



# EVALUATION METRICS

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## Protocol

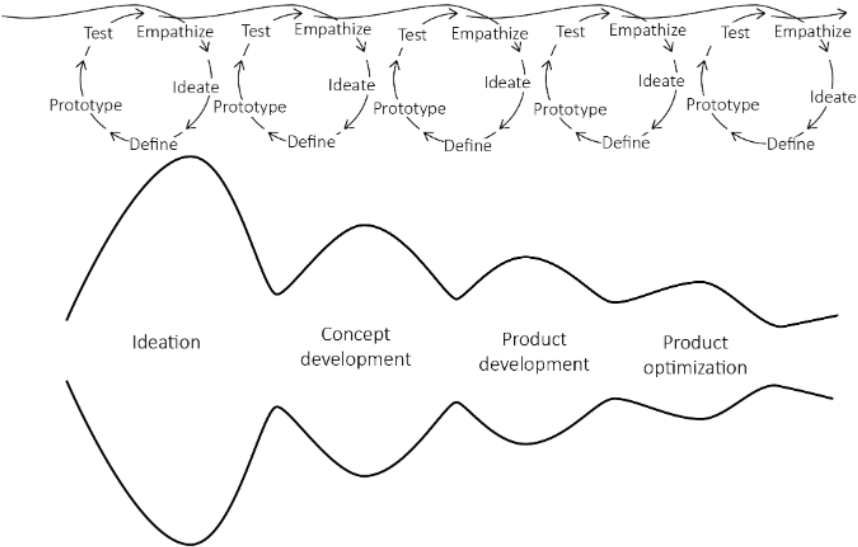
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The process of co-design is an iterative process, in which potential end-users (informal carers) are closely involved in discovering how the POSTHCARD concept and platform should be shaped, functioning and used. The co-design approach reflects a fundamental change in the traditional developer-user relationship, enabling a wide range of people to make a creative contribution in the formulation and solution of a problem. While initially aiming to generate ideas with an open approach, the assessment of end-user perspectives becomes increasingly specifically focused on a certain problem and/or solution as the co-design process progresses, which is reflected in the figures below. The co-design process follows an iterative loop-based design and evaluation path from ideation, concept development, product development to product optimization.



This deliverable lists the recommendations for improvement for concept development, product development and optimization. The recommendations are shared in an Excel file on the shared POSTHCARD online space and are directly accessible to all project partners. Screen dumps have been made from these Excel files to share the various Feedback rounds in this deliverable.

Furthermore, the evaluation phases are described in the pilot test guidelines D4.2a deliverable (for alpha and beta prototype testing). The deliverable will include results from D4.2a (alpha & beta) and also from D4.3a on the metrics, e.g., the results from the heuristic evaluations.

Since the mean age of informal carers is around 60 years of age (Mantelzorg, Nederland), with the largest group between 50-55 years of age, we also present game design guidelines for seniors. This to ensure that older informal carers are supported in navigation, perception and interaction with the POSTHCARD game (see section 5).

# 1. Feedback on simulation and menu

FEEDBACK FOR POSTHCARD SIMULATION 0.2.5			
Contributor	Type (positive,issue,other)	Description	Severity
CCARE	positive comment	Wheel works good, seems suitable for extension by clicking on other objects, characters	
CCARE	improvement	Increase the speed of the wheel animation: in particular the reveal of the options around the characters head	
CCARE	improvement	remove the dots in front of the options from the wheel (but keep some spacing, so all text is always visible, see "Order to")	
CCARE	improvement	Increase the speed of the wheel hiding after selecting an option	
CCARE	issue	Move lamps upwards in kitchen (or change camera pov)	
CCARE	improvement	Increase the smoothness/sharpness of the texts and lines in the wheel (anti alias)	
CCARE	issue	If you click a person, deselect and select again, the wheel animation is still running. Animations should be terminated when out of view	
CCARE	other	Change the UI of the options in the wheel so the text is always horizontal and allows for horizontal expansion (for other languages)	
CCARE	issue	the wheel also expands when clicking on the head of the selected person. I would just ignore any clicks on the head	
CCARE	improvement	Show speech bubble after animation of hiding the wheel is done. (so we don't mix up cues)	
TWE	improvement	Add a slight delay after camera motion, before showing new speech bubbles.	Low
TWE	improvement	Maybe add easing on the camera. For example while moving between speech bubbles.	Low
TWE	issue	Use a more appropriate camera angle when in dialog and/or when facial emotions are changing, e.g. eye-level over-the-shoulder to make it more cinematic.	Medium
TWE	other	Will the player be able to pan and tilt the camera?	
TWE	issue	Speed up opening of menus to 200-300 ms.	Medium
TWE	issue	Clicking an already open menu category for a second time doesn't close it, it just replays the animation of opening it.	Medium
TWE	issue	While having a main menu open, click somewhere in the room. The menu disappears. Good. Now, between 1 and 3 seconds after the menu has closed, click the same person again. You will see the menu fan moving right-to-left (closing), before opening again. Either reset the state of the menu every time it is closed, or don't animate it at all when the same person is clicked again (like how it is when clicked within a second of deselecting).	High
TWE	improvement	Add hover effects, like 10% darker colour or a border colour change.	Low
TWE	other	The category labels ("Ask to..." etc.) could also only pop up when hovering over an icon. The icons have to be very clear, though.	
TWE	improvement	Perhaps style the toggles somewhat more 'clickable', almost like a button.	Low
TWE	issue	(Temporary: The "pretend I'm doing stuff" bubbles are placed right over the existing speech bubbles. Will real speech bubbles also overlap if triggered to quickly after each other?)	Medium
TWE	improvement	Enable anti-aliasing on the text bubbles.	Low
TWE	improvement	Perhaps change their shape to be bubble-like. (Minimum solution: round off the three furthest corners of a text box.)	Low
UNIGE	other	How can icons match predicates? Maybe with facial expressions of the speaker that corresponds the most to the type of predicate	
VILANS	issue	Don't let the wheel appear but let it show in one moment of time.	
VILANS	issue	"If you want Paula to perform an action related to Marion, you click on Marion." More logical to click on the person that you would like to speak	
VILANS	issue	If I play the game for the second time, I can only click on Paula and let her read the magazine. After that I can not click on Marion anymore.	
CON	issue	complete sentences: ask to... cuddle dog; sit on chair... cuddle the dog; sit on the chair	
CON	issue	If you want Paula to perform an action related to Marion, you click on Marion. To me it is not logical, confusing. Better to click on Paula	
CON	issue	different conversations (square) between the 2 characters move very quickly. It is hard to follow with the eyes. Better to slow down the camera	
CON	improvement	instead of square conversation box, replace by speech bubbles (more standard & less rigid)	
CON	improvement	the person who performs an action (speaks, by giving an order, asks...). Maybe put his/hers communication in blue bubble and at the same time highlight with blue halo around the person. The character who is "active" lights up in blue. It is more easily recognizable	
CON	other	what is the purpose of the "?????" in the wheel	
CON	improvement	placement of the wheel in the center of the screen. Maybe in order to better see the characters put it more in top right corner as a rectangle window.	
CON	issue	ask the repair man to hang up the lamps a bit higher in order to see the characters properly	
CON	improvement	it would be nice to see that the characters can move their arms. It's a bit robotic now	
CON	issue	See script scenario - The different options in the "wheel". Order Marion to take fork. in the simulation : order to take knife Ask Marion to use the knife. In the simulation: ask to take knife	
CON	issue	Order Marion to take fork. Answer in the conversation box: "Listen Paula, you have to take knife the knife (fork the fork) repetition!	
CON	other	When Marion is going to sit down and is sitting down. It would be nice if Paula is facing her/looking at her	
CON	other	what do you mean by "please PRETEND that i am reading magazine..?"	
TWE	positive comment	The interior and the characters look nice	
TWE	issue	As others said, clicking on Marion for Paula's actions is not intuitive. Then I expect Marion to act, not Paula.	Medium
TWE	issue	Similarly, showing Marion inside the "action wheel" makes it look like this is going to be Marion's action, not Paula's. Maybe show Paula inside the wheel and instead of "Ask..." on the wheel put "Ask Marion" (maybe just inside the menu options)	Medium
TWE	issue	For Paula to read the magazine, I would click on the magazine.	Medium
TWE	issue	The high viewpoint feels impersonal. With a viewpoint closer to Paula I think it would feel more like you are playing Paula	Low
TWE	issue	The speech balloons disappear too fast	Medium
TWE	issue	The initial distance between the characters seems quite big, bigger than normal conversation distance.	Low
TWE	issue	It is strange that Paula keeps looking at the place where Marion used to be after Marion has moved away	High
TWE	issue	Paula should turn to Marion "before" she talks to her, not after	High
TWE	positive comment	Virtual environment looks good	
TWE	improvement	Camera angle is not intuitive, first person perspective would be more intuitive	
TWE	issue	Dialogue texts are a bit too quick	
TWE	issue	Camera movements are a bit too quick	
TWE	issue	Looking around in the environment is not possible	
TWE	positive comment	Dialogue selection interface looks good	
TWE	improvement	Replace the question marks with more intuitive symbols for the categories	
TWE	improvement	Bend the text with the interface	
TWE	improvement	Maybe put the dialogue selection interface in the corner; it's quite prominent in the middle, especially when folded out	

## FEEDBACK FOR POSTHCARD SIMULATION 0.4 (2019)

Contributor	Type (positive,issue,other)	Description	Severity
Lisa	issue	The game is quite slow right now, it takes a long time for Marion to react. The scene is also quite static, there is not a lot changing. Players might lose interest because of this.	Medium
Lisa	issue	I feel kind of lost when trying actions that don't have the desired effect on Marion. The player will need support in this. For example hints or an information page on how to cope with Alzheimer patients in certain situations.	High
Lisa	issue	Right now I don't know whether I am being nice or harsh to Marion. The actions should be arranged from nice (left) to harsh (right)	High
Lisa	issue	It would be easier to identify with Paula (and to have a higher level of immersion in the game) when you view the scene from Paula's perspective. For example by seeing Paula from behind, and Marion from the front. It would also help if the scene is displayed on eye level, and when the characters are closer to the player (right now the table is in the way).	Medium
Lisa	issue	The text in the menu is not entirely readable. The text should fit in the boxes. Better would be to have the text bent along the arc of the circle. Of course this is not an issue if we use the new interface design.	Medium
Liesbeth	issue	Currently the game is more about moving around in the room than about the conversation between Marion and Paula and learning from that. It would be nice if the user would get feedback on his/her behaviour with the facial expression of his/her conversation partner.	High
Liesbeth	issue	The categories are: influence for, ask to, harsh talk about, beg to, offer to, announce about... The category Harsh talk about seems not to belong in this list. It is already a result of a certain action. The other categories are about activities.	Medium
Mariet	positive comment	It looks quite good! Nice to see the other rooms.	
Mariet	issue	After playing for a little while, each time the game gets stuck and I get a black screen with an error message: "The network connection has ended for the following reason: Network ERROR: The scheduled pulse timed out. The server has not been responding for 10 seconds. If this was unexpected, please check your internet connection and restart." But I'm sure there's nothing wrong with my Internet connection.	High
Mariet	issue	When choosing "beg to" Paula says "I'm really sorry about all that" but it is unclear what she is apologizing for (doesn't fit the context)	Medium
Pia	issue	characters are a bit too small in comparison to the setting- furniture. It would be nice to see their faces properly. The walk of the characters is a bit strange (zigzag)	
Pia	other	bathroom: screen remains dark on my pc. Is this the bug?	
Pia	issue	i am sorry but i am still confused about how to use the simulation. Can we have instructions? If you click on a character, it becomes active and it is visualised by the blue halo. Active should mean that the person will say/ask something towards the other person by clicking on the wheel of activities? When a character reacts/says it is visualised how? When the conversation is going on between the 2. How will it be shown? I see square boxes in white and red.	High
Pia	positive comment	use of colors : warm, welcoming & characters are realistic & accessible & i like the new living room	
Pia	issue	When choosing "beg to" Paula says "I'm really sorry about all that" but it is unclear what she is apologizing for (doesn't fit the context)	
Pia	issue	Currently the game is more about moving around in the room than about the conversation between Marion and Paula and learning from that. It wo	High

## Feedback round on Menu v2.0

Describe the Issue/Feedback	(use Insert->Picture if needed or give link from where you stored the image)	Leaderboards
to perform an action		Before deadline
to the toilet) and there are no blue objects to click on. Second this, I have the same issue, running into a dead end in the game. There from this game if the result of my actions is not only shown by the reaction of the patient, but is also explained on the screen. When		Done
Downfloor can be changed to a term that is more like an action, leave room		Adapted
turn the light on when it is already on		After deadline
part of the conversation/actions, so closer to the things that happen, instead of looking at it from a distance. We should look into this in		Comment
backdrop except the thing you're hovering		Don't understand
I would add the same kind of glow on the door icon as on the other things that are clickable; it acts the same way		
are still hovering it and also other labels will appear behind the menu when hovering over them		
the menu, Google says it is possible in Unity		
the bathroom). It is done correctly for the magazine though		
quite some time. You need to have an indication as player that you have to wait till this animation is done to continue. Some kind of		
Sometimes, there are 2 similar options in a menu	<a href="https://i.imgur.com/gIQzSNG.png">https://i.imgur.com/gIQzSNG.png</a>	
ADD blue hover to 2nd level menu items as well, not only to the main menu items		
The camera angle on the bathroom is really bad. Also there is only one action visible	<a href="https://i.imgur.com/xTJ02c5.png">https://i.imgur.com/xTJ02c5.png</a>	
the hallway	<a href="https://i.imgur.com/FQU0Fw.png">https://i.imgur.com/FQU0Fw.png</a>	
At a certain moment, I've apparently clicked to much and I cannot click Marion anymore and the menu UI is broken	<a href="https://i.imgur.com/AILxX0.png">https://i.imgur.com/AILxX0.png</a>	
When an object is hovered, the round box appears far away, which is not good (better if the label appears closely)		
This same round box too much looks like a button, people want to click on it.		
to opacity the UI		
had short examples)		

## Feedback round on Menu V2.0 with bubbles

Who	Describe the Issue/Feedback	Graphical aid (use Insert->Picture if needed or give link from where you stored the image)
CCARE	Rendering of icons is quite rough, not sure if this is because it is a dev. version, but it would be nice if we can do some anti-aliasing or otherwise preprocessing (resizing) the images	<a href="https://i.imgur.com/eRcbFWD.png">https://i.imgur.com/eRcbFWD.png</a> Compare Unity version vs. Figma version of the same
CCARE	Lighting is still very poor (even with lights turned on). This makes it hard for people to navigate, e.g. to other rooms. Also it seems that lighting is depending on the moment of the day? It should be always consistent	<a href="https://i.imgur.com/awJpTps.jpg">https://i.imgur.com/awJpTps.jpg</a>
CCARE	Room navigation is inconsistent: from kitchen you can go everywhere, from other rooms, you can only go to adjacent rooms, would be logical to have the last on all rooms	
CCARE	Because the persons are always moving a bit (which is good), the camera also moves a bit all the time (this is fine as well). However, this phenomenon combined with the poor rendering results in weird artifacts	<a href="https://drive.google.com/open?id=16LCX_eduKAFVPr0PC6f7ubqQBWjNhttps://drive">https://drive.google.com/open?id=16LCX_eduKAFVPr0PC6f7ubqQBWjNhttps://drive</a>
CCARE	Suggestion to keep the UI more consistent: maybe we should always have the full-width menu bar when clicking (also when there is just one option), just to keep a more consistent UI element. If it always has the same (full) width, we can also properly align it in the center, which is more pleasing to the eye	<a href="https://i.imgur.com/vH5bcR0.png">https://i.imgur.com/vH5bcR0.png</a>
VIL	The game still has a 'helicopter view' instead of a view at eye height. Eye height view would help the user immerse in the scenario	
VIL	When I go the living room, the story breaks as well. There is no option to go back to the kitchen or to any other room	
VIL	If you don't want the user to start right away with opening the light (because then the story breaks), then the room should not be dark at the start of the game. It is better to have the light turned on already	
UNGE	Related to the previous comment (CCARE) regarding the slightly moving camera: sometimes, regardless of the rendering, it can make the bubble suddenly jump from one side to the other. Maybe a sort of damping/stabilizing mechanism would help.	
UNGE	The display of the roll-overed object/character's name in the center is not optimal. It almost encourages you to click on it.	
UT	Tiny remark about visuals: the smoke is a bit too prominent... (also because the room is so dark)	
UT	Marion's hands go through the table when she eats the meal, also the eating flow is very abrupt, the sandwich suddenly disappears	
UT	GUI works OK	
UT	It's still a bit slow with some waiting between turns. Maybe add a loading icon while it's busy.	
UT	About dead ends: after Marion has eaten the meal and gotten up there seems to be nothing you can do with her anymore, is that right? Currently, with only one menu item per category (for example, "ask" only expands "to take the knife") it is a bit counter-intuitive that you have to click twice, first on "ask" and then on "take the knife" to select it. But when there are more things you can ask, this won't be a problem anymore.	
UNGE	Cases when the simulation breaks: - When one immediately open the light - When one leaves the room once Marion is seated.	

2. Feedback on heuristic evaluations and MoSCoW (To be shared after heuristic evaluation)

3. Feedback from Alpha study (To be shared after Alpha study)

4. Feedback from Beta study (To be shared after Beta study)

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## 5. Age-related changes and digital gaming design guidelines for seniors (Nap & IJsselsteijn, 2012)

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Partially based on Bennett, Sekuler and Sekuler, 2007(a); Birren and Shaie, 2006(b); Brant and Fozard, 1990(c); Docampo Rama, 2001(d); Echt, 2002(e); Mead, Lamson and Rogers, 2002(f); Authors, 2008(g); Stuart et al., 2003(h))

<b>Ability</b>	<b>Age-related change</b>	<b>Guideline</b>
<b>Vision</b>		
Colour vision	Difficulty discriminating certain wavelengths, particularly blue-greens	Avoid blue-green and blue-yellow contrasts to increase perception of discriminating stimuli
Motion detection	Decrease in sensitivity to motion and identifying direction of movement	Support motion detection by other modalities (e.g. sound, vibration) to increase perception of and reaction to moving game content
Visual acuity	Decreased ability to resolve small details	Use large fonts (14-point size) to increase ease of reading of game interface concepts and in-game information. Avoid small objects, or provide zoom or enlarge options for perception and manipulation abilities of visual game content
Visual selection	Difficulty selecting relevant information in a display that contains relevant and irrelevant information	Provide smallest amount of functions necessary for game play to increase easy of use and decrease distraction
<b>Hearing</b>		
Auditory acuity	Pure-tone hearing loss, especially at higher frequencies in speech(c)	Avoid higher pitched sounds (> 1000 Hz), especially in speech, and offer crucial in-game information in multiple modalities to increase perception of game content.
Auditory selection	Decreased ability to separate speech from background noise(f)	Level-down background noise during in-game speech, and/or provide multiple modalities (speech and text)

**Motor Control**

Fine motor control	Decreased ability to manipulate small controls	Use large buttons (1.3 * 2.3 cm surface area) to increase the ability to navigate through menus
Vibration detection	Decreased vibrotactile sensibility	Increase force of tactile feedback or present feedback at high density receptor areas (e.g. fingertips, to increase perception of vibration feedback

**Cognition**

Computer self-efficacy	Little to intermediate experience with new technologies like the computer and low expectancies about performance	Provide positive feedback from start, especially for learning goals, to decrease stress and to increase self-efficacy
Language comprehension	Decreased language comprehension and/or experience with foreign languages	Provide native language in the game interface and in-game textual information, avoid technical expert language, and offer multiple modalities (speech and text) to increase function and game-content comprehension
Speed of processing	Decreased speed of cognitive processes	Reduce or adapt in-game speed or difficulty to seniors' abilities to increase playability
Technology Experience	Interface interaction based on interface experienced during the formative period in life, e.g. electro-mechanical interfaces, can cause difficulties interacting with today's interfaces(d)	Provide direct manipulation interaction devices, e.g. touch screen, single operation keys on keyboard/controller, or click & drag controllers (e.g. Stylus, WII mote) to increase ease of interaction with game interface and content. Avoid scrolling and Up Down buttons to improve navigation through game interface menus.
Working memory	Reduced ability to hold and operate on spatial representations in working memory	Use 1 information layer in game-interface to decrease distraction and disorientation. Reduce screen switching to decrease distraction and disorientation

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