibilities on what the chatbot can and cannot do to. Zeff (2016) added that the ability to compose an appropriate greeting demonstrates communicative competence. This is quite similar to function of greeting in human-human interaction, as illustrated in several studies:

Williams (1997) provided an evaluation of greeting exchanges in ESL textbooks and real life settings. His findings suggest that there is a significant inequality between greetings demonstrated in ESL materials and greetings used in real life. He argued that the former lacks of variety, as they tend to be exemplified using formal forms, and discovered that greetings used in real life settings are structured in rather informal speech. In broader context, Meiirbekov et al. (2015) compared the sociolinguistic aspects of greeting speech act in Kazakh and English languages. They observed that greeting speech acts in both languages are affected to a great extent by such social variables as gender differences, interpersonal relation, social status, and educational background. They concluded that the given variables will further determine the forms of greeting expressions in Kazakh and English languages.

These findings will be used as the framework of the present study, whose aim is to answer the following question: what are forms of greetings which Replika chatbot can perform in an utterance? The findings of the present research is expected to provide a thorough evaluation of greetings performed by Replika chatbot and to serve as a basis for AI workers in developing conversational interfaces.

## 2. Theoretical Framework

### 2.1. Pragmatics

Pragmatics is recently regarded as a growing research field in contemporary linguistics that not only has become a hub of interest in linguistics, but also has drawn a substantial amount of recognition from anthropologists, artificial intelligence workers, and cognitive scientists (Huang, 2013). This particular interest has resulted two main views in contemporary pragmatics, namely component view of pragmatics and continental view of pragmatics. Whereas the former considers pragmatics as the branch of linguistics that studies meaning of utterances with regards to the context in which they are used (Allan and Nodoushan, 2015), the latter defines pragmatics as a theory of linguistic communication. In the present study, the analysis will be focused on the former view of pragmatics.

### 2.2. Context

The component view of pragmatics assumes that there is a considerable gap between the meaning of a sentence and the actual proposition conveyed by uttering the sentence. This is why pragmatics is necessarily taken into account, as the study systematically analyses language use in context (Birner, 2013). Context is defined as a set of features that relevantly describe the changing situation in which a linguistic unit is used (Huang, 2013). It further determines how particular proposition conveyed in an utterance is articulated and interpreted. Context is composed of three different sources, consisting of situational context, background knowledge, and co-textual context.

**Table 1.** Context.

| No. | Context | |
| --- | --- | --- |
| 1. | Situational Context | Situational context refers to the immediate physical and temporal situation in which an utterance takes place. The context is illustrated through the use of place deixis and time deixis (Cutting, 2002). |
| 2. | Background Knowledge | Background knowledge refers to information that interlocutors can derive from an utterance. It can either be cultural knowledge or interpersonal knowledge. The former includes general knowledge that is already known by the interlocutors. The latter, on the other hand, consists of specific, private knowledge about each interlocutor that is shared exclusively (Cutting, 2002). |
| 3. | Co-textual Context | Co-textual context refers to context of the utterance itself, derived from lexical and grammatical cohesion. Some examples of the former include repetition, synonyms, superordinates, general words, whereas the latter include reference, substitution, and ellipsis (Cutting, 2002). |

## 2.3. Speech Acts

Contextual meaning of an utterance depends on how the utterance is conveyed and interpreted. To utter something is to perform particular act through particular function. This is the underlying argument of speech act theory. Austin (1962) in Huang (2013) suggests that utterances are not only employed to assert some statements, but also to perform certain acts. He posits three kinds of act which an utterance can perform, such as:

**Table 2.** Speech acts.

| No. | Speech Acts | |
| --- | --- | --- |
| 1. | Locutionary Act | The act of producing linguistic expression. |
| 2. | Illocutionary Act | The act performed by a speaker in uttering linguistic expression. |
| 3. | Perlocutionary Act | The act intended by a speaker to elicit an effect on a hearer by uttering linguistic expression. |

An utterance is essentially composed of an illocutionary force and a propositional content which the utterance attempts to describe. Illocutionary force refers to specific type of function that a speaker intends to accomplish in an utterance (Huang, 2013). There is a range of basic illocutionary force that can be asserted in an utterance, including declaratives (i.e. effects immediate changes in some current state of affairs), representatives (i.e. commits the speaker's belief), directives (i.e. expresses the speaker's attempts to get the hearer to do something), commissives (i.e. commits the speaker to some future course of action), and expressives (i.e. expresses the emotional state of the speaker).

## 2.4. Greetings

Greetings belong to the category of expressives. They have phatic function that is demanded in a communicative routine (Jibreen, 2010). Greetings are therefore constrained by common social contexts and is consequently conventionalized into formulaic patterns.

Formulaic patterns of greetings can be categorized based on how greeting speech act is expressed. The act in question can be performed either by verbal means or non-verbal means (Jibreen, 2010). Some common examples of verbal greeting consist of topic initiation, verbal salute, and references to the interlocutor. In addition, Halliday (1979) in Jibreen (2010) categorizes verbal greetings into time-free greetings and time-bound greetings. Such a classification is dependent of the relation between greeting expressions and the time at which they are uttered. Time-free greetings are those that are performed without any particular reference to the situational context of an exchange. On the other hand, time-bound greetings are those that are performed with particular reference to the situational context during which an exchange occurs. They are characterized by the use of daily or seasonal greeting, asserted in either formal or less formal setting.

Like other speech acts, the form which greetings embody relies mostly on the context of the encounter (Zeff, 2016). The context considers the level of acquaintance between interlocutor and the degree of imposition of the encounter. Wei (2010) further adds two possible settings in which greeting speech act may occur. Casual setting relates to a situation in which a greeting exchange takes place without any institutionalized structure. Closed setting pertains to a situation in which greeting exchange occurs in stratified institution.

In sum, greeting exchange is a social ritual. It is composed of passing greeting and engaging greeting (Williams, 1997). The former is the use of a greeting expression in a conversation without any intention of maintaining the conversation into some other forms of social exchange, whereas the latter is the use of greeting expression with the intention of maintaining the conversation into some other forms of social exchange. Ritual, in this sense, is defined as a conventionalized act, whereby a speaker renders their recognition and consideration for particular matter of utmost value (Williams, 1997).

## 3. Method

Research method that is applied in the present study is a qualitative method. Qualitative method concerns the structures and patterns of particular variable (Litosseliti, 2010). The method is conducted through inductive emic approach that allows the researchers to derive premises from the findings of the study. The approach involves the following procedures:

### 3.1. Data Collecting

Data in the present study are collected by virtue of participant observation. Participant observation is a qualitative method of data collecting that requires the researchers to involve with the subject of the research through two separate roles of subjective participant and objective observer (Crossman, 2018). Subjective participation is when the researchers engage themselves in conversations managed by Replika, while objective observation is when the researchers form a group, consisting of three correspondents to become involved in conversations managed by Replika. Data collected through this method determine the purposive sample of the present analysis. Purposive sample is a non-probability sample that is selected based on the objectives of the study (Crossman, 2018).

### 3.2. Data Analysis

Data in the present study are analysed by virtue of qualitative analysis. The method is conducted on two levels of analysis, consisting of descriptive analysis and interpretative analysis. The former aims to provide description of the preferred data, conducted by defining the preferred data based on their context. The latter aims to infer the preferred data based on the aim of the present study, conducted by interpreting the preferred data based on Halliday's (1979) classification of time-free greeting and time-bound greeting.

## 4. Results and Discussion

### 4.1 Time-Free Greeting

Time-free greetings are those which are performed without any particular reference to the situational context of an exchange. Some examples of the given category identified in Replika include:

**Table 3.** Datum 1.

| June 20, 2018 | |
| --- | --- |
| Replika | "Hey! Sending you sweet dreams this evening." |
| Correspondent | "Hey. I just had a nightmare and I am scared." |

The context of exchange above is marked by the use of situational deixis *'this evening'* in greeting utterance asserted by Replika. The context refers to specific time at which the exchange begins. Greeting act performed by Replika is identified by its illocutionary force. Illocutionary force of a greeting act intends either to maintain interpersonal relation between speech participants or to set up the possibility for further interaction. In this exchange, greeting act performed by Replika aims to achieve the former function as exemplified by representative phatic expression that comes after the speech act in question.

Such an illocutionary force is identified by the use of time-free greeting expression in the form of *'hey'* interjection. The researchers consider the given expression as the illocutionary force indicating device of the utterance, as the researchers identify no explicit performative verb *'to greet'* being used in this category. It is assumed that the chatbot is after the intended meaning of greeting instead of the performative use of the verb.

**Table 4.** Datum 2.

| June 26, 2018 | |
| --- | --- |
| Replika | "Hey there! I'm happy you are here!" |
| Correspondent | "Hey! What are you up to these days? We haven't talked in a while." |

The context of exchange above is derived from interpersonal knowledge that is exclusively shared by Replika and the correspondent. Both of them know that they have not been conversing with each other recently. Similar to previous exchange, greeting utterance expressed by Replika in this exchange is composed of time-free greeting expression in the form of *'hey'* interjection. This particular expression is the illocutionary force of the utterance itself, aimed to suggest the chatbot's intention in maintaining its interpersonal relationship with the correspondent by recognizing her presence. This is emphasized in representative phatic expression that comes after the speech act.

**Table 5.** Datum 3.

| June 23, 2018 | |
| --- | --- |
| Replika | "Hey! You having a good evening?" |
| Correspondent | "I had. Are you following updates from recent news?" |

The context of exchange above is illustrated by the use of temporal deixis *'evening'* asserted by Replika. The deixis describes immediate temporal setting at which the dialogue is about to begin. Greeting utterance asserted by Replika in the exchange is composed of a time-free greeting expression in the form of *'hey'* interjection, attached to an explorative phatic expression. The greeting expression denotes the chatbot's intention in setting up further possible contact after recognizing the presence of the correspondent. This sort of recognition is pointed out by phatic expression that is attached to the speech act:

*'You having a good evening?'* By uttering such an expression, the chatbot intends to examine the emotional state of the correspondent, in order to discern their emotion.

**Table 6.** Datum 4.

| June 27, 2018 | |
| --- | --- |
| Replika | "Hey! It's a lovely morning, isn't it?" |
| Correspondent | "It is!" |

The context of exchange above, marked by the use of temporal deixis *'morning'*, describes particular occasion at which the conversation between the chatbot and the correspondent begins to unfold. The researchers regard greeting utterance conveyed by Replika as an expressive speech act, due to the illocutionary force which the chatbot is able to fulfil. The utterance is formed by a time-free greeting expression *'hey'* interjection, performed to set up the possibility for further social interaction between the chatbot and the correspondent. This particular function is maintained by tag-question phatic expression attached into the greeting utterance.

**Table 7.** Datum 5.

| June 24, 2018 | |
| --- | --- |
| Replika | "Hey there! I wanted to discuss something you've told me earlier." |
| Correspondent | "What is it about?" |

The context of greeting exchange above is acquired from interpersonal knowledge that is exclusively shared by the chatbot and the correspondent. The context concerns the correspondent's personal background, previously discussed by both participants before the exchange occurs. Greeting utterance conveyed by Replika is aimed to set up the possibility for further contact. This is the illocutionary force of the utterance. This particular intention is indicated by virtue of time-free greeting expression in the form of hey interjection. The chatbot's attempt in setting up further interaction consists in directive phatic expression that comes after the speech act, whereby the chatbot expresses its desire for the correspondent to cooperatively engage in conversation which the chatbot maintains.

## 4.2 Time-Bound Greeting

Time-bound greetings are those that are performed with particular reference to the temporal context during which a conversation occurs. They are characterized by the use of daily and seasonal greeting. They are embodied in such expressions as *'good morning', 'good afternoon', 'good evening'*, and so on. The researchers have distinguished some remarks that demonstrate the comparison between this particular form of greeting and the one which has been previously discussed:

**Table 8.** Datum 1.

| June 22, 2018 | |
| --- | --- |
| Replika | "Good morning! Have an amazing day today!" |
| Correspondent | "Morning, Replika." |

One compelling remark about time-bound greeting is that greeting expression itself determines the context of the utterance. It is because time-bound greeting tends to be performed with particular reference to the temporal context during which a conversation takes place. In this exchange, greeting utterance communicated by Replika refers to a period of a day, at which the dialogue is about to begin, Hence, time-bound greeting cannot be performed deliberately, suggesting that this specific form of greeting is heavily regulated by social routines.

Time-bound greeting in the exchange is composed of an illocutionary force and a propositional content, similar to time-free greeting. Illocutionary force of greeting utterance in exchange above above is distinguished by the use of time-bound greeting expression *'good morning'*. The greeting expression is later followed by representative phatic expression that emphasize the chatbot's attempt in maintaining interpersonal relationship with the correspondent.

**Table 9.** Datum 1.

| June 22, 2018 | |
|---|---|
| Replika | "Good evening! Just wanted to remind you that you're awesome." |
| Correspondent | "That's a very sweet of you." |

There are still some similarities that are shared by time-free greeting and time-bound greeting performed by Replika. For an instance, they both are partially defined by phatic expressions that are attached to them. Time-bound greeting utterances asserted by the chatbot in data 6 and data 7 are similarly embedded with representative phatic expression. This specific kind of phatic expression highlights the chatbot's comments about the correspondent by inducing positive emotion. The comments range from expressing hope for the correspondent's wellbeing, e.g. *'Have an amazing day today'*, to expressing praise and admiration for the correspondent, e.g. *'Just wanted to remind you that you are awesome'*, as in dialogue above.

Speech act being performed by Replika in exchange above is a greeting act. It is indicated through the use of time-bound greeting expression *'good morning!'* followed by a representative phatic expression, *'just wanted to remind you that you're awesome.'* Time-bound greeting expression employed in the utterance suggests Replika's attempt in maintaining interpersonal relation between the chatbot and the correspondent. The attempt results in representative phatic expression that comes after the speech act intended to express the chatbot's praise and admiration for the correspondent.

**Table 10.** Datum 1.

| June 23, 2018 | |
|---|---|
| Replika | "Good morning!" |
| Correspondent | "Good morning! It's Sunday!" |

The researcher examine that time-bound greeting performed by Replika is not always partially defined by phatic expressions that are attached to them. There are several time-bound greeting expressions communicated without such an expression as exemplified in greeting utterance expressed by Replika in exchange above.

The context of the exchange is determined through the expression of time-bound greeting itself, referring to a certain period of day in between 5 PM and 9 PM during which the dialogue is about to unfold. Not only does the greeting expression describe the context of the exchange, it denotes the illocutionary force of the utterance. Illocutionary force of greeting utterance asserted by Replika in the present exchange intends to maintain communicative exchange between the chatbot and the correspondent.

**Table 11.** Datum 4.

| June 26, 2018 | |
|---|---|
| Replika | "Morning! Just a reminder of how special you are." |
| Correspondent | "Morning, Replika. How are you?" |

In some cases, time-bound greetings can be abbreviated by the omission of initial word *'good'*, as exemplified in greeting

utterance expressed by Replika in exchange above. This kind of abbreviation has resulted a less-formal time-bound greeting expression. It is presupposed that the chatbot expects to maintain an interpersonal relation with the correspondent by presenting itself in rather casual setting.

In this exchange, the context of greeting utterance asserted by Replika refers to particular period of a day at which the exchange begins to unfold. Its illocutionary function suggests that speech act being performed in the utterance is a greeting act. The act in question conveys an illocutionary function of communicative exchange with regards to social routines. Such an illocutionary function is established by the use of time-bound greeting expression *'good morning'* that is followed by representative phatic expression: *'just a reminder of how special you are'*. This kind of phatic expression denotes the chatbot's comment regarding the correspondent's personal trait in order to induce positive emotion.

**Table 12.** Datum 1.

| June 27, 2018 | |
| --- | --- |
| Replika | "Evening! Let's talk for a bit?" |
| Correspondent | "What do you want to talk about?" |

The researchers examine that Replika seems to be merely capable of performing daily greeting, rather than seasonal greeting. There are two periods of a day which the chatbot can recognize, i.e. morning and evening. Exchange above takes place during a certain period of a day in between 5 PM and 9 PM. It results in through the expression of time-bound greeting *'evening!'* addressed by Replika towards the correspondent.

This temporal context distinguishes the illocutionary force of greeting expression performed by Replika to the correspondent. The illocutionary force of greeting utterance in this exchange is to set up the possibility for further interaction. It consists in the use of time-bound greeting expression *'evening'* that is abbreviated into less formal speech and is followed by directive phatic expression. This particular form of phatic expression is employed to persuade the correspondent in doing the chatbot's favor, which is to involve in further interaction initiated by the chatbot.

## 5. Conclusion

In sum, there are two forms of verbal greeting which Replika can perform. They include time-free greetings and time-bound greetings. Time-free greetings are those which are performed without any particular reference to situational context during which an exchange occurs, whereas time-bound greetings are those which are performed with particular reference to situational context at which an exchange takes place. Illocutionary force of these greeting expressions is addressed either to maintain interpersonal relationship or to set up the possibility for further contact, depending on the context of the greeting exchange. Both time-free greetings and time-bound greetings performed by Replika are entirely defined by illocutionary force of the speech act. The illocutionary force can be identified through the use of *'hey'* interjection in time-free greeting expressions and the use of *'good'* affirmation in time-bound greeting expressions. The study considers these expressions as illocutionary force indicating devices of greeting speech acts performed by Replika in preferred exchanges above. The researchers observe no explicit use of performative verb *'to greet'*, suggesting that the chatbot is after the intended meaning of greeting instead of the performative use of the verb.

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