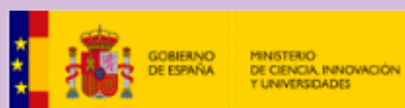


COGNIVITRA

D3.3 – PILOT ACCEPTANCE EVALUATION RESULTS

DOCUMENT ID - TYPE:	D3.3 (REPORT)	PROJECT TITLE:	COGNitive Vitality TRaining at home (COGNIVITRA)
DELIVERABLE LEADER:	IPN	GRANT AGREEMENT N°:	AAL-2018-5-115-CP
DUE DATE:	V1 - 30/04/2020 V2 – 31/01/2022	CONTRACT START DATE:	1 February 2019
DELIVERY DATE:	V1 - 30/04/2020 V2 – XX/XX/XXXX	CONTRACT DURATION:	36 Months
DISSEMINATION LEVEL:	Public	PROJECT COORDINATOR:	IPN
STATUS - VERSION:	Final – v1.00	LAST UPDATE:	11/08/2020



Luxembourg National Research Fund

(Page intentionally blanked)



AUTHORS - CONTRIBUTORS

Name	Organization
Alireza Emami	IPN
João Quintas	IPN

PEER REVIEWERS

Name	Organization
Lúcia Neves	IPN
Sérgio Sousa	IPN
Edwin Pesantes	PSSJD
David Benhsain	RHZ

REVISION HISTORY

Version	Date	Author/Organisation	Modifications
0.1	03.04.2019	Alireza Emami	Creation of document
0.2	15.04.2020	João Quintas	Update structure
1.0	30.04.2020	João Quintas	Release version (during COVID-19 pandemic)
1.1	11.08.2020	João Quintas	Short summary of tests performed in July 2020 (during COVID-19 pandemic)



GLOSSARY

ABBREVIATION	DESCRIPTION
AAL	Active Assisted Living
CTE	Cognitive Training Exercise
IANI	Interface and Advanced Natural Interaction
EIP	European Innovation Partnerships
AHA	Active and Healthy Ageing
MAF	Monitoring and Assessment Framework
HRQoL	Health Related Quality Of Life
CA	Consortium Agreement
WHOQOL	World Health Organization Quality of Life
CO	Coordinator; except when referring to a deliverable, in which case it refers to "Confidential", i.e. only for members of the consortium (including EC Services)
CR	Change Request
D	Demonstrator
DL	Deliverable Leader
DMS	Document Management System
DoA	Description of Action
Dx	Deliverable (where x defines the deliverable identification number e.g. D1.1.1)
EC	European Commission
ECAS	European Commission Authentication Service
EU	European Union
ExM	Exploitation Manager
EM	Ethics Manager



InM	Innovation Manager
FM	Financial Manager
GA	General Assembly
GRA	Grant Agreement
KPI	Key Performance Indicator
MC	Management Committee
MSx	project Milestone (where x defines a project milestone, e.g. MS3)
Mx	Month (where x defines a project month, e.g. M10)
MoM	Minutes of Meeting
O	Other
P	Prototype
IPN	Instituto pedro Nunes (Project Coordinator partner)
PM	Person Month (a unit to count workload)
PO	Project Officer
PP	Restricted to other programme participants (including the Commission Services)
PPM	Partner Project Manager
PU	Public
QA	Quality Assurance
QAP	Quality Assurance Plan
QM	QA Manager
R	Report
RE	Restricted to a group specified by the consortium (including Commission Services)
TL	Task Leader



ZBI

Zarit Burden Interview



Executive Summary

This document reports the results of the work executed in “Task 3.3 - Pilots assessment”. This task will run in parallel with the pilots with the objective to collect the necessary information for the validation of the COGNIVITRA implemented solution.

For the validation of the technology we plan to collect some information about its use, make questionnaires to the end-users, caregivers and others stakeholders to evaluate the social impact and the potential cost-effectiveness due to enhanced self-care, life-style and care management.

COGNIVITRA will be validated from the perspective of the co-design methodology, relating these activities to the discovery of relevant information about the usability and effectiveness of the solutions. We will take as reference the guidelines provided by the AAL Program, identifying the method of “Cognitive Walkthrough” and “Co-Discovery” (suggested in the AAL Program toolbox for the testing phase). “Cognitive Walkthrough” is an analytical inspection method for prototypes evaluation from the end-user view. The “Co-Discovery” method can occur in parallel with the Cognitive Walkthrough, usually with two end users who, as they use the system, express what they are thinking out loud.

In terms of the pilots' usability assessment tools, we will apply the instruments defined in D3.1. Additionally, this document also reports the main conclusions of pilot operation as defined in T3.2, which delivers D3.2 as a prototype.

This document has two planned versions, one will be reporting on the results up to M15, and the final version at M36.

Note about COVID-19 pandemic: The expected date of release (M15) was coincident with calendar month April 2020. Given the COVID-19 pandemic that spread all over Europe starting in early 2020, it also had a negative influence in COGNIVITRA implementation. Due to the enforced sanitary regulation that had to be applied in the involved organizations, it was impossible to proceed with pilot's implementation as planned initially. Hence, as a mitigation action, COGNIVITRA started being validated by care professional alone and remotely. Also, the prototype version that was tested by the involved professionals had to be adapted as a consequence of the disruption that occurred in the logistic chain, which imposed some delays in the development of the physical part of the prototype (e.g. some components had 1 month delay in shipping because China manufacturers stop production for some weeks in December 2019). Given these exceptional circumstances, the work being reported by M15 is a summary of the work that was possible to progress.



Table of Contents

Executive Summary	8
1. Introduction	11
1.1. Validating technology and assessing its usefulness, satisfaction and ease of use	11
2. Reporting of initial testing	12
2.1. MVP1 testing	12
2.2. MVP2 testing	12
2.2.1. Testimonies from testing partial MVP2.....	13
3. Conclusion	17
4. References	18



Index of Figure

NA

Index of Table

NA



1. Introduction

One of the main objectives of COGNIVITRA is the organization and execution of pilot trials in three (2 within the consortium and 1 external) realistic user environments, for validation and assessment of system's functionalities regarding user acceptance and technical/ business viability of the COGNIVITRA solution. This objective will be achieved in WP3 where three pilots, in Portugal, in Luxembourg and in Spain will be carried out. In Portugal, IPN will engage partners from Ageing@Coimbra (PT) in Coimbra region (e.g. Cáritas Diocesana de Coimbra (CDC) and IPN collaborated in previous pilots). One of the main goals, of involving an organization external to the consortium, will be to test the potential market by bringing the perspective of a potential customer that did not participate in the development of the solution. In Luxembourg, in the RehabZenterRehazenter. In Spain, the Parc Sanitari Sant Joan de Déu, located in Barcelona.

1.1. Validating technology and assessing its usefulness, satisfaction and ease of use

The aspects related with the validation of technology and assessing its usefulness, satisfaction and ease of use motivated a whole research field during the past two decades. In particular, in the context of human-computer interaction practices, the concept of user experience [Z42] has been widely used. The concept aims to embrace the total usage phenomenon of a system, product, or service, namely a digital solution, including the emotional impact that it can have in the users' lives [Z43]. For the International Organization for Standardization, user experience is related to the users' perceptions and responses (i.e., emotions, beliefs, preferences, perceptions, comfort, behaviors), that result from the use and/or anticipated use of a system, product, or service, which is dependent on each user personality and prior experiences, attitudes, skills, and abilities, as well as the context of use [Z44].

User experience is grounded mainly in intangible aspects, which means that different individuals and different usages of the same system, product, or service can result in different user experiences [Z45]. The user experience is, therefore, unique to each individual and for a specific moment in time, which means that the user experience is not able to be measured [Z45]. However, it is possible to operationalize this complex concept into different dimensions, which can then be characterized and assessed.

One of the most important components that contributes to and modulates the user experience of digital solutions is usability. According to ISO 9241-11, usability refers to the "extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" [Z46, p. 1-2]. In turn, assessment of usability is crucial to minimize the probability of errors and undesirable consequences, and to increase the probability of use by a large proportion of the target users [Z46,Z47]. In this respect, it should be noted that, when thinking about digital solutions to support healthcare, usability contributes to enhance patient safety and quality of care [Z48], although good assessment of usability is not a common practice [Z48,Z49,Z50].



2. Reporting of initial testing

2.1. MVP1 testing

The MVP1 version of COGNIVITRA was mainly tested by the technical partners and was presented in brief periods during the consortium meetings.

The technical achievements focused integration of most important components. In particular, the overall Graphical User Interface, where the Cognitive Exercises were side-by-side to the virtual agent with minimal interactive features (e.g. selecting between two choices using head movement).

Therefore, in this version of the prototype, most of the feedback was collected through the discussions between partners. Also, additional feedback about this version was collected at AAL Forum 2019, which contributed with valuable information to improve the prototype into MVP2 and main conclusions were reported in D1.1.



2.2. MVP2 testing

The MVP2 version of COGNIVITRA corresponded to the first development sprint that incorporated new features and improved the integration between components (i.e. software and hardware).

While in MVP1 our main focus was on fast integration to have a functional prototype very quickly, in MVP2 was all about reshaping features, incorporate state-of-the-art technology into the prototype and planning for the next iteration (i.e. MVP3 will incorporate newly identified features and will correct defects found during MVP2 testing).

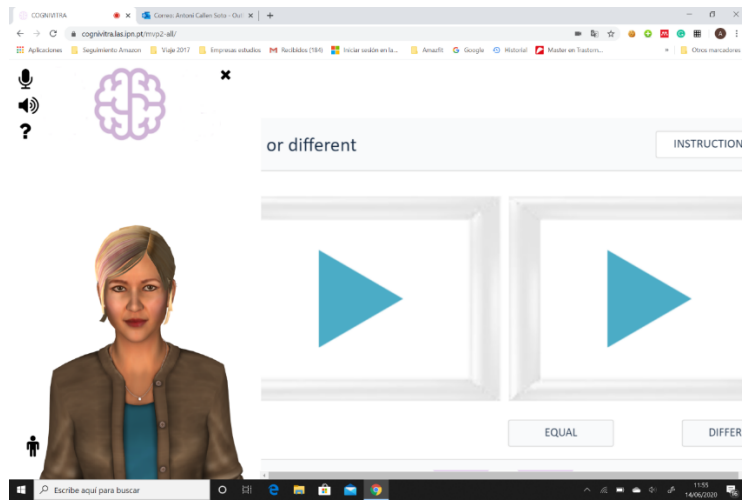
Following we present some feedback collected during July 2020, while our end-user partners were testing MVP2 in an independent use session.

Please note that this feedback refers testing a partial version of MVP2 that did not account for the hardware part, as it suffered from delays in shipping electronic components needed for assembling the prototype. The full MVP2 was made available to all partners by August 2020, as all components were received by IPN and successfully assembled into the COGNIVITRA Box. We expect different feedback after testing the full version of MVP2.

2.2.1. Testimonies from testing partial MVP2

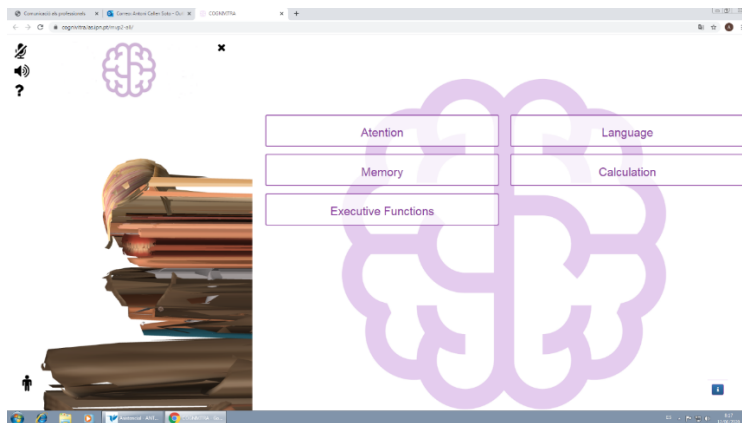
Dr. Antoni Callén:

I think the current version has greatly improved the platform both for content, there are many more exercises, and the environment. However, I have detected that in a mac environment it does not work, in Safari impossible and with Chrome it does not load the contents. I have tested on a laptop with Windows 10 and Chrome and it comes out CUT, as you can see here (you need to adjust the magnification but it is cropped):



In Windows 10 and Internet Explorer it does not load the exercises, and it takes much longer to enter the page.

The following screenshot is from a Hospital computer and this is what Rachel looks like, although the exercises can be performed correctly:



Do you have any recommendation of which is the most recommended browser? My impression, apart from the small bugs/errors, is that it can be Chrome, but I have not tried Opera or Mozilla.

The selection has not worked with the camera (sight) nor with my hand, only with the mouse.

I have shown it to the assistants that that work together with me with patients with cognitive deterioration and they liked it very much and they see it as a very useful tool.

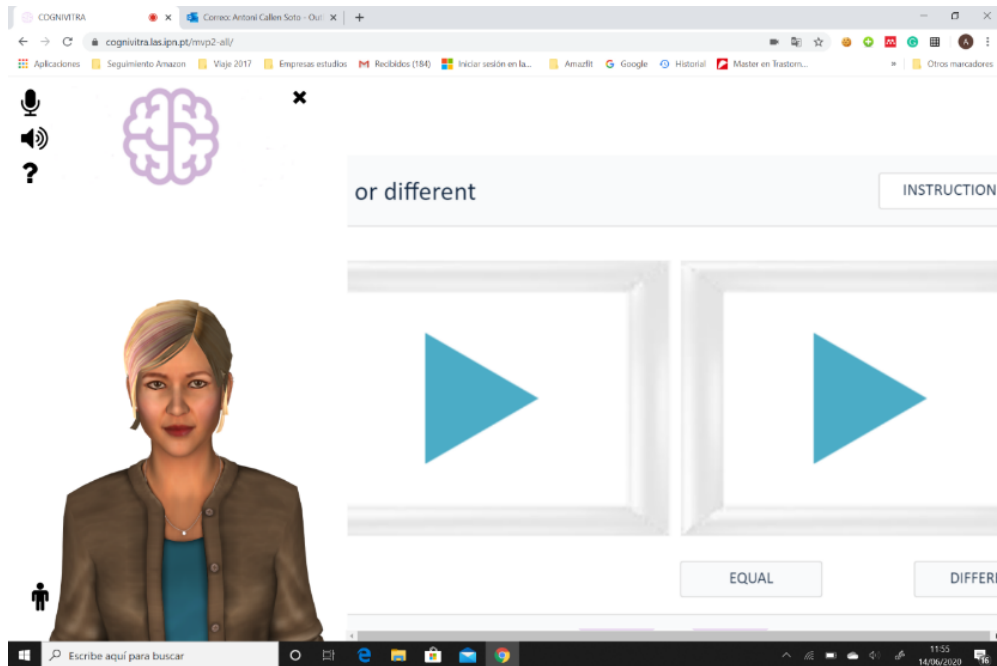
Dr. Edwin Pesantes:

In my case, I have tried with Chrome and Explorer (both in Windows 10) and these are my impressions:

In Chrome it takes a while to enter but in the end it loads the platform, I think this had already been seen when Joao entered the platform during the last TC.

The voice commands to Rachel are not always executed, initially it seems to work well but then it does not execute the commands.

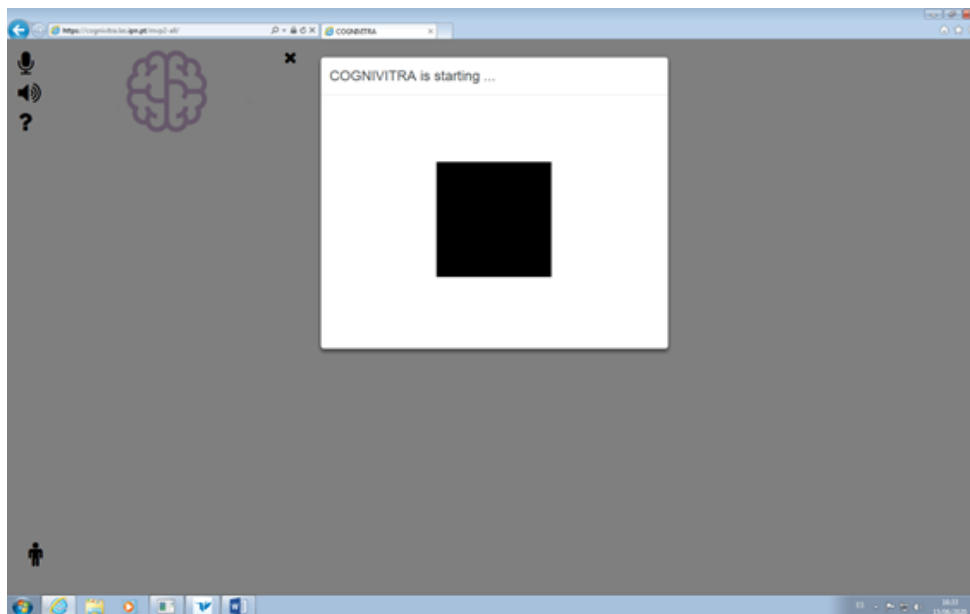
It happens to me the same as to Dr. Antoni Callén with the screen that appears cropped as seen in the image. It is easily resolved by reducing the image using the Ctrl-commands, with this you can see all the contents of the page, but it can be a problem if we take into account that the end-users will be the patients (patients with cognitive impairment or at risk)



In each game to pass the level, only one mistake is allowed. If more than one mistake is made, it is necessary to repeat the same level. I do not know if it was previously specified at any time. It is just a comment to take into account.

Once in a game I can't find the "go back" icon in case you want to go back to the main games screen, if you click on the back arrow (upper left part of the screen) it definitely comes out of the platform, at least that is what happens to me on the computer I have used (Windows 10 with Chrome).

In the case of Windows 10 with Explorer, I have definitely not been able to enter, the platform does not load and it is hanged up (See image):



Judit López: everything done with Windows 10 and Chrome browser

ATTENTION TO THE NUMBER and TO THE LETTER:

Number and letter: It do not work with the space key (nor touch screen, as I do not have it). Only with the mouse.

Tiles and Patters: Rachel does not explain (voice) the instruction in these two games.

MEMORY:

- News Time: is not working (nothing to listen)

3. EXECUTIVE FUNCTIONS:



- Inside outside: the instructions are read simultaneously two times by Rachel. It does not work with arrows in the keyboard. Only with the mouse.
- At the right moment: It does not work with the space key (nor touch screen, as I do not have it). Only with the mouse.
- Opposites: the instructions are read simultaneously two times by Rachel. It does not work with arrows in the keyboard. Only with the mouse.
- Into the sea: It does not work with the space key (nor touch screen, as I do not have it). Only with the mouse.

CALCULATION:

- Maths: is not working (nothing to listen)

GENERAL:

Once Rachel is explaining you the instructions of a game, if you change the game, Rachel continues with the last explanation (she does not stop and starts the new game until she has finished the previous explanation). Maybe it would be confusing for the patients.

The sound of a correct answer sometimes it seems a bit noisy to me (acute sound) when you have many correct answers together (personal opinion).

Once you are doing an exercise in one level (ex. Level 5) you cannot change the level until you have finished this level (example: if you think it is too easy for you, you cannot change to a more difficult one until you have completed the 20 exercises for this level).

Also, if I am right, you cannot see the total number of different levels for each exercise (ex. 20? 15? 50?).

Once you have done several voice instructions to Rachel that she does not understand, she stops "listening" to more instructions.

In some games you have the time you have to answer, but not in others (just a comment).



3. Conclusion

This document summarizes the work performed in terms of validation and acceptance of the developed technology.

It refers mainly to initial user experience from health and care professionals, from end-user partners in the consortium, as they firstly experienced with the available version of COGNIVITRA prototype at month M15. In particular, this corresponds to a partially available MVP2 (i.e. the software part that could be available online). Due to COVID-19 pandemic, and the particular situation in Europe during the months that were initially planned to validate the technology, it created a force major situation and is considered the reason that did not allow the consortium to progress as expected.

Nevertheless, it was possible to validate some essential aspects of the technology and identify new requirements that were not anticipated at the beginning of the project. For example, the value perceived in having a video-conferencing feature is much greater now than before the project.

Overall, some of the key finding that were possible to collect during the work in T3.3 helped updating other deliverables, namely D1.1, D1.2, D2.1 and D4.2.

This document will be updated as new information will be collected throughout the validation process of COGNIVITRA solution.

The consortium will report on the latest findings later in the project, with expected release by month M36 (i.e. note that this date may change depending on the progress we can achieve to mitigate the negative impact of the delays caused by COVID-19 pandemic).



4. References

- Z42. Norman, D. A. The design of everyday things (Revised an). Basic Books, 2013.
- Z43. Hartson, R.; Pyla, P. The UX Book: Process and Guidelines for Ensuring a Quality User Experience. Morgan Kaufmann, 2012. [<https://doi.org/10.1016/C2010-0-66326-7>].
- Z44. International Organization for Standardization. Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems (ISO 9241-210:2019). International Organization for Standardization, 2019. [<https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-2:v1:en>].
- Z45. Kim, J.; Park, S.; Hassenzahl, M.; Eckoldt, K. The Essence of Enjoyable Experiences: The Human Needs A Psychological Needs-Driven Experience Design Approach. In Design, User Experience, and Usability; A. Marcus, A., Eds.; Springer-Verlag: Berlin Heidelberg, 2011, pp. 77–83. [https://doi.org/10.1007/978-3-642-21675-6_9].
- Z46. International Standards Organisation. Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts (ISO 9241-11: 2018). International Organization for Standardization, 2008.
- Z47. Bevan, N.; Carter, J.; Earthy, J.; Geis, T.; Harker, S. New ISO standards for usability, usability reports and usability measures. In Proceedings of the 2016 International Conference on Human-Computer Interaction (HCI'2016), Toronto, Canada, 17 - 22 July 2016. Springer: Cham. [https://doi.org/10.1007/978-3-319-39510-4_25].
- Z48. Middleton, B.; Bloomrosen, M.; Dente, M.A.; Hashmat, B.; Koppel, R.; Overhage, J.M.; Payne, T.H.; Rosenbloom, S.T.; Weaver, C.; Zhang, J. Enhancing patient safety and quality of care by improving the usability of electronic health record systems: Recommendations from AMIA. J. Am. Med. Inform. Assoc. 2013, 20, e2-e8. [<https://doi.org/10.1136/amiajnl-2012-001458>].
- Z49. Davis, T. L.; DiClemente, R.; Prietula, M. Taking mHealth forward: examining the core characteristics. JMIR mHealth and uHealth 2016, 4, e97. [<https://doi.org/10.2196/mhealth.5659>].
- Z50. Behler, R.: Military Healthcare System (MHS) GENESIS Initial Operational test and Evaluation Report. Available online: https://www.nextgov.com/media/gbc/docs/pdfs_edit/051118letterng.pdf, (accessed on 16 June 2020).

