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# Gamification Technique and Checklist-Based and Technique For Inspection of Interaction Models

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# ABSTRACT

This technical report describes the two inspection techniques for different interaction models, called MoLVERIC Cards (MCards) and MoLVERIC Check (MCheck). MCards employs gamification elements to motivate professionals during the inspection. MCheck uses a checklist to guide the inspection.

## 1. MCARDS

Scene	Scene
<p><b>Description</b> The scenes represent user goals.</p> <p><b>Note:</b> The Information scenario can be represented by one or more scenes.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px dashed gray; padding: 5px; width: 45%;"> <p>Requirement: View weight assessment</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 5px;"> <p>View weight assessment</p> <pre>View the result { d: name d: BMI d: wight goal }</pre> </div> </div> <div style="border: 1px dashed gray; padding: 5px; width: 45%;"> <p>Requirement: Create new account</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 5px;"> <p>Create new account</p> <pre>AND{ Inform personal data { d+u: weight d+u: height } Inform account data d+u: e-mail d+u: password }</pre> </div> </div> </div>	<p><b>Description</b> The scenes represent user goals.</p> <p><b>Note:</b> The Information scenario can be represented by one or more scenes.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px dashed gray; padding: 5px; width: 45%;"> <p>Requirement: View weight assessment</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 5px;"> <p>View weight assessment</p> <pre>View the result { d: name d: BMI d: wight goal }</pre> </div> </div> <div style="border: 1px dashed gray; padding: 5px; width: 45%;"> <p>Requirement: Create new account</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 5px;"> <p>Create new account</p> <pre>AND { Inform personal data { d+u: weight d+u: height } Inform account data d+u: e-mail d+u: password }</pre> </div> </div> </div>
<p>I. Are the all user goals was represented in the topics of the scenes (based on the the requirements/Information scenario)? In the <b>negative case</b>, report it as an <b>Omission defect</b>.</p> <hr/> <p>II. Verify if there scenes inconsistent with the requirements/Information scenario. In the positive case, report it as an <b>Inconsistency defect</b>.</p> <hr/> <p>III. Are there scenes that are not in the context of requirements/Information scenario? In the positive case, report it as an <b>Extraneous Information defect</b>.</p>	<p>I. The scenes can they be read as: "At this point, you (user) can (or should) &lt;top&gt;"? Verify if these scenes represent the user goals. In the <b>negative case</b>, report It as an <b>Incorrect Fact defect</b>.</p> <hr/> <p>II. Are there the possibility to obtain different interpretations in the reading of each scene? In the positive case, report It as an <b>Ambiguity defect</b>.</p> <hr/> <p>III. Verify if there similar scenes. In the positive case, report also It as an <b>Ambiguity defect</b>.</p>
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">I. Omission </div> <div style="text-align: center;">II. Inconsistency </div> <div style="text-align: center;">III. Extraneous </div> <div style="text-align: center;">Points </div> </div>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">I. Incorrect Fact </div> <div style="text-align: center;">II e III. Ambiguity </div> <div style="text-align: center;">Points </div> </div>
SC-1	SC-2

## Dialogues

### Description

The dialogues represent the user's actions in relation to the topic of the scene. They may be composed of other dialogues, through the following structures:

The SEQ structure represents the dialogues that must be exchanged in the specified sequence.  
 The XOR structure represents mutually exclusive dialogues.  
 The structure OR represents the choice of exchanging one or more dialogues.  
 The structure AND represents the use of all dialogs, but not in a predefined sequence.



I. Are all dialogues represented in the scenes (based on the requirements/information scenario)? In the negative case, report it as an Omission defect.

II. According to the requirements/information of the scenario, there are unnecessary dialogues? In the positive case, report it as an Extraneous Information defect.

III. Are there dialogues that offer multiple interpretations? In the positive case, report it as an Ambiguity defect.

I. Omission



II. Extraneous Information



III. Ambiguity



Points



D-1

## Dialogues

### Description

The dialogues represent the user's actions in relation to the topic of the scene. They may be composed of other dialogues, through the following structures:

The SEQ structure represents the dialogues that must be exchanged in the specified sequence.  
 The XOR structure represents mutually exclusive dialogues.  
 The structure OR represents the choice of exchanging one or more dialogues.  
 The structure AND represents the use of all dialogs, but not in a predefined sequence.



Are there incorrect notation in the dialogues? In the positive case, report it as an Incorrect Fact defect.

Incorrect Fact



Points



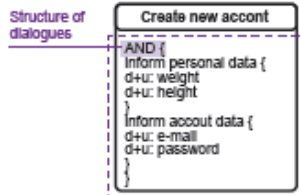
D-2

## Dialogues

### Description

The dialogues represent the user's actions in relation to the topic of the scene. They may be composed of other dialogues, through the following structures:

The SEQ structure represents the dialogues that must be exchanged in the specified sequence. The XOR structure represents mutually exclusive dialogues. The structure OR represents the choice of exchanging one or more dialogues. The structure AND represents the use of all dialogs, but not in a predefined sequence.



I. The necessary structures were represented in the dialogues? In the negative case, report it as an Omission defect.

II. The structures were applied correctly in relation to the goal of each structure? In the negative case, report it as an Inconsistency defect.

III. The structures detailed are required for user actions in relation to the requirements/information scenario? In the negative case, report it as an Incorrect Fact defect.

I. Omission



II. Inconsistency



III. Incorrect Fact



Points

20

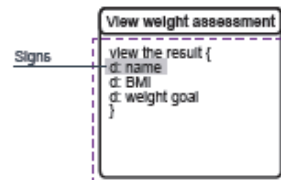
D-3

## Signs

### Description

The signs represent the information involved in the dialogues, for example in dialogue "register the name" is used the sign "d + u: name".

**Note:** A sign has only enunciators "d" (designer's deputy) and "d + u" (when the designer's deputy allows user interaction).



I. Are the all signs to represent the information in the user interaction was represented in the dialogues (based on the the requirements/information scenario)? In the negative case, report it as an Omission defect.

II. The signs are in the context of the requirements/information scenario? In the positive case, report it as an Extraneous Information defect.

III. The signs are inconsistent with the requirements/information scenario? In the positive case, report it as an Inconsistency defect.

IV. Are there signs that offer multiple interpretations? In the positive case, report it as an Ambiguity defect.

I. Omission



II. Extraneous Information defect.



III. Inconsistency



III. Ambiguity



Points

20

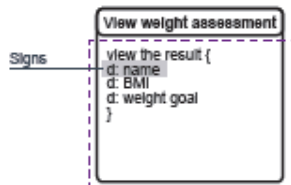
S-1

## Signs

### Description

The signs represent the information involved in the dialogues, for example in dialogue "register the name" is used the sign "d + u: name".

**Note:** A sign has only enunciators "d" (designer's deputy) and "d + u" (when the designer's deputy allows user interaction).



I. In the signs, the enunciators ("d:" and "d+u:") was used? **In the negative case, report it as an Omission defect.**

II. The signs were applied correctly? **In the negative case, report it as an Inconsistency defect.**

I. Omission



II. Incorrect Fact



Points

10

S-2

## Opening Point

### Description

The opening point indicates the start of user interaction with the system.



I. The opening point was represented in the diagram? **In the negative case, report it as an Omission defect.**

II. The transition user utterance, related with the opening point, has consistently content with the requirements/information scenario for the start user interaction? **In the negative case, report it as an Inconsistency defect.**

III. According to the requirements/information of the scenario, the transition user utterance was directed to the scene representing the initial goal user? **In the negative case, report it as an Inconsistency defect.**

I. Omission



II e III. Inconsistency



Points

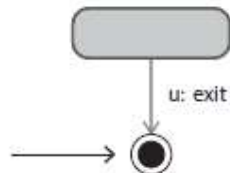
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OP-1

## Closing Point

### Description

The closing point indicates the end of user interaction with the system.



I. The closing point was represented in the diagram? In the negative case, report it as an Omission defect.

II. According to the requirements/information of the scenario, the transition user utterance to the closing point has consistent content to represent the end of the interaction? In the negative case, report it as an Inconsistency defect.

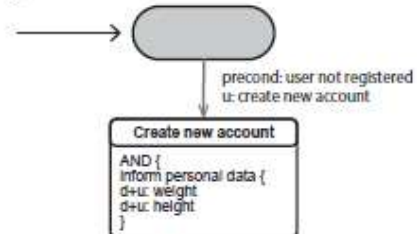


CP-1

## Ubiquitous Access

### Description

The ubiquitous access is the user's opportunity change the topic of conversation to a different goal than current.



I. The scenes associated with ubiquitous access can be accessed at any time, in the user-system interaction, consistent with the with the requirements/information scenario? In the negative case, report it as an Inconsistency defect.

II. The ubiquitous access is being related to other elements, besides scenes and point of closure? In the positive case, report it as an Incorrect Fact defect.

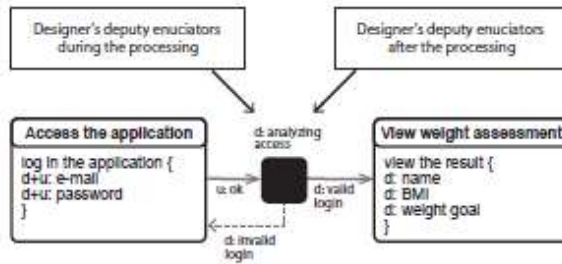


UA-1

## System Process

### Description

The system process is the internal processing of a transition user utterance. This occurs only when it's necessary the system interpret the transition user utterance to provide adequate direction.



I. The element system the process was used to interpret a transition user utterance? In the negative case, report it as an Incorrect Fact defect.

II. After a system processing, they are used designer's deputy enunciators for the transition utterance and breakdown recovery utterance? In the negative case, report it as an Incorrect Fact defect

I e II. Incorrect Fact



Points

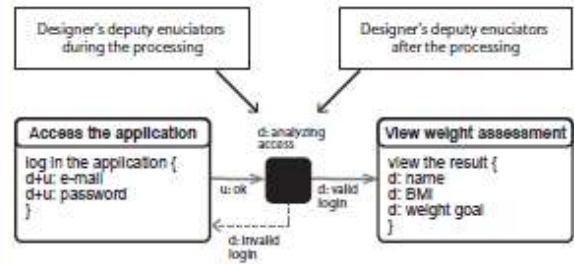
10

SP-1

## System Process

### Description

The system process is the internal processing of a transition user utterance. This occurs only when it's necessary the system interpret the transition user utterance to provide adequate direction.



The system process was used in necessary moments for the interpretation of a transition user utterance? In the negative case, report it as an Omission defect.

Omission



Points

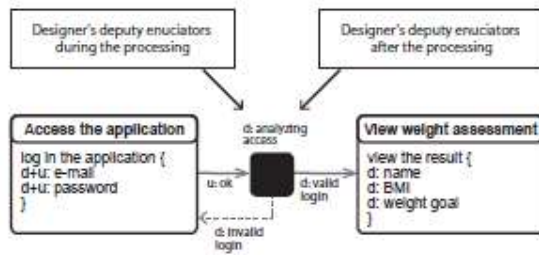
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SP-2

## System Process

### Description

The system process is the internal processing of a transition user utterance. This occurs only when it's necessary the system interpret the transition user utterance to provide adequate direction.



The feedback system processing was used in necessary moments, as the download files? In the negative case, report it as an Omission defect.



Omission

Points

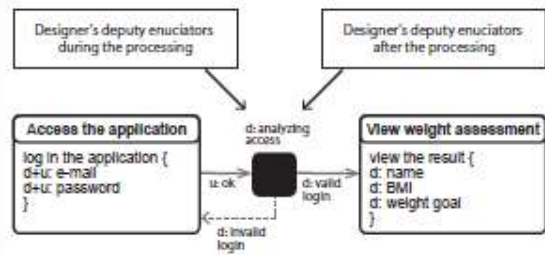
10

SP-3

## System Process

### Description

The system process is the internal processing of a transition user utterance. This occurs only when it's necessary the system interpret the transition user utterance to provide adequate direction.



As outputs of process system, a transition utterance and other (s) transition utterance were used? In the negative case, report it as an Incorrect Fact defect.



Incorrect Fact

Points

10

SP-4

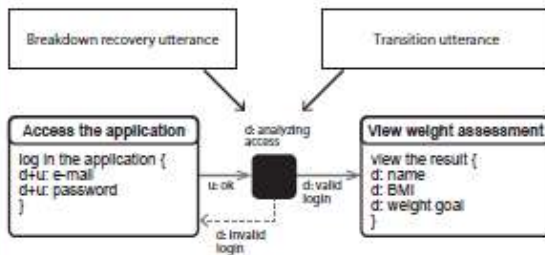


## Transition Utterance and Breakdown Recovery Utterance

### Description

Transition utterance represents the user goals change from the current scene. Breakdown recovery utterance is a type of designer utterance for a recovery situation of communication disruption.

**Note:** The transition utterance and breakdown recovery utterance have only enunciators "u" and "d".



I. The direction of the utterances (arrow) is correct in relation to the requirements/information scenario? In the negative case, report it as an **Incorrect Fact defect**.

II. The utterances use the right arrow? That is, the transition utterance with normal arrow and breakdown recovery utterance with the dashed arrow. In the negative case, report it as an **Incorrect Fact defect**.

I e II. Incorrect Fact      Points  
       20

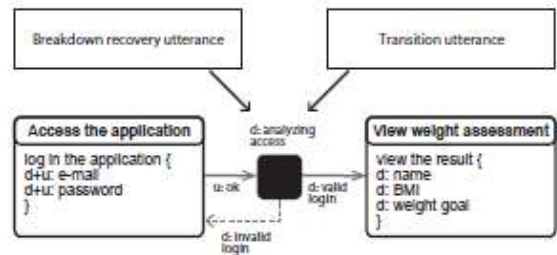
TR-1

## Transition Utterance and Breakdown Recovery Utterance

### Description

Transition utterance represents the user goals change from the current scene. Breakdown recovery utterance is a type of designer utterance for a recovery situation of communication disruption.

**Note:** The transition utterance and breakdown recovery utterance have only enunciators "u" and "d".



I. The utterances have content? In the negative case, report it as an **Omission defect**.

II. The content of the utterances is in the context of the requirements/information scenario? In the negative case, report it as an **Extraneous Information defect**.

III. The content is consistent with the requirements/information scenario? In the negative case, report it as an **Inconsistency defect**.

IV. The content of the utterances offer multiple interpretations? In the positive case, report it as an **Ambiguity defect**.

I. Omission      II. Extraneous Information      III. Inconsistency      IV. Ambiguity      Points  
                         20

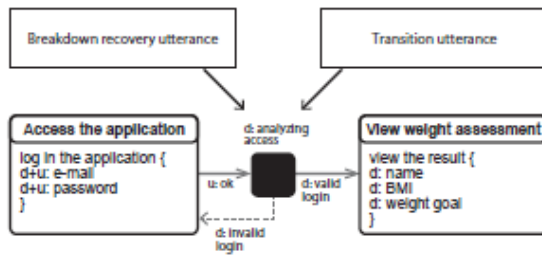
TR-2

## Transition Utterance and Breakdown Recovery Utterance

### Description

Transition utterance represents the user goals change from the current scene. Breakdown recovery utterance is a type of designer utterance for a recovery situation of communication disruption.

**Note:** The transition utterance and breakdown recovery utterance have only enunciators "u" and "d".

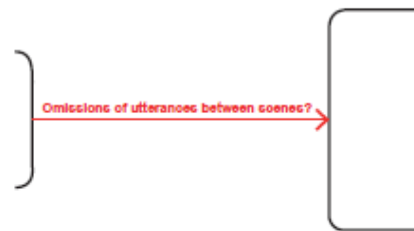


## Transition Utterance and Breakdown Recovery Utterance

### Description

Transition utterance represents the user goals change from the current scene. Breakdown recovery utterance is a type of designer utterance for a recovery situation of communication disruption.

**Note:** The transition utterance and breakdown recovery utterance have only enunciators "u" and "d".



I. The utterances use the enunciator "u" or "d"? In the negative case, report it as an Omission defect.

II. The enunciator utterances is correct? Being considered "u" to the user and "d" to the designer's deputy. In the negative case, report it as an Incorrect Fact defect.

Are there omissions of utterances between scenes? In the positive case, report it as an Omission defect.



TR-3

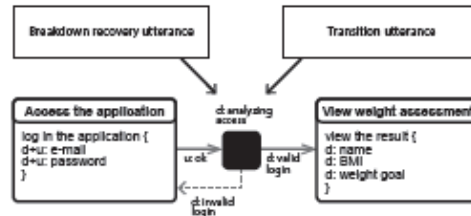
TR-4

## Transition Utterance and Breakdown Recovery Utterance

### Descrição

A fala de transição representa a mudança de objetivo do usuário a partir da cena corrente (seta normal). A fala de recuperação da ruptura representa um tipo de fala para uma situação de recuperação de ruptura da conversa (seta tracejada).

Observação: As falas de transição e recuperação da ruptura da conversa possuem somente os enunciadore de "u:" (representa a fala do usuário) e "d:" (representa a fala do designer).



I. Are there utterances where necessary any precondition? If not, disregard the next verification items. In the positive case, if the precond expression was not used to represent a necessary precondition in the utterances, report it as an Omission

II. The precond expression has inconsistent content with a precondition necessary for the requirements/information scenario? In the positive case, report it as an Inconsistency defect.

III. The precond expression has unnecessary content with the requirements/information scenario? In the positive case, report it as an Extraneous information defect.

IV. The precond expression has ambiguous content? In the positive case, report it as an Ambiguity defect.

I. Omission

II. Inconsistency

III. Extraneous information

IV. Ambiguity

Points



20

TR-5



## 2. MCHECK

SCENE	
TOPIC OF THE SCENE (FIRST COMPARTMENT OF THE SCENE)	
Description	Example
<p><i>The scenes represent user goals.</i></p> <p><i>Note: The information scenario can be represented by one or more scenes.</i></p>	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"> <p><b>Requirement:</b> View weight assessment</p> <pre> View weight assessment view the result { d: name d: BMI d: weight goal }                     </pre> </div> <div style="border: 1px solid black; padding: 5px;"> <p><b>Requirement:</b> Create new account</p> <pre> Create new account inform personal data{ d+u: weight d+u: height } inform account data{ d+u: e-mail d+u: password }                     </pre> </div> </div>
<p><b>Verification items:</b></p> <p><b>CN1:</b> Are the all user goals was represented in the topics of the scenes (based on the the requirements/information scenario)? In the negative case, report it as an <b>Omission defect</b>.</p> <p><b>CN2:</b> Verify if there scenes in consistent with the requirements/information scenario. In the positive case, report it as an <b>Inconsistency defect</b>.</p> <p><b>CN3:</b> Are there scenes that are not in the context of requirements/information scenario? In the positive case, report it as an <b>Extraneous Information defect</b>.</p> <p><b>CN4:</b> The scenes can they be read as: "At this point, you (user) can (or should) &lt;topic&gt;"? Verify if these scenes represent the user goals. In the negative case, report it as an <b>Incorrect Fact defect</b>.</p> <p><b>CN5:</b> Are there the possibility to obtain different interpretations in the reading of each scene? In the positive case, report it as an <b>Ambiguity defect</b>.</p> <p><b>CN6:</b> Verify if there similar scenes. In the positive case, report also it as an <b>Ambiguity defect</b>.</p>	
DETAILS OF THE SCENE	
DIALOGUES (SECOND COMPARTMENT OF THE SCENE)	
Description	Example
<p><i>The dialogues represent the user's actions in relation to the topic of the scene. They may be composed of other dialogues, through the following structures:</i></p> <p><i>The <b>SEQ</b> structure represents the dialogues that must be exchanged in the specified sequence.</i></p> <p><i>The <b>XOR</b> structure represents mutually exclusive dialogues.</i></p> <p><i>The structure <b>OR</b> represents the choice of exchanging one or more dialogues.</i></p> <p><i>The structure <b>AND</b> represents the use of all dialogs, but not in a predefined sequence.</i></p>	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;"> <p><b>Dialogues</b></p> </div> <div style="border: 1px solid black; padding: 5px;"> <p><b>Create new account</b></p> <pre> AND inform personal data{ d+u: weight d+u: height } inform account data{ d+u: e-mail d+u: password }                     </pre> </div> <div style="margin-left: 20px;"> <p><b>Structure of dialogues</b></p> </div> </div>
<p><b>Verification items:</b></p> <p><b>D1:</b> Are the all dialogues was represented in the scenes (based on the the requirements/information scenario)? In the negative case, report it as an <b>Omission defect</b>.</p> <p><b>D2:</b> According to the requirements /information of the scenario, there are unnecessary dialogues? In the positive case, report it as an <b>Extraneous Information defect</b>.</p> <p><b>D3:</b> Are there incorrect notation in the dialogues? In the positive case, report it as an <b>Incorrect Fact defect</b>.</p> <p><b>D4:</b> Are there dialogues that offer multiple interpretations? In the positive case, report it as an <b>Ambiguity defect</b>.</p> <p><b>D5:</b> The necessary structures were represented in the dialogues? In the negative case, report it as an <b>Omission defect</b>.</p> <p><b>D6:</b> The structures were applied correctly in relation to the goal of each structure? In the negative case, report it as an <b>Inconsistency defect</b>.</p> <p><b>D7:</b> The structures detailed are required for user actions in relation to the requirements/information scenario? In the negative case, report it as an <b>Incorrect Fact defect</b>.</p>	

DETAILS OF THE SCENE	
SIGNS (SECOND COMPARTMENT OF THE SCENE)	
Description	Example
<p>The signs represent the information involved in the dialogues, for example in dialogue "register the name" is used the sign "d + u: name".</p> <p><i>Note:</i> A sign has only enunciators "d" (designer's deputy) and "d + u" (when the designer's deputy allows user interaction).</p>	
<p><b>Verification items:</b></p> <p>S1: Are the all signs to represent the information in the user interaction was represented in the dialogues (based on the requirements/information scenario)? In the negative case, report it as an <b>Omission defect</b>.</p> <p>S2: The signs are in the context of the requirements/information scenario? In the positive case, report it as an <b>Extraneous Information defect</b>.</p> <p>S3: The signs are inconsistent with the requirements/information scenario? In the positive case, report it as an <b>Inconsistency defect</b>.</p> <p>S4: Are there signs that offer multiple interpretations? In the positive case, report it as an <b>Ambiguity defect</b>.</p> <p>S5: In the signs, the enunciators ("d:" and "d+u:") was used? In the negative case, report it as an <b>Omission defect</b>.</p> <p>S6: The signs were applied correctly? In the negative case, report it as an <b>Inconsistency defect</b>.</p>	
TRANSITION UTTERANCE AND BREAKDOWN RECOVERY UTTERANCE	
Description	Example
<p>Transition utterance represents the user goals change from the current scene.</p> <p>Breakdown recovery utterance is a type of designer utterance for a recovery situation of communication disruption.</p> <p><i>Note:</i> The transition utterance and breakdown recovery utterance have only enunciators "u" and "d".</p>	
<p><b>Verification items:</b></p> <p>FTR1: The direction of the utterances (arrow) is correct in relation to the requirements/information scenario? In the negative case, report it as an <b>Incorrect Fact defect</b>.</p> <p>FTR2: The utterances use the right arrow? That is, the transition utterance with normal arrow and breakdown recovery utterance with the dashed arrow. In the negative case, report it as an <b>Incorrect Fact defect</b>.</p> <p>FTR3: The utterances have content? In the negative case, report it as an <b>Omission defect</b>.</p> <p>FTR4: The content of the utterances is in the context of the requirements/information scenario? In the negative case, report it as an <b>Extraneous Information defect</b>.</p> <p>FTR5: The content is consistent with the requirements/information scenario? In the negative case, report it as an <b>Inconsistency defect</b>.</p> <p>FTR6: The content of the utterances offer multiple interpretations? In the positive case, report it as an <b>Ambiguity defect</b>.</p> <p>FTR7: The utterances use the enunciator "u" or "d"? In the negative case, report it as an <b>Omission defect</b>.</p> <p>FTR8: The enunciator utterances is correct? Being considered "u" to the user and "d" to the designer's deputy. In the negative case, report it as an <b>Incorrect Fact defect</b>.</p> <p>FTR9: Are there omissions of utterances between scenes? In the positive case, report it as an <b>Omission defect</b>.</p> <p>FTR10: Are there utterances where necessary any precondition? If not, disregard the next verification items. In the positive case, if the precondition expression was not used to represent a necessary precondition in the utterances, report it as an <b>Omission defect</b>.</p> <p>FTR11: The precondition expression has inconsistent content with a precondition necessary for the requirements/information scenario? In the positive case, report it as an <b>Inconsistency defect</b>.</p> <p>FTR12: The precondition expression has unnecessary content with the requirements/information scenario? In the positive case, report it as an <b>Extraneous Information defect</b>.</p> <p>FTR13: The precondition expression has ambiguous content? In the positive case, report it as an <b>Ambiguity defect</b>.</p>	

OPENING POINT	
Description	Example
<p>The opening point indicates the start of user interaction with the system.</p>	
<p><b>Verification items:</b></p> <p><b>PA1:</b> The opening point was represented in the diagram? In the negative case, report it as an <b>Omission defect</b>.</p> <p><b>PA2:</b> The transition user utterance, related with the opening point, has consistently content with the requirements/information scenario for the start user interaction? In the negative case, report it as an <b>Inconsistency defect</b>.</p> <p><b>PA3:</b> According to the requirements/information of the scenario, the transition user utterance was directed to the scene representing the initial goal user? In the negative case, report it as an <b>Inconsistency defect</b>.</p>	
CLOSING POINT	
Description	Example
<p>The closing point indicates the end of user interaction with the system.</p>	
<p><b>Verification items:</b></p> <p><b>PE1:</b> The closing point was represented in the diagram? In the negative case, report it as an <b>Omission defect</b>.</p> <p><b>PE2:</b> According to the requirements/information of the scenario, the transition user utterance to the closing point has consistent content to represent the end of the interaction? In the negative case, report it as an <b>Inconsistency defect</b>.</p>	
UBIQUITOUS ACCESS	
Description	Example
<p>The ubiquitous access is the user's opportunity change the topic of conversation to a different goal than current.</p>	
<p><b>Verification items:</b></p> <p><b>AU1:</b> The scenes associated with ubiquitous access can be accessed at any time, in the user-system interaction, consistent with the requirements/information scenario? In the negative case, report it as an <b>Inconsistency defect</b>.</p> <p><b>AU2:</b> The ubiquitous access is being related to other elements, besides scenes and point of closure? In the positive case, report it as an <b>Incorrect Fact defect</b>.</p>	
SYSTEM PROCESS	
Description	Example
<p>The system process is the internal processing of a transition user utterance. This occurs only when it's necessary the system interpret the transition user utterance to provide adequate direction.</p>	
<p><b>Verification items:</b></p> <p><b>PS1:</b> The element system the process was used to interpret a transition user utterance? In the negative case, report it as an <b>Incorrect Fact defect</b>.</p> <p><b>PS2:</b> After a system processing, they are used designer's deputy enunciators for the transition utterance and breakdown recovery utterance? In the negative case, report it as an <b>Incorrect Fact defect</b>.</p> <p><b>PS3:</b> The system process was used in necessary moments for the interpretation of a transition user utterance? In the negative case, report it as an <b>Omission defect</b>.</p>	