

Co-Care

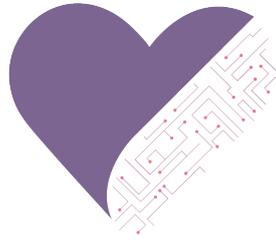
2022

Training Course



Co-Care

Co-created ICT solutions for Alzheimer's Informal Caregiving



Co-Care
SHARE TO EVOLVE, CONNECT TO REMEMBER

612532-EPP-1-2019-1-ES-EPPKA2-KA

Please cite this document as: Ramon-Aribau, A.; Soares, C.; Garip, G.; Cross, A.; Mas, G.; Piromalli, D.; Cavaleiro, A.M.; Nobrega, L.; Capper, C.; Shields, C.; (2021) Training Course. Deliverable 3 of the Co-Care project funded by Erasmus+ Program of the European Union GA No: 612532. Available at: on demand.

Table of Contents

List of tables	3
Executive Summary	4
1.- About this document	6
2.- Introduction	7
3.- Content of the Training Course.....	10
3.1.- Detailed content of the sections	12
Topic – 1.- Health and technology context.....	12
Topic – 2.- Basic skills for digital solutions development for health.....	20
Topic – 3.- Design & development of digital solutions for health.....	24
4.- Participants.....	33
4.1.- Students	33
4.2.- Faculty	33
4.3.- Community	35
5.- Modalities of teaching.....	37
5.1.- Presence-based model	37
5.2.- Online model	38
5.3.- Hybrid model	38
6.- European added value	40
7.- Sustainability.....	42
8.- Conclusion	44

List of tables

Table 1. Content details of the training course	9
---	---

Executive Summary

This document justifies why it is necessary to have a training course in our university education systems that brings together future technologists, health and social care professionals and current end users, in this case, caregivers of people with Alzheimer's / dementia, to learn how to propose, design, develop and evaluate technological solutions in a co-created way, including relevant actors, multidisciplinary and evidence-based manner.

To achieve this, content organized in three large blocks is proposed. The first refers to the general context in which technological solutions will be created for caregivers of people with Alzheimer's. This block will also show how to find relevant information in the field and recent events, see in what health context they will be, including specific examples of technology existing either by the specific group (caregivers of people with Alzheimer's/dementia) or in its absence by similar population. Finally, it will highlight strategies to evaluate the products created to give them credibility that can really serve the purpose of each product. The second refers to the specific skills that students need to be able to develop their products such as skills related to teamwork, project management and creativity. The third block refers to the way of making the product through co-creation and using a user-centred approach, as well as processes that must be done in the creation of new products such as prototyping, evaluation of the product impact and new product development.

In this training course proposal, following the principles of the Co-Care project, we find three different groups of actors that must always be present: Students, faculty, and community. The profile of students and teachers must be in the areas of health and technology, with the participation of other areas being possible in the future. When we talk about the community, we refer to those actors who are the stakeholders around the topic of interest: the caregivers of people with Alzheimer's / dementia.

There could be three types of teaching: presence-based modality, fully online or a hybrid model between the two. All are possible and all have advantages and disadvantages.

They are all presented and the one that suits each moment best can be adopted according to the circumstances of the context.

The European dimension is clearly an added and important value, but it poses certain challenges that need to be considered, such as administrative, calendar or linguistic.

Sustainability is also important, as with any project, so there are several options. Its inclusion in the subjects of the degrees as an optional subject, its conversion into an intensive course within the regular offer of intensive courses that already exists, the incorporation of internships as a tool to give more weight to the practical part and generate more interest in technology students or offer it to graduate students in an entire graduate course.

The training course presented here tries to teach and practice the principles of co-design in the field of health and social care in such a way that all actors involved can together contribute to maximizing the knowledge of each other to achieve better results. At the same time, it contributes to cooperation between disciplines and expertise in official degrees, which is often difficult. And we can say that it covers what is needed to propose, design, develop, and evaluate specific interventions to solve a real problem, while making participants do so in a co-created, multidisciplinary, and evidence-based manner.

1.- About this document

This document is structured as follows:

- **Chapter 2:** There is an introduction that provides a framework for the content presented in the training course.
- **Chapter 3:** It is explained how the syllabus of the course is organized and its structure is presented. This structure is then detailed in each of the sections, explaining its purpose, a summary of what can be found, the basic concepts, the basic and complementary material.
- **Chapter 4:** A description is made of the profiles of the participants that must be in the course according to the functions they assume.
- **Chapter 5:** The different teaching modalities are presented, and their advantages and disadvantages are analysed.
- **Chapter 6:** The meaning of the European dimension of the course is explained and the implementation options are presented to guarantee this European added value.
- **Chapter 7:** The forms that the course can take to make it sustainable over time are presented.
- **Chapter 8:** The main conclusions of the document in relation to the training course are presented.

2.- Introduction

In WP1 results (<https://co-care.eu/en/reports>) it was found that in the last five years there has been an investment from associations, companies and universities to address the constraints and difficulties felt by informal caregivers in their daily life, but that there is still room for further development. The solutions found in literature provide technological tools that may improve the practical life and well-being of caregivers, namely educational resources and development of competences, psychological health and social engagement. It was also found that there are available solutions focusing on specific needs of caregivers, like planning, personal health, caregiving tasks, informal relationships, and relationships with formal services providers. However, and considering the typology of caregivers needs of Queluz et al. (2020)¹, we are still lacking technological/digital resources in many relevant domains, such as physical health of the carer, juggling responsibilities, crisis planning and information about legal regulation in caring, to mention some. Considering the purpose and following the typology of Lorenz et al. (2019)², most categories can be found in literature, however self-care of the carer and treatments and interventions delivery seem to receive less attention from stakeholders and developers. Results clearly show that participatory methods and approaches centred in processes of co-creation are not yet implemented in this field of research. In fact, in 85% of the literature found, the key terms focusing on co-design processes are absent. Results focusing on how caregivers are included in the process of design also show that their involvement is mostly passive. In fact, when caregivers are included, they are mainly requested to contribute to aspects of refinement and potential improvement of solutions. The actual participation in the design phase is still scarce.

To conclude, there is space to improve user-led design and co-creation needs in the process of designing ICT solutions focusing on the informal caregiving of Alzheimer patients.

¹ Queluz et al. (2020). Understanding the needs of caregivers of persons with dementia: a scoping review. *International Psychogeriatrics*, 32(1): 35–52. doi:10.1017/S1041610219000243

² Lorenz, K. et al. (2019). Technology-based tools and services for people with dementia and carers: Mapping technology onto the dementia care pathway. *Dementia*, 18(2): 725–741. Doi: 10.1177/1471301217691617

If we look at the evolution of these participatory models, we see how there has been a shift in the manufacturing industry since the 1970s. Firstly, to move from designing products for people (supplier-centred design) to designing them with people's needs in mind (user-centred design), to more recently designers, suppliers and consumers coming together to look at a problem and design a solution together (co-design). The benefits of adopting co-design principles in healthcare were outlined by several authors^{3,4,5} and models were proposed to identify key stakeholders to be involved in co-producing healthcare for example at a national level⁶.

Co-design in healthcare can involve the equal partnership of individuals who work within the system (healthcare staff), individuals who have lived experience of using the system (patients and their families/carers) and the 'designers' of the new system (whether that be IT personnel in terms of electronic platforms to improve efficiency or researchers in terms of designing interventions to improve health systems). Co-design involves working together to design a new product, making full use of each other's knowledge, resources, and contributions to achieve better outcomes or improved efficiency⁷.

It is therefore of the utmost importance to create convening spaces for bringing together ICT solutions designers and providers and users, but also to develop practical guidance on how to implement design-enabled co-production. To do this, the start-up approach - which focuses on the rapid and iterative development of small but scalable

³ Davies, N., Mathew, R., Wilcock, J., Manthorpe, J., Sampson, E.L., Lamahewa, K., Iliffe, S. A co-design process developing heuristics for practitioners providing end of life care for people with dementia. *BMC Palliat Care*. 2016 Aug 2; 15:68.

⁴ Blackwell, R.W., Lowton, K., Robert, G., Grudzen, C., Grocott, P. Using Experience-based Co-design with older patients, their families and staff to improve palliative care experiences in the Emergency Department: A reflective critique on the process and outcomes. *Int J Nurs Stud*. 2017 Mar; 68:83-94.

⁵ Manikam, L., Shah, R., Reed, K., Santini, G., Lakhanpaul, M. Using a co-production prioritization exercise involving South Asian children, young people and their families to identify health priorities requiring further research and public awareness. *Health Expect*. 2017 Oct; 20(5):852-861.

⁶ Batalden, M., Batalden, P., Margolis, P., Seid, M., Armstrong, G., Opiari-Arrigan, L., Hartung, H. Coproduction of healthcare service. *BMJ Qual Saf*. 2016 Jul; 25(7):509-17.

⁷ Bovaird, T., Loeffler, E. From engagement to co-production: How users and communities contribute to public services. In: Brandsen T., Pestoff V., editors. *New Public Governance, the Third Sector and Co-Production*. Routledge; London, UK: 2012.

projects – is the most suitable one. Naturally, start-ups are intrinsically linked with Higher Education Institutions (HEIs)⁸. Nevertheless, few experiences of entrepreneurship and innovation in classrooms involving users and companies collaborating with students and teachers exist⁹. ICT, health and social care undergraduate programs are still very isolated from one another with few collaborative opportunities in the curriculum to solve real life challenges from a multidisciplinary perspective.

For these reasons, the following training program is proposed. The main objectives of the course are in line with the original project idea that it is necessary to encourage specific technological solutions/products for caregivers of people with Alzheimer's/dementia to be exclusively aimed at covering needs, and unmet needs, as well as made from start to finish with the people who will eventually use them. Following this idea, the objectives of the course are:

- To provide the knowledge and skills necessary to be able to propose, design, develop and evaluate interventions to solve a real need.
- To make sure that the intervention is co-created with all the relevant actors involved in a multidisciplinary and evidence-based way.

⁸ Alfred R, Thirolf K, Harris N, Webb J. (2012) Performance: The dynamic of results in postsecondary organizations. Maryland: Rowman & Littlefield Publishers, Inc.

⁹ Jarna Heinonen, (2007) "An entrepreneurial-directed approach to teaching corporate entrepreneurship at university level", Education + Training, Vol. 49 Issue: 4, pp.310-324, <https://doi.org/10.1108/00400910710754453>

3.- Content of the Training Course

The content is organized into three major blocks. The first refers to the general context in which technological solutions will be created for caregivers of people with Alzheimer's. Also how to find relevant information in the field and recent events, what health context they will be, specific examples of technology existing either by the specific group (caregivers of people with Alzheimer's/dementia) or in its absence by similar population and lastly strategies to be able to evaluate the products created to give them credibility that can really serve the purpose of each product. The second refers to the specific skills that students need to develop their products such as skills related to teamwork, project management and creativity. The third block refers to the way of making the product through co-creation and using the user-centred approach, as well as processes that must be done in the creation of new products such as prototyping, evaluation of the product impact and new product development.

Detail of the titles of the blocks, sections it contains, and content seen in each can be seen in Table 1. After the table, a detailed explanation of each section is presented where the objective is explained, a summary of its content, the basic concepts that will be worked on, the basic material and the complementary if any.

Table 1. Content details of the training course

1.- Health and technology context	1.1.- Identification of breakthroughs in Life Sciences & Healthcare	To know how to look for the latest advances in health and technology, from the specific context to which we want to work: family caregivers of people with Alzheimer's
	1.2.- Healthcare Systems and contexts	How the solutions that will be proposed to the identified needs must be immersed and adjusted to a context such as local healthcare system and specific context of final users. Specific training in dementia and Alzheimer's as it is the person cared for by caregivers
	1.3.- Existent technology solutions	Examples of eHealth & mHealth, artificial Intelligence and other technologies to know what it is, the potential it has, and existing practical examples included those that have been adopted and why

	1.4.- Health Technology Assessment	To know how to make the proposed solutions transferable in a rigorous and evidence-based way there are assessment procedures that need to be known and passed. Data protection issues, and other ethical considerations
2.- Basic skills for digital solutions development for health	2.1.- Team building	Tools to move forward with the team during the course, through all processes, from building to final presentation and own evaluation, working especially on multidisciplinary teams, and introducing the practice of team building in online environments
	2.2.- Management strategies	Tools and practical examples on how to govern tasks and people to support project development
	2.3.- Creativity strategies	Tools and practical examples on how to use creative strategies in design and development of solution processes
3.- Design & development of digital solutions for health	3.1.- Co-creation	To know in a practical way what the co-creation process consists of and to establish it as a norm in future designs in professional practice
	3.2.- User-centred approach	To understand user-centred approach to know the search strategies to be able to know the needs of the people to whom the intervention will be directed considering accessibility
	3.3.- Prototyping	To know how to develop a minimum viable product to check the feasibility of the idea and product
	3.4.- Evaluation and Impact	To know approaches and tools to conduct a monitoring strategy to evaluate the design and its impact
	3.5.- New product development (NPD)	The complete process of bringing a new product to scale it up to the market, including the communication process

3.1.- Detailed content of the sections

Topic – 1.- Health and technology context	
<i>Subtopic – 1.1.- Identification of breakthroughs in Life Sciences & Healthcare</i>	
Aim	The aim of this subtopic is to know how to look for the latest advances in health and technology in general and from the specific context to which we want to work: family caregivers of people with Alzheimer's
Summary	It will be seen that there are two different sources, one from an academic point of view and the other from already existing non-academic institutions who work on this field. In this second option we have international sources and national sources. It will be shown how to use them. It will also include how information can be stored, managed and analysed to make it agile through reference manager programs.
Basic concepts	<u>Academic databases</u> <u>Non-academic databases</u> <u>Reference manager programs</u> : such as Mendeley

Basic material

Video – Academic sources: Video about what are the main health, technology or general databases (IEEE, ACM Portal, Science Direct, WOS, PubMed) to proceed with the search and how to find, access and navigate within these databases.

Video - Resources on how to save the material found in the bibliographic reference manager and guidelines for its storage and subsequent use.

Non-academic sources: List of places to look at (*to be updated in each edition*):

- HealthTech: <https://healthtechmagazine.net/>
- Forbes: <https://www.forbes.com/sites/bernardmarr/2019/11/01/the-9-biggest-technology-trends-that-will-transform-medicine-and-healthcare-in-2020/?sh=28a7a0ff72cd>
- UIC: <https://healthinformatics.uic.edu/blog/5-emerging-technologies-and-their-impact-on-health-informatics/>
- Medical futurist: <https://medicalfuturist.com/ten-ways-technology-changing-healthcare/>
- Coxblue: <https://www.coxblue.com/17-technology-advances-that-will-influence-the-future-of-digital-healthcare/>

- Medical Technology Schools: <https://www.medicaltechnologyschools.com/medical-lab-technician/top-new-health-technologies>

Topic – 1.- Health and technology context	
<i>Subtopic – 1. 2.- Healthcare Systems and contexts</i>	
Aim	The aim of this subtopic is to know how the solutions that will be proposed to the identified needs must be immersed and adjusted to a context such as local healthcare system and specific context of final users.
Summary	Here we will see what kind of health framework we have in terms of general health status in Europe as international context, but also in your own country. Then we will look at the status specifically for dementia and Alzheimer’s and caregivers as our target population. The first part of the topic will be devoted to understanding health status at European, national, and more local level if possible. This is how current health challenges are understood where there is a significant presence of mental health related issues. The second part of the topic will be devoted to understanding the situation of dementia and Alzheimer’s in particular, in the world, at the country level and if possible local. There is a special mention of comorbidities as they are common in the population we are talking about. Then special attention is paid to the caregiver population. Here we will see a conceptualization of informal care and its impact on health and their needs, as well as the profile and number of caregivers. Then this will be put it in national/local context.
Basic concepts	<p><u>Health status</u>: main health challenges at European, national, and local level.</p> <p>Alzheimer’s status: How Alzheimer’s / dementia impact our societies in international, national/local level.</p> <p><u>Alzheimer’s disease</u>: main issues regarding the impact of Alzheimer’s in those living with the disease.</p> <p><u>Comorbidities</u>: What is comorbidity and how it occurs in the group of people with dementia/Alzheimer's.</p> <p><u>Informal care</u>: A definition of what we mean by informal care.</p> <p><u>Health status of informal caregivers</u>: What are the main health effects on caregivers at European/national/local level.</p> <p><u>Needs of informal caregivers</u>: Identification of their main needs in order to improve their quality of life.</p>

Basic material

Health Status

- International: World health challenges: <https://streamable.com/mhpdk>
- Europe:
 - From the document: OECD/EU (2018), Health at a Glance: Europe 2018: State of Health in the EU Cycle, OECD Publishing, Paris.
https://doi.org/10.1787/health_glance_eur-2018-en
 - A - Executive summary (Pages 11-14)
 - B – Chapter 1. Promoting mental health in Europe: Why and how? (Pages 19-40)
 - C – Chapter 3. Health Status, Dementia prevalence (Pages 108-109)

Dementia and Alzheimer's

- Alzheimer's Disease International (2015), World Alzheimer Report 2015. The Global Impact of Dementia:
 - A – Summary (Pages 1-5)
 - B – Chapter 5. The impact of dementia worldwide
- Alzheimer's association: <https://www.alz.org/alzheimers-dementia/what-is-alzheimers>
- Dementia Statistics: <https://www.dementiastatistics.org/statistics/comorbidities/>
- Dementia Experience Toolkit: <https://www.alzheimers.org.uk/dementia-professionals/dementia-experience-toolkit>

Caregivers

- International:
 - Lindeza P, et al. Impact of dementia on informal care: a systematic review of family caregivers' perceptions. *BMJ Supportive & Palliative Care* 2020; 0:1–12. doi:10.1136/bmjspcare-2020-002242
 - Family caregivers of people with dementia: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3181916/>

Europe:

- European Union, 2018. Informal care in Europe. Exploring formalization, availability and quality. Luxembourg: Publications Office of the European Union, 2018
 - A. Executive Summary
 - B. Chapter 2. Background, epigraphs 2.1, 2.2 and 2.4.
 - C. Chapter 4. Availability of Informal Care in Europe, epigraph 4.1.

Complementary materials

- OECD/EU (2018), Health at a Glance: Europe 2018: State of Health in the EU Cycle, OECD Publishing, Paris. https://doi.org/10.1787/health_glance_eur-2018-en
- OECD/European Observatory on Health Systems and Policies (2019), España: Perfil sanitario nacional 2019, State of Health in the EU, OECD Publishing, Paris/European Observatory on Health Systems and Policies, Brussels.
- Alzheimer's Disease International (2015), World Alzheimer Report 2015. The Global Impact of Dementia.
- Ruth Bartlett & Tula Brannelly (2019) Life at Home for People with a Dementia. NY: Routledge.
- Dementia: comorbidities in patients - data briefing (UK case): <https://www.gov.uk/government/publications/dementia-comorbidities-in-patients/dementia-comorbidities-in-patients-data-briefing>
- Rees, J. L., Burton, A., Walters, K. R., Leverton, M., Rapaport, P., Herat Gunaratne, R., Beresford-Dent, J., & Cooper, C. (2020). Exploring how people with dementia can be best supported to manage long-term conditions: a qualitative study of stakeholder perspectives. *BMJ open*, 10(10), e041873. <https://doi.org/10.1136/bmjopen-2020-041873>
- European Union, 2018. Informal care in Europe. Exploring formalization, availability and quality. Luxembourg: Publications Office of the European Union, 2018.
- Andrew P Allen, Maria M Buckley, John F Cryan, Aoife Ní Chorcoráin, Timothy G Dinan, Patricia M Kearney, Rónán O'Caomh, Mareeta Calnan, Gerard Clarke, D William Molloy, Informal caregiving for dementia patients: the contribution of patient characteristics and behaviours to caregiver burden, *Age and Ageing*, Volume 49, Issue 1, January 2020, Pages 52–56, <https://doi.org/10.1093/ageing/afz128>
- Isla Rippon, Catherine Quinn, Anthony Martyr, Robin Morris, Sharon M. Nelis, Ian Rees Jones, Christina R. Victor & Linda Clare (2020) The impact of relationship quality on life satisfaction and well-being in dementia caregiving dyads: findings from the IDEAL study, *Aging & Mental Health*, 24:9, 1411-1420, DOI: 10.1080/13607863.2019.1617238
- Dementia diaries: <https://dementiadiaries.org/>
- Building a Care Ecosystem:
 - <https://memory.ucsf.edu/research-trials/professional/care-ecosystem>
 - <https://ucsf.app.box.com/v/CurriculumFINAL/folder/7649063766>

Topic – 1.- Health and technology context	
Subtopic – 1.3.- Existent technology solutions	
Aim	The aim of this subtopic is to see examples of eHealth & mHealth, artificial Intelligence and other technologies for healthcare in order to know what it is, the potential it has, and existing practical examples including those that have been adopted and why.
Summary	We will start with a definition of healthcare technology and the uses of it and a proposal of classification in order to have some structure. We will see concrete examples that already exist.
Basic concepts	<p><u>Healthcare technology</u>: A definition of what healthcare technology means.</p> <p><u>Uses of healthcare technology</u>: Specific ways which technology can be used in healthcare.</p> <p><u>Ways of classifying healthcare technology</u>: Classification framework of healthcare technology.</p>

Basic material

Healthcare Technology definition and uses

- What do we mean by healthcare technology and Healthcare Technology Uses: <https://builtin.com/healthcare-technology>
- WHO guideline: recommendations on digital interventions for health system strengthening. Geneva: World Health Organization; 2019. License: CC BY-NC-SA 3.0 IGO.
 - Chapter 4, section 4.3. Overarching implementation considerations (Pages 81-85)
 - Chapter 3, section 3.1. Cross-cutting acceptability and feasibility findings, Subsection Acceptability and feasibility for clients/individuals (Page 37 of the document 61 in the pdf)

Healthcare Technology classification

- World Health Organization (2018). Classification of digital health interventions. Geneva: World Health Organization; (WHO/RHR/18.06). Licence: CC BY-NC-SA 3.0 IGO.

Existing examples

- Video - Short video explaining the WP1 report

Complementary materials

- Mobile Apps for Caregivers of Older Adults: Quantitative Content Analysis:
<https://mhealth.jmir.org/2018/7/e162/>
- Care of family caregivers of persons with dementia (CaFCa) through a tailor-made mobile app: study protocol of a complex intervention study:
<https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-020-01712-7>
- Research and innovation in the field of ICT for health, wellbeing and ageing - An overview:
https://ec.europa.eu/information_society/newsroom/image/document/2019-33/health_ageing_projects_list_2019_6BC92EFF-90F3-8A94-09FBFA3C4DFD150E_61321.pdf

Topic – 1.- Health and technology context	
Subtopic – 1.4.- Health Technology Assessment	
Aim	The aim of this subtopic is to know how to make the proposed solutions transferable in a rigorous and evidence-based way, there are assessment procedures that need to be known and passed.
Summary	It is necessary to follow a methodology that standardizes the process and ensures a minimum so that it cannot harm people. For this reason, we will look at what do we mean by Health Technology Assessment (HTA) and the standards within the International level. The main dimensions to evaluate are always: clinical effectiveness, safety and cost and economic evaluation. But other dimensions related to ethics, organization, society, patient and legality need to be considered.
Basic concepts	<u>Health Technology Assessment</u> : Know what it is and what dimensions it includes. <u>Tools for HTA</u> : Know how to identify and apply tools for HTA

Basic material

HTA meaning

- General - HTA Definitions: https://apps.who.int/iris/bitstream/handle/10665/44564/9789241501361_eng.pdf;jsessionid=4769D0B3A3823B998958F04000799C33?sequence=1
- Examples - Global Survey on Health Technology Assessment by National Authorities: https://www.who.int/health-technology-assessment/MD_HTA_oct2015_final_web2.pdf?ua=1

HTA standards and tools

- Final validated Standards Tool for Registries in HTA prepared.

Data Ethics

- Vallor, Shannon. "An Introduction to Data Ethics." Markkula Center for Applied Ethics Website, January 23, 2018. Available at: <https://www.scu.edu/media/ethics-center/technology-ethics/IntroToDataEthics.pdf> (Introduction, Pages 2-6)

Complementary material

European Network for Health Technology Assessment: <https://eunethta.eu/>
Eunetha – Companion guide: <https://eunethta.eu/eunethta-companion-guide/>

Designing Without the -isms: How Tech Inclusion Benefits Society:

<https://ieeetv.ieee.org/video/designing-without-the-isms-how-tech-inclusion-benefits-society-ieee-techethics-panel>

World Health Organization (2016), From innovation to implementation. eHealth in the WHO European Region.

- Chapter 3 describes how national and cross-border telehealth is being used in Member States, also an overview of telehealth programmes and services and information on evaluations of governments sponsored telehealth programmes, reported barriers to implementing telehealth. (Pages 31-39)
- Chapter 4 provides an overview of mHealth programmes and the barriers to implementing them reported by Member States. (Pages 41-52)
- Chapter 8 examines national legal frameworks addressing matters related to health care, such as medical jurisdiction, patient safety, the protection of patient data and the reimbursement of eHealth services. The chapter also discusses collection, use and reuse of data as elements of eHealth, which require legal frameworks to define roles and create certainty in the relationship between health care providers and consumers. (Pages 77-82)

Topic – 2.- Basic skills for digital solutions development for health	
<i>Subtopic – 2.1.- Team building</i>	
Aim	The aim of this subtopic is to give tools/mechanisms/resources to move forward as a team during all the processes developed in the course, from team building to final presentation and self-evaluation, working especially in multidisciplinary teams. The practice of team building in online environments will be introduced.
Summary	We will see one of the most known framework theory of team performance which says that effective teamwork relies less on qualifications and experience and more on a complementary mixture of interpersonal styles. Meredith Belbin’s original studies introduced an easily understood framework for analysing the complex interactions involved in group work and increasing the chances of success in any team endeavour. Through the completion of a questionnaire, we will analyse the role of each member of the team and, once the mandatory activity has been carried out, we will reflect on it within the team.
Basic concepts	<u>Belbin’s team roles</u> : To know what roles there are and what potentialities and limitations they have.

Basic materials

- Video – Short explanation on Belbin Roles: <https://www.youtube.com/watch?v=7LunroajlLE>
- Text. Team Roles in a Nutshell: <https://www.belbin.com/media/1336/belbin-for-students.pdf>
- Belbin’s Questionnaire

Complementary material

- Team assessment: https://www.mindtools.com/pages/article/newTMM_84.htm
- Belbin’s webpage: <https://www.belbin.com/about/belbin-team-roles>

Topic – 2.- Basic skills for digital solutions development for health	
<i>Subtopic – 2.2.- Management strategies</i>	
Aim	The aim of this subtopic is to give tools and practical examples on how to govern tasks and people to support a project development.
Summary	We need to understand that innovation in today’s connected world does not just mean launching new products and services. It also means new business models, which often require different ways of organizing and new forms of organization design. Design sprints are a new approach that get people aligned around new ideas, create more ownership and buy-in, get new ideas to prototype and launch more quickly and efficiently and with higher quality.
Basic concepts	<u>Agile method</u> : To know the basic principles of agile methodology.

Basic materials

- Stellman, A., Greene, J. (2014) Learning Agile: Understanding Scrum, XP, Lean, and Kanban. O’Reilly Media Inc.

Complementary material

- Knapp, J., Zeratsky, J., Kowitz, B. (2016). Sprint: How To Solve Big Problems and Test New Ideas in Just Five Days. Transworld.
- Banfield, R., Lombardo, T., Wax, T. (2015). Design sprint: a practical guidebook for building great digital products. O’Reilly Media.
- Link: <https://servicedesigntools.org/>

Topic – 2.- Basic skills for digital solutions development for health	
Subtopic – 2.3.- Creativity strategies	
Aim	The aim of this subtopic is to give tools and practical examples on how to use creative strategies in design and development of solutions processes.
Summary	Here we will see the tools and frameworks you need to kick off a digital transformation. Students will learn and practice the core concepts of design thinking. Design Thinking is about approaching things differently with a strong user orientation and fast iterations with multidisciplinary teams to solve wicked problems. Students will apply methods that will help them turn the customer needs into human-centred solutions. You will see how Design Thinking fits into agile methods within management, innovation, and start-ups.
Basic concepts	<p><u>Design</u>: To know what it means.</p> <p><u>Design thinking</u>: To know the concept of design thinking as a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test.</p>

Basic material

- Lewrick, M., Link, P., Leifer, L. (2018). The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems. John Wiley & Sons Inc.
- How to Kill Creativity by Teresa M. Amabile. <https://hbr.org/1998/09/how-to-kill-creativity>.
- Transcending Fear in the Creative Process: 5 Timeless Insights by Maria Popova: <https://www.theatlantic.com/entertainment/archive/2011/09/transcending-fear-in-the-creative-process-5-timeless-insights/244922/>
- The Nature of Creativity by Robert J. Stenberg: http://lchc.ucsd.edu/mca/Mail/xmcamail.2010_10.dir/pdfFlf9STmJn3.pdf
- Design thinking for every endeavour: <https://youtu.be/TPXrheqhTCs>
- Your elusive creative genius by Elizabeth Gilbert: https://www.ted.com/talks/elizabeth_gilbert_your_elusive_creative_genius#t-1934
- Where good ideas come from by Steven Johnson: <https://www.youtube.com/watch?v=0af00UcTO-c>
- Edward de Bono on Creative Thinking: <https://www.youtube.com/watch?v=UjSjZOjNIJg>
- The Deep Dive: <https://www.youtube.com/watch?v=2Dtrkrz0yoU>

Complementary material

- Banfield, R., Lombardo, T., Wax, T. (2015). Design sprint: a practical guidebook for building great digital products. O'Reilly Media.
- Creativity is Not Enough by Theodore Levitt: <https://hbr.org/2002/08/creativity-is-not-enough>
- Six Thinking Hats by Edward de Bono: <https://www.debonogroup.com/services/core-programs/six-thinking-hats/>
- Bono, E. (1993). Serious Creativity: Using the Power of Lateral Thinking to Create New Ideas. Harperbusiness.
- Carson, S. (2012). Your Creative Brain: Seven Steps to Maximize Imagination, Productivity, and Innovation in Your Life. Jossey Bass.

Topic – 3.- Design & development of digital solutions for health	
<i>Subtopic – 3.1.- Co-creation</i>	
Aim	The aim of this subtopic is to know in a theoretical and practical way what the co-creation process consists of and to establish it as a norm in future designs in professional practice.
Summary	To begin we will first see what the concept of co-creation is and the evolution of the concept until today. We will also see examples of how to apply it in different spheres with a general approach to co-creation, or where is a quadruple helix approach including academia, public sector, private sector and third sector.
Basic concepts	<u>Co-creation, co-design, co-production</u> Know what they are, what principles they obey and forms of application.

Basic material

- Easy version of what is Co-creation?:
https://www.youtube.com/watch?v=VID2EyW5W_k&feature=emb_logo
- Co-Design Framework: <http://results.learning-layers.eu/methods/co-design/>
- Working together to co-create knowledge:
<https://www.youtube.com/watch?v=IDVu9QAZQjQ>
- 17John Design Competition:
https://www.youtube.com/watch?v=pFEjowSHOPE&feature=emb_logo

Complementary material

- For software design: Mirri, S., Rocchetti, M., Salomoni, P. Collaborative design of software applications: the role of users. Human-centric Computing and Information Sciences 8, Article number 6 (2018).
- Co-creation toolkit from Gonano: <http://gonano-project.eu/toolkits-for-co-creation/>
- Co-design: best practice report: http://www.cocreate.training/wp-content/uploads/2017/07/co-design_best-practice-report.pdf
- Chéron, C., Pera, G. (2016) Co-Creation during New Product Development: Downsides and effects of a booming activity: <https://www.diva-portal.org/smash/get/diva2:940809/FULLTEXT01.pdf>
- Rill, B. R.; Hämmäläinen, M.M. (2019). The art of co-creation, a guidebook for practitioners. Palgrave Macmillan.

Topic – 3.- Design & development of digital solutions for health	
Subtopic – 3.2.- User-centred approach	
Aim	The aim of this subtopic is to understand a user-centred approach to be able to know the needs of the people to whom the intervention will be directed considering accessibility.
Summary	<p>In topic 1, section 1.2, the state of Alzheimer's and its caregivers are covered. To be able to carry out a good co-creation process and achieve good results in the design of the product/service, it is also needed to know how to do it from a users' point of view. Here it will be seen what it is meant by user-centred approach from two different perspectives.</p> <p>This first approach which comes from a health perspective, needs to be combined with user experience (UX) from the technology point of view. Here we will learn how to create a user experience for a product, how to understand your user in order to build something brand new that people will like and in the framework of an agile and lean start-up, learned in topic 2, section 2.2.</p>
Basic concepts	User-centred approach: Understand what the concept means from the point of view of health (set goals and solutions related to health from the user's perspective) but also from the point of view of design and development of the technological product / service.

Basic material

- Integrated care for older people: guidelines on community-level interventions to manage declines in intrinsic capacity. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO.
 - Executive summary
 - Chapter 3 – Evidence and recommendations
 - Chapter 4 – Implementation considerations
- Martin, J.L., Clark, D.J., Morgan, S.P., Crowe, J.A., Murphy, E. A user-centred approach to requirements elicitation in medical device development: a case study from an industry perspective. Appl Ergon. 2012 Jan;43(1):184-90. doi: 10.1016/j.apergo.2011.05.002. Epub 2011 Jun 1. PMID: 21636072.
- Pravettoni, G., Triberti, S. (2020) P5 eHealth: An Agenda for the Health Technologies of the Future.
 - Chapter 9. User-Centered Design Approaches and Methods for P5 eHealth

- Thorpe, J. R., Rønn-Andersen, K. V., Bień, P., Özkil, A. G., Forchhammer, B. H., & Maier, A. M. (2016). Pervasive assistive technology for people with dementia: a UCD case. *Healthcare technology letters*, 3(4), 297–302. <https://doi.org/10.1049/htl.2016.0057>

Complementary material

- Additional resources: <https://www.usability.gov/index.html>
- This paper proposes a framework for mHealth application design that combines the Information Systems Research (ISR) framework and design thinking: Farao J, Malila B, Conrad N, Mutsvangwa T, Rangaka MX, Douglas TS (2020) A user-centred design framework for mHealth. *PLoS ONE* 15(8): e0237910. <https://doi.org/10.1371/journal.pone.0237910>
- Schnall R, Rojas M, Bakken S, Brown W, Carballo-Dieiguez A, Carry M, Gelaude D, Mosley JP, Travers J. A user-centered model for designing consumer mobile health (mHealth) applications (apps). *J Biomed Inform.* 2016 Apr;60:243-51. doi: 10.1016/j.jbi.2016.02.002. Epub 2016 Feb 20. PMID: 26903153; PMCID: PMC4837063.
- Zhou L, DeAlmeida D, Parmanto B. Applying a User-Centered Approach to Building a Mobile Personal Health Record App: Development and Usability Study. *JMIR Mhealth Uhealth.* 2019 Jul 5;7(7):e13194. doi: 10.2196/13194. PMID: 31278732; PMCID: PMC6640070.
- Guide for healthcare app development: <https://www.panacea.digital/2018/12/07/healthcare-app-development/>
- Klein, L. (2013). *UX for lean startups: Faster, smarter user experience research and design.* O'Reilly Media.
- The complex relationship between data and design in UX: https://www.ted.com/talks/rochelle_king_the_complex_relationship_between_data_and_design_in_ux

Topic – 3.- Design & development of digital solutions for health	
Subtopic – 3.3.- Prototyping	
Aim	The aim of this subtopic is to know how to develop a prototype to check the feasibility of the idea and product.
Summary	At the beginning of the course, we have seen the bases of Lean and Minimum Viable Product Development Methodology and in topic 3, sections 3.1 and 3.2 we have learned what a co-creation process consists of and how to apply a user-centred design in problem identification and solution design. Here we will see different types of prototypes and we will create and iteratively validate and refine a prototype for our idea or solution.
Basic concepts	<u>Prototyping</u> : To know what prototyping is, its types and the prototyping model.

Basic material

- McElroy, K. (2016). Prototyping for designers: Developing the best digital & physical products. O’Reilly Media, Inc.
- The ultimate guide to prototyping: The best prototyping methods, tools and processes - <https://www.uxpin.com/studio/ebooks/guide-to-prototyping/>
- Designing for Healthcare: Research, prototype, test, repeat: <https://medium.com/@TylerBeauchamp/designing-for-healthcare-aa9fd2812ec9>

Examples:

Paper prototype	Rapid Prototyping: Sketching https://www.youtube.com/watch?v=JMjzqjS44M
	What is Paper Prototyping? https://www.youtube.com/watch?v=4ZRzJTczMCE
Digital prototyping	Rapid Prototyping: Digital https://www.youtube.com/watch?v=KWGBGTGryFk
	Material Design Email App prototype https://www.youtube.com/watch?v=gVI-wuldf4E
	How to create a product walkthrough https://www.youtube.com/watch?v=Apwm6bkwbFA
Native prototyping	Rapid Prototyping: Native https://www.youtube.com/watch?v=lusOgox4xMI
Wireframe	How to wireframe a website https://www.youtube.com/watch?v=2hQA1ZsGAH8
	Wireframing Basics: The Easy Way to Get Started https://www.youtube.com/watch?v=aqdn7vVKygA&t=9s

Mock-ups	Mockup, qué es o qué son, cómo y para que utilizarlos https://www.youtube.com/watch?v=DcHwmHSAQQI
3D printing	The Power of Rapid Prototyping https://www.youtube.com/watch?v=SJMCJhy6Dz4
	What is rapid prototyping? https://www.youtube.com/watch?v=OhNnKTaciVI
Physical prototype	Real World: From Idea to Physical Prototype https://www.youtube.com/watch?v=r-ToqI1KUYg

Complementary material

- Agile prototyping (Video): <https://www.uxpin.com/studio/webinars/agile-prototyping-best-practices/>
- Lean Rapid Prototyping. Improving healthcare design (Not digital): <https://www.asianhbm.com/facilities-operations/lean-rapid-prototyping>

Topic – 3.- Design & development of digital solutions for health	
<i>Subtopic – 3.4.- Evaluation and Impact</i>	
Aim	The aim of this subtopic is to know approaches and tools to conduct a monitoring strategy to evaluate the design of technological solutions and its impact on health of the population to whom they are addressed.
Summary	Digital tools are increasingly being tested, evaluated and, in some instances, integrated at scale into health systems in low- and middle-income countries striving to meet goals of universal health coverage (UHC). Here we will see an introduction to the approaches and methods that were identified as useful for (1) the monitoring of project (i.e., intervention) deployments, focusing on the quality and fidelity of the intervention inputs; and (2) the evaluation of project outputs and impacts across several axes, from user satisfaction to process improvements, health outcomes and cost-effectiveness. Focusing on presenting pragmatic highlights and experience-informed tips for implementers to consider, together with links and resources for further study.
Basic concepts	<p><u>Monitoring</u>: What does the concept mean, what are its basic principles and what does it mean at the procedural level.</p> <p><u>Impact evaluation</u>: What does the concept mean, what are its basic principles and what does it mean at the procedural level.</p> <p><u>Health technology intervention processes</u>: understanding the typical path of these kind of interventions which begin with exploring basic questions of whether the intervention addresses the identified needs, including technical functionality and feasibility, followed by assessment of user satisfaction, then move towards efforts to evaluate the effectiveness, attributable impact and, ultimately, “value for money” of the intervention.</p>

Basic material

Monitoring and evaluating digital health interventions: a practical guide to conducting research and assessment. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO.

- Chapter 1: Overview of monitoring and evaluation (Pages 1-12)

Complementary material

- Ries, E. (2011). The Lean Startup: How Constant Innovation Creates Radically Successful Businesses. USA: Portfolio Penguin.
- Niven, P.R.; Lamorte, B. (2016) Objectives and Key Results: Driving Focus, Alignment, and Engagement with OKRs. New Jersey: John Wiley & Sons, Inc.
- Doerr, J.; Page, L. (2018). Measure what matters: How Google, Bono, and the Gates Foundation Rock the World with OKRs. USA: Porfolio Penguin.
- Minimum Viable Product (MVP): <https://baremetrics.com/academy/minimum-viable-product-mvp-2>
- Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically. Currency; Illustrated.
- Huang, k. (2011) 10 frameworks to help you measure success in design: Setting the right metrics: <https://uxdesign.cc/how-to-measure-success-in-design-f63f96a0c541>

Topic – 3.- Design & development of digital solutions for health	
Subtopic – 3.5.- New product development (NPD)	
Aim	The aim of this subtopic is to know the complete process of bringing a new product to scale it up to the market, in search of a scalable, repeatable, profitable business model.
Summary	Customer Development is a four-step framework, originally identified by Steve Blank, to discover and validate that you have identified a need(s) that customers have, built the right product to satisfy that customer’s need(s), tested the correct methods for acquiring and converting customers, and deployed the right resources in the organization to meet the demand for the product.
Basic concepts	<p><u>Customer discovery</u>: Understand customers and their needs that you may be able to satisfy.</p> <p><u>Customer validation</u>: Validate if a product will satisfy your customer’s needs.</p> <p><u>Company creation</u>: Determine whether product will satisfy all the customers’ needs.</p> <p><u>Company building</u>: Grow organization in order to support the demand for product.</p>

Basic Material

- Ries, E. (2011). The Lean Startup: How Constant Innovation Creates Radically Successful Businesses. USA: Portfolio Penguin.
- Link to video presentation to the book “The Lean Startup” from Eric Ries: <https://www.youtube.com/watch?v=fEvKo90qBns&list=PL8JjTGG9v5OWdNWz3MtFcAXiOnjaFwyPV&index=2>
- Blank, S. (2020) The Four Steps to the Epiphany: Successful Strategies for Products that Win. John Wiley & Sons Inc.
- Cooper, B., Vlaskovits, P. (2010) The entrepreneur’s guide to customer development. Cooper-Vlaskovits

Complementary material

- Lombardo, T., McCarthy, B., Ryan, E., Connors, M. (2017). Product Roadmaps Relunched: A Practical Guide to Prioritizing Opportunities, Aligning Teams, and Delivering Value to Customers and Stakeholders. USA: O'Reilly Media, Inc, USA.
- Ellis, S. (2017). Hacking Growth: How Today's Fastest-Growing Companies Drive Breakout Success. Random House LCC.

- Maurya, A. (2012) Running Lean: Iterate from Plan A to a Plan That Works. O'Reilly Media.
- Knapp, J., Zeratsky, J. Kowitz, B. (2016) Sprint: How To Solve Big Problems and Test New Ideas in Just Five Days).

Lean Start-up videos:

- <https://www.youtube.com/watch?v=RSaIOCHbuYw&list=PL8JjTGG9v5OWdNWz3MtFcAXiOnjaFwyPV&index=1>
- <https://www.youtube.com/watch?v=sobxOzRjAGg&list=PL8JjTGG9v5OWdNWz3MtFcAXiOnjaFwyPV&index=6>
- <https://www.youtube.com/watch?v=zofgIYOCpec&list=PL8JjTGG9v5OWdNWz3MtFcAXiOnjaFwyPV&index=34>
- Resources: <https://steveblank.com/category/lean-launchpad/>

MVP/LEAN:

- Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically. Currency; Illustrated.
- Fortoul, F., Torstensson, J. (2016) Applying MVP Principles when Developing Mobile Health Applications: An Exploratory Study on Selected Mobile Applications and their Version History (University of Gothenburg):
https://gupea.ub.gu.se/bitstream/2077/44686/1/gupea_2077_44686_1.pdf
- Saadatmand, M. "Assessment of Minimum Viable Product Techniques: A Literature Review" (2017). Engineering and Technology Management Student Projects. 1179.
https://pdxscholar.library.pdx.edu/etm_studentprojects/1179
<https://hackernoon.com/10-great-wats-to-evaluate-your-minimum-viable-product-mvp-3e343tla>
- Geevarghese, D. (2020) Everything You Need to Know about Healthcare MVP Development: <https://www.cabotsolutions.com/everything-need-to-know-about-healthcare-mvp-development>

MVP Explained:

- V. Lenarduzzi and D. Taibi, "MVP Explained: A Systematic Mapping Study on the Definitions of Minimal Viable Product," 2016 42th Euromicro Conference on Software Engineering and Advanced Applications (SEAA), 2016, pp. 112-119, doi: 10.1109/SEAA.2016.56.
- Duc A.N., Abrahamsson P. (2016) Minimum Viable Product or Multiple Facet Product? The Role of MVP in Software Startups. In: Sharp H., Hall T. (eds) Agile Processes, in Software Engineering, and Extreme Programming. XP 2016. Lecture Notes in Business Information Processing, vol 251. Springer, Cham.
https://doi.org/10.1007/978-3-319-33515-5_10

4.- Participants

In this training course proposal, following the principles of the Co-Care project, we find three different groups of actors that must always be present: Students, faculty and community.

4.1.- Students

In the case of students, it is worthwhile for all those who are in the area of health and social care to participate, such as psychology, nursing, physiotherapy, occupational therapy, nutrition, speech and language therapy, medicine, psychiatry, neurology, neuropsychologist or social work and all those that can contribute to the quality of life of caregivers of people with Alzheimer's / dementia from a health and social care point of view. In addition, they are also central and essential students in the field of technology such as biotechnology, computer systems, electrical engineering, electromechanical, electronics engineering, mechanical engineering.

Students need to co-create a product/solution for caregivers of people with Alzheimer's/dementia. They also need to be able to effectively communicate it to the target audience and think of strategies to make it scalable. This could open the door to other disciplines that could intervene in a timely manner, such as economics and business or communication and marketing.

4.2.- Faculty

In the case of permanent teachers with a central role in accompanying students, they must be either from the health and social care branch or from the technology branch. The presence of both profiles in the teaching staff is essential.

In the teaching of each of the topics there must be a double check so that students in both branches find meaning in their learning within the framework of their discipline.

In the teaching of specific contents, it is necessary that the students see real cases to be inspired. That is why it is necessary that there are, at least, in the following subtopics, guest speakers:

- 1.2. Healthcare Systems and contexts: In this case the guests should be one or more caregivers who explain their experience in the care received from the diagnosis of the person they care for to the present date. They should emphasise in which aspects the health system helps them in their job as caregivers and which not, and what they do to fix this or take advantage of what the system currently offers. In addition, a health professional is also invited to be, in the context of each country, the one who has the most contact with caregivers of people with Alzheimer's / dementia. Sometimes they are those who conduct support groups. However, it is always necessary to adjust to the cultural context of each country.
- 1.3. Existent technology solutions: In this case, the guests should be people in the field of health technology who have done the same process as the students will do. This can be entrepreneurs or companies that have designed technology for caregivers of people with Alzheimer's, if any, or for people with Alzheimer's / dementia, or the elderly or groups similar to the target group. This will be useful for students to see practical examples of the process followed and the result obtained. Ideally, it would be good to include examples with co-creation, although they are difficult to find, and others that have not exactly followed this process, in order to be able to observe the differences.
- 1.4. Health Technology Assessment: If the products/solutions presented in the previous point (1.3) have passed an evaluation process to be able to be commercialized as a health product, they could be the invited speakers for 1.4. as health technology professionals who explicitly explain their experience in the process of being assessed. If this is not the case, it would be good if an entrepreneur/company in this sector that has done the process of evaluating their technology should explain with their case the process followed, the difficulties encountered and previous considerations to prepare for this process.

- 2.2. Management strategies: At this point the collaboration of a management expert is requested so that they can explain the most appropriate examples for the process that students use (such as the agile method) by using real situations
- 2.3. Creativity strategies: At this point the collaboration of a creativity expert is requested to explain to students using real cases the most appropriate examples for the process they have to do with their product/solution, such as design thinking.
- 3.1.- Co-creation: If it did not appear in 1.3, look for real examples of products / solutions that have followed a co-creation process to illustrate to students how to do it. There may not be examples with the same target as caregivers of people with Alzheimer's / dementia. If this happens, look for target groups as close as possible.
- 3.2. User-centred approach: In this case, two professionals are invited, one from the health sector and one from the technology sector. This is so that the two can reflect with the students on the meaning of 'user-centred' for the two disciplines in such a way that they can find a shared operational definition among all so that their product / solution is effectively so.
- 3.5. New product development (NPD): In this case an expert in customer development who can teach them using real cases, the complete process of bringing a new product to scale it up to the market, in search of a scalable, repeatable, profitable business model.

In the other sub-topics, it is understood that the permanent teaching staff has the necessary knowledge and skills to teach in a theoretical and practical way.

4.3.- Community

When we talk about the community, we refer to those actors who are the stakeholders around the topic of interest: the caregivers of people with Alzheimer's / dementia. Again, we have levels of importance.

At the level of essential importance, we find caregivers of people with Alzheimer's / dementia. As explained, co-creation is the way something is taught and practiced with students. This implies that the end user is involved in the process from start to finish and is

part of the co-creation groups, so it is necessary that there is more than one caregiver for each co-creation group within the course. They play an active role throughout the process, so they are essential. Without them the course cannot be carried out.

At the second level of importance, we find those who perform a mentoring role. Here we find health professionals who are working with caregivers to ensure that the student proposals pursue a goal related to the quality of life of caregivers of people with Alzheimer's / dementia. There must also be professionals in the field of technology who work in the health sector with a target group as close as possible to what is being worked on in this course, to ensure that they are adequately following the necessary processes to properly develop the technology.

Finally, there is a third level which are those that evaluate the end result. In this case, the panel in charge of evaluating the final products is made up of entrepreneurs from the health technology sector, caregivers of people with Alzheimer's (different from those who have been in the co-creation groups) and permanent teachers within the course. That is why these profiles of the community are also needed, through a one-off collaboration over time. Depending on the maturity of the products made in the co-creation groups, the participation of professionals from the business world could be requested to review the business model presented by the students or also from the world of communication to evaluate their communication strategy.

5.- Modalities of teaching

There could be three types of teaching: presence-based modality, fully online or a hybrid model between the two.

After the pandemic we have learnt different things in relation to presence teaching. The first, that it shouldn't be taken for granted. The introduction of flexible plans in the training is recommended, for this reason, the possible modalities and the main advantages and disadvantages are presented.

5.1.- Presence-based model

We are very used to face-to-face teaching and the main advantages for students are that being able to meet their peers during, before and after the class, can contribute to the creation of ties of companionship. This is beneficial in a study climate, but to also better their projects in this course. Having teachers in the class also facilitates formal and informal communication with them to create an environment of trust which is necessary to be able to create and learn more securely. Apart from that, by having a defined and well-structured timetable, a feeling of constant progress is created by establishing a routine. These advantages presented can also be felt by the teaching staff.

What for some may be advantages for others may be disadvantages, doing it fully in this mode may not be easy for caregivers. This modality involves travel and it is certainly not easy for caregivers to leave their cared persons or their job, if they have one, to come and collaborate in the course. This will require them to use time they may not have on travel, and also result in an economic cost. Aside from that, fixed-time care can also be difficult to combine with their role as caregivers and any other role they may have.

The pros and cons for all participants must be carefully considered before deciding on the presence-based modality.

5.2.- Online model

Many people study and work at the same time, have certain personal occupations that do not allow them to go to the classroom daily, or live far from the desired study centre. Online training is emerging as a great alternative, especially after the great advance that LMS (Online Training Platforms) have experienced.

The biggest advantage is that it does not require travel. This reduces personal costs of time and money and reduces environmental impact. Another of the advantages is the flexibility you have without a fixed schedule to look at and work through materials, as you can adapt the training to your rhythm of life. Despite this, there is a very high amount of teamwork hours that can be difficult to achieve if everyone wants their own flexibility, and it can be difficult to find common schedules / spaces for teamwork. The main disadvantage is the lack of socialization and climate creation which can be achieved through presence.

If we think of the participants of the course, the students appreciate the flexibility that this model can give them as well as the fact of not having to move, especially those that combine it with work. However, after the experience of the pandemic we have seen that they appreciate being able to meet in person with their peers and teachers, creating a different work climate than when connected at home. In the case of caregivers, given that many of them cannot leave the person they care for alone and may have to avoid travel, it can be a good way for them to follow the course and be able to participate and not exclude them for lack of time to be able to come in person.

The pros and cons for all participants must be carefully considered before deciding on the presence-based modality.

5.3.- Hybrid model

One possibility, arising from the evaluation of pilot training courses, would be a hybrid model of course implementation. This could be implemented in two ways.

The first way would be organized in such a way where some of the formative or evaluation activities were face-to-face and others virtual for all participants in the course at

once. It would be necessary to analyse accurately those activities that would be essential to or that can suppose an added value to do them in person and those that could be done virtually without losing the learning of hard and soft skills.

The second way would be to organize face-to-face / virtual sessions according to the profile of the participants. This way students can do much of the course in person, leaving room for some virtual activities. Caregivers will be able to do a lot of the course virtually to facilitate participation but still have the option to assist face-to-face if they wish.

6.- European added value

From a purely educational point of view, work has been going on for some time now on the European Higher Education Area to achieve convergence to facilitate the exchange of graduates and adapt the content of university studies to market demands. Just to follow this principle, it makes sense to approach this training course with a European dimension. But trying to be more specific we can mention some added values of the European dimension.

One can be the possibility of having access to a more significant number of international collaboration networks and stakeholders from different countries which increase the quality of training and its relevance. Being part of this network is also an important tool for disseminating results to all participant countries and other countries with which they have a relationship with. It can be also a good mechanism of promoting best practices in all participating countries in order for EU students to benefit from the state-of-the-art best practices.

Putting the focus on students and participants within the training course, it can enable meaningful intercultural encounters, allowing students to discover who they are, and what kinds of citizens they want to be. Besides developing employability, it has a distinctive role in enhancing citizenship, and facilitating transnational engagement with common European values as well as the exchange of knowledge among the generations that are so critical for the future of Europe.

If we look now in practical terms, it poses certain challenges. It poses administrative challenges since each university has its own academic calendar in which to fit the course and this is not always easy. Apart from the fact that the organization of the volume and weight of tasks is also different between universities. They have different ways of counting contact and autonomous hours and the weight of different subjects. It also poses technical challenges. Not all universities use the same platforms for learning which makes it necessary to have an alternative virtual space. This adds many extra complications to rigorously comply with data protection regulations. Finally, the variety of languages is not the biggest challenge but makes the implementation of the course more complex. While this brings richness in

learning it can make some of the caregivers participating in the course feel excluded for not speaking or understanding other languages, although ways can be found to be able to minimize it.

With this scenario, we have found two possible ways to maintain the European added value. The first would be to match the training course in the same semester, even if there are different start and end dates, and look for two moments in time so that course participants can meet in real time, during the process and at the end, and share reflections for learning in addition to seeing the care of people with Alzheimer's from a multicultural perspective. Another option is to have a shared virtual platform where you can see the evolution of the students' projects, as well as have an asynchronous space where you can comment so you can share what has been done and your reflections on learning. Also, that the final presentations of the project can be held there as a repository.

7.- Sustainability

To guarantee the sustainability of the training course, several ways are proposed. All of them with advantages and disadvantages.

The first option is to have the course in optional subject format in the regular offer within the degrees offered in the faculties with at least 3 ECTS and with the obligatory condition of the students coming from at least the areas of health and technology. It is the most ambitious proposal as it involves the agreement of many institutional actors from the degree coordinators, the deans of the faculties and even above this body as in all cases more than one faculty (health and technology) is involved. This option is being explored by different HEIs. The main advantage is the fixed permanence of the subject as an offer, but the main drawback is to find the fit as the different degrees and faculties often have space and calendar restrictions when adding new optional subjects in the regular offer.

The second option is to offer the course as an intensive course as part of the intensive courses already offered for degrees that are often already interdisciplinary. The main advantage is that it would be easy to guarantee interdisciplinarity and internationalization as intensive courses are often offered to work these two pathways. The big disadvantage is that they are often very short courses that would not allow to do all syllabus and planned activities. In this case, alternative spaces in the academic calendar should be sought or the course shortened until the design of the proposed solution / product without piloting it. We are working with the support of the internationalization areas of the HEIs to possibly fit this into some of the Erasmus+ higher education mobility opportunities.

The third option is to offer the subject to health students within the standard subjects of official degrees and make it possible for technology students to link to it through internships in companies collaborating in the Co-Care project, or other companies in the sector willing to participate by hosting interns to develop the project. Associations of people with Alzheimer's would be willing to offer internships, for the most applied part of the course, in case it was necessary to have more time to be able to do the practical aspect. The

main advantage of this format is that it guarantees the practical part of the training course for both technology and health students. The main drawback is the timing and coordination of so many internships that can be in different companies at once. The process of creating agreements for internships in companies is not complex and is well received by all the institutions involved, HEIs, businesses and associations.

All of these options would be in the framework of maintaining it by undergraduate students as was the official commitment in the application. Once the previous options have been worked on, the feasibility of a postgraduate course will be explored.

8.- Conclusion

The training course presented here tries to teach and practice the principles of co-design in the field of health and social care in such a way that all the actors involved together can contribute to maximizing the knowledge of each to achieve better results. At the same time, it contributes to cooperation between disciplines and expertise in official degrees, which is often difficult. We can also say that it covers what is needed to propose, design, develop, and evaluate specific interventions to solve a real problem, while making participants do so in a co-created, multidisciplinary, and evidence-based manner.

With the proposed training course presented here, the Co-Care project contributes to the training of the health and social care and technology professionals of the future to solve the gap found in the work done in WP1 where self-care of the carer receives less attention from stakeholders and developers. This can be overcome through participatory methods and approaches focused on co-creation processes, which it was also found were not yet implemented in this field. This course creates a convening space for bringing together ICT solutions designers and providers and users, but also to develop practical guidance on how to implement design-enabled co-production. It does so through current and up-to-date content, as well as through real-world experiences. It actively brings into the classroom actors who contribute meaningful experiences to student learning, such as caregivers of persons with Alzheimer/dementia, while students try to provide solutions to the challenges the caregivers face covering their needs and contributing to improve their quality of life.



The European Commission support for the production of this document does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.