UNIVERSITÀ DEGLI STUDI DI GENOVA

AREA RICERCA, TRASFERIMENTO TECNOLOGICO E TERZA MISSIONE

SERVIZIO PER IL TRASFERIMENTO TECNOLOGICO E DELLE CONOSCENZE

SETTORE VALORIZZAZIONE DELLA RICERCA, TRASFERIMENTO TECNOLOGICO E RAPPORTI CON LE IMPRESE

IL RETTORE

Vista la Legge 9 maggio 1989, n. 168 - Istituzione del Ministero dell'Università e della ricerca scientifica e tecnologica e ss.mm.ii;

Visto lo Statuto dell'Università degli Studi di Genova;

Visto il Regolamento Generale di Ateneo;

Visto il Regolamento di Ateneo per l'Amministrazione, la Finanza e la Contabilità;

VISTA la legge 7 agosto 1990, n. 241 recante "Nuove norme in materia di procedimento amministrativo e di diritto di accesso ai documenti amministrativi" pubblicata sulla Gazzetta Ufficiale n. 192 del 18/08/1990 e s.m.i.;

VISTO il Decreto del Presidente della Repubblica 28 dicembre 2000, n. 445 (Disposizioni legislative in materia di documentazione amministrativa) e s.m.i.;

VISTO il Decreto Direttoriale MUR n. 341 del 15/03/2022 di emanazione di un Avviso pubblico per la presentazione di Proposte di intervento per la creazione di "Partenariati estesi alle università, ai centri di ricerca, alle aziende per il finanziamento di progetti di ricerca di base" nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 "Istruzione e ricerca" – Componente 2 "Dalla ricerca all'impresa" – Investimento 1.3, finanziato dall'Unione europea – NextGenerationEU";

VISTO il Decreto Direttoriale MUR n. 1553 dell'11/10/2022 di concessione del finanziamento del progetto Codice identificativo PE00000006, Acronimo MNESYS, Titolo "*A multiscale integrated approach to the study of the nervous system in health and disease*", registrato alla Corte dei Conti il 23/11/2022 al n. 2948 e relativi allegati;

CONSIDERATO che l'Università degli Studi di Genova è leader dello Spoke 6, dal titolo "*Neurodegeneration, trauma and stroke*";

CONSIDERATO che gli Spoke possono emanare - nell'ambito dei limiti e con le modalità previste dall'Avviso - "bandi a cascata" finalizzati alla concessione di finanziamenti a soggetti esterni per attività coerenti con il progetto approvato;

VISTA la delibera della seduta del 27 settembre 2023 con cui il Consiglio di Amministrazione dell'Università degli Studi di Genova ha approvato l'emanazione del bando a cascata per organismi di ricerca nell'ambito del Progetto MNESYS - "*A multiscale integrated approach to the study of the nervous system in health and disease* - PNRR M4C2 per lo Spoke 6;

VISTO il Decreto del Direttore Generale n. 5418 del 14 novembre 2023 di nomina del Responsabile

del Procedimento;

VISTO il Decreto del Rettore n. 5439 del 14 novembre 2023 e il Decreto Rettorale n. 5474 del 15 novembre 2023 di emanazione del Bando a cascata per il finanziamento di proposte di intervento per le attività di ricerca svolte da Organismi di Ricerca nell'ambito del programma di ricerca PE MNESYS "*A multiscale integrated approach to the study of the nervous system in health and disease*", per lo Spoke 6 dal titolo "*Neurodegeneration, trauma and stroke*", nell'ambito del PNRR, Missione 4, Componente 2, Investimento 1.3 – finanziato dall'Unione europea – NextGenerationEU (CUP D33C22001340002);

CONSIDERATO che alla data di scadenza per la presentazione delle proposte progettuali, fissata entro e non oltre il giorno 14 dicembre 2023, per la **Tematica L – "Cognitive tele-rehabilitation in the field of neurodegenerative diseases: provision of a "network-based" cognitive rehabilitation program on "home-based" virtual technology to improve cognitive abilities remotely"** era pervenuta a mezzo PEC all'indirizzo air3@pec.unige.it la seguente proposta:

PROPONENTE: Fondazione Bruno Kessler
TITOLO PROPOSTA: RETURN-VR – ReminiscencE Therapy for neURodegeNerative diseases via Virtual Reality

TENUTO CONTO che la Responsabile del procedimento, Ing. Patrizia Cepollina, ha ritenuto ricevibile, ammissibile e conforme la proposta sopra citata;

CONSIDERATO che nel Bando è previsto che la valutazione di merito tecnico-scientifico dei progetti pervenuti sia affidata ad una Commissione composta da almeno tre esperti esterni al Partenariato, indipendenti e competenti dell'Area tematica dello Spoke;

VISTO il Decreto Rettorale n. 6114 del 20 dicembre 2023 con cui è stato emanato l'Avviso di manifestazione di interesse per la costituzione di un albo di esperti indipendenti a supporto della valutazione di merito dei progetti PNRR presentati sui bandi a cascata del progetto MNESYS – A multiscale integrated approach to the study of the nervous system in health and disease;

VISTO l'Estratto del Verbale della Riunione del 12 febbraio 2024 del Comitato Scientifico del programma di ricerca MNESYS "*A multiscale integrated approach to the study of the nervous system in health and disease*" che ha approvato la "Rosa di Candidati" per le Commissioni di Valutazione dei Bandi a cascata sul Programma MNESYS;

VISTO il Decreto del Rettore n. 855 del 20 febbraio 2024 con cui è costituito l'Albo a supporto delle valutazioni dei progetti presentati in risposta al bando pubblico per la selezione di proposte progettuali da finanziare nell'ambito delle attività di ricerca dello Spoke n. 6 di cui al programma di "*A multiscale integrated approach to the study of the nervous system in health and disease*" – MNESYS, a valere sulle risorse del Piano Nazionale di Ripresa e Resilienza (PNRR), Missione 4 "Istruzione e Ricerca", Componente 2 "Dalla ricerca all'impresa", linea di Investimento 1.3 "Creazione di Partenariati Estesi alle università, centri di ricerca, alle aziende per il finanziamento di progetti di ricerca di base";

VISTO il Decreto del Rettore n. 1233 del 12 marzo 2024 con cui è stata nominata la Commissione di valutazione delle proposte pervenute in risposta al bando a cascata di cui al D.R. n. 5439 del 14 novembre 2023, indicato nelle premesse del presente decreto;

ACQUISITO il verbale della Commissione di Valutazione della seduta del 16 aprile 2024 (Prot. n. 37982 del 07 maggio 2024);

VISTO il Decreto del Rettore n. 2293 del 10 maggio 2024 con cui è stata approvata la graduatoria di merito per la Tematica L – "Cognitive tele-rehabilitation in the field of neurodegenerative diseases: provision of a "network-based" cognitive rehabilitation program on "home-based" virtual technology to improve cognitive abilities remotely", di cui al bando a cascata di cui al Decreto del Rettore n. 5439 del 14 novembre 2023, indicato nelle premesse del presente decreto;

TENUTO CONTO che in data 14 maggio 2024 è stata inviata alla Fondazione Bruno Kessler la comunicazione con prot. n. 41370 in cui si rendevano noti gli esiti della procedura e si richiedeva la documentazione propedeutica all'adozione del provvedimento di ammissione del finanziamento;

VISTO che in data 20 maggio 2024 con prot. n. 43924 la documentazione richiesta è stata ricevuta dall'Università degli Studi di Genova che l'ha ritenuta conforme a quanto previsto nel bando a cascata di cui al Decreto del Rettore n. 5439 del 14 novembre 2023 e il Decreto Rettorale n. 5474 del 15 novembre 2023 , indicato nelle premesse del presente decreto,

DECRETA

ART. 1

L'ammissione a finanziamento del progetto RETURN-VR – ReminiscencE Therapy for neURodegeNerative diseases via Virtual Reality per la **Tematica L – "Cognitive tele-rehabilitation in the field of neurodegenerative diseases: provision of a "network-based" cognitive rehabilitation program on "home-based" virtual technology to improve cognitive abilities remotely"** con Soggetto proponente la Fondazione Bruno Kessler – come rappresentato negli Allegati B e C alla proposta presentata con domanda di partecipazione prot. n. 74572 del 14 dicembre 2023.

ART. 2

L'entità dell'agevolazione concessa, a fondo perduto, ammonta a 144.841,50 euro complessivi come rappresentati nell'allegato C alla proposta presentata con domanda di partecipazione prot. n. 74572 del 14 dicembre 2023. L'agevolazione è pari al 100% dei costi di progetto trattandosi di attività di ricerca fondamentale per Organismi di Ricerca. L'agevolazione è concessa a valere sui fondi PNRR - Programma "*A multiscale integrated approach to the study of the nervous system in health and disease*" – MNESYS Codice PE00000006 a valere sulla Missione 4, Componente 2, Investimento 1.3, ai sensi del Decreto di concessione n. 1553 dell'11 ottobre 2022, registrato alla Corte dei Conti il 23/11/2022 n. 2948, iscritto al Bilancio di Ateneo sul progetto UGOV 100009-2022-TF-PNRR-PE_MNESYS_BAC_DINOGMI.

ART. 3

Le attività, come indicate dettagliatamente nell'Allegato B alla domanda di finanziamento, dovranno essere avviate a partire dalla data di sottoscrizione del Contratto e concluse entro e non oltre 12 mesi, affinché siano rendicontate in tempo utile per consentire la chiusura del Programma PE MNESYS, il cui termine è attualmente previsto al 31 ottobre 2025.
Potrà essere valutata e concessa una sola proroga in presenza di ritardi dovuti a circostanze eccezionali e non dipendenti da scelte del Beneficiario esclusivamente nel caso in cui il MUR, a sua volta, proroghi il termine del Programma MNESYS.

ART. 4

Il presente atto sarà pubblicato sul sito UniGe https://unige.it/progetti-finanziati-dal-pnrr e laddove la normativa vigente lo richiede.
Il documento informatico originale sottoscritto con firma digitale sarà conservato presso l'Area Ricerca, Trasferimento Tecnologico e Terza Missione.

ALLEGATI:

Allegato B – Proposta progettuale
Allegato C – Piano economico-finanziario

IL RETTORE
Prof. Federico DELFINO
(documento firmato digitalmente)

ANNEX B

PE00000006
"A multiscale integrated approach to the study of the nervous system in health and disease"

MNESYS

SPOKE N. 6

Research proposal

Topic L: Cognitive tele-rehabilitation in the field of neurodegenerative diseases: provision of a 'network-based' cognitive rehabilitation program on 'home-based' virtual technology to improve cognitive abilities remotely

RETURN-VR
ReminiscencE Therapy for neURodegeNerative diseases via Virtual Reality

- Name of the PIs' host institution for the project: Fondazione Bruno Kessler
- Name of the Principal Investigators (PIs): Oscar Arturo Mayora Ibarra, Susanna Pardini
- Proposal duration in months: 12 months

- Name and qualification of the Principal Investigator (PI): Oscar Arturo Mayora Ibarra - PhD, Prof., Head of the Digital Health Research Unit

- Name and qualification of the co-Principal Investigator (PI): Susanna Pardini - PhD Candidate (expected graduation: March 2024), Researcher, PsyD

- Name and qualification of the components the research team

ROLE IN THE PROJECT	*NAME*	*SURNAME*	*DEPARTMENT*	*QUALIFICATION*	*YOUNG (under 40 al 31.12.2023)*	*F/M*
Principal Investigator	*Oscar Arturo*	*Mayora Ibarra*	*Digital Health Research*	*prof., Head of the Digital Health Research Unit*		*M*
Co-Principal Investigator (PI)	*Susanna*	*Pardini*	*Digital Health Research*	*PhD Candidate* (expected graduation: March 2024), *Researcher, PsyD*	*YES (Birthdate: 12/08/1988)*	*F*
Sr Researcher	*Elio*	*Salvadori*	*Digital Health Research*	*Sr Researcher*		*M*
Prj manager	*Giulia*	*Mezzanotte*	*Digital Health Research*	*Project manager*	*YES (Birthdate: 27.04.1998)*	*F*
Sw developer	*Michele*	*Lamon*	*Digital Health Research*	*Jr Technologist*	*YES (Birthdate: 22.10.2000)*	*M*

ABSTRACT:
The rising elderly population has led to increased dementia rates, impacting society and economics. Behavioral and Psychological Symptoms of Dementia (BPSD) worsen this, challenging patients and caregivers. Traditional medication poses risks, sparking interest in non-pharmacological approaches leveraging innovative digital technologies like Virtual Reality (VR). While VR shows promise in engaging dementia patients and offering benefits such as reduced anxiety and improved cognition, its long-term effects require further exploration. Recent research suggests that employing Reminiscence Therapy (RT), a method that leverages past experiences related to significant locations, through immersive VR holds potential for delivering both immediate and enduring benefits on the mood and cognitive function of individuals with dementia. Cognitive telerehabilitation via VR may pave the way toward remote interventions for neurodegenerative diseases, targeting specific cognitive functions. Ongoing research aims to optimise these programs for long-term effectiveness. FBK has recently developed a VR application exposing older adults with cognitive impairments to customisable immersive environments aiming at facilitating a positive impact on their behavioural and psychological symptoms.
The RETURN-VR project aims to (i) enhance the current VR application prototype by incorporating an RT-based approach through personalised virtual contexts based on users' life experiences; (ii) enable exposure to customisable immersive environments from patients' home with the remote supervision of healthcare professionals; (iii) assesses the feasibility of a telerehabilitation intervention focusing on acceptability, engagement, and memory impact immediately and 3-6 months post-intervention.

RESEARCH PROPOSAL

Section a. State-of-the-art and objectives

In recent decades, the burgeoning elderly population has precipitated a gradual surge in dementia prevalence across affluent nations. This cognitive decline profoundly impacts both societal and economic spheres [1]. Within the dementia cohort, Behavioral and Psychological Symptoms of Dementia (BPSD) frequently manifest, contributing to distress, diminished quality of life, exacerbated cognitive and functional impairments [2]. Although pharmacological interventions are often recommended for cognitive impairment and BPSD in various dementia types, their usage in the elderly can lead to adverse effects owing to polypharmacy. Thus, there exists an escalating demand for innovative non-pharmacological therapies.

Virtual Reality and Reminiscence Therapy Virtual Reality (VR), an immersive computer-generated environment primarily associated with entertainment, has garnered attention for its applications in medical training, rehabilitation, and therapy [3-5]. Studies indicate that immersive VR is well-received and captivating for individuals with dementia, potentially offering an enjoyable experience [6-8]. Reminiscence Therapy (RT), a prevalent psychosocial intervention, involves revisiting past experiences utilising stimuli such as photographs or music [9]. While this therapy exhibits modest positive effects on enhancing quality of life, cognition, communication, and mood in dementia patients, its efficacy remains limited [9]. Leveraging immersive VR for reminiscence therapy might present a more effective alternative, providing heightened realism and potentially bolstering engagement. Previous research suggests immediate enhancements, including reduced anxiety and improved verbal fluency among elderly individuals undergoing short-term immersive VR reminiscence therapy in care facilities [10,11]. However, the long-term impact on dementia patients necessitates further exploration. Recent research indicates that immersive VR reminiscence offers benefits for cognitive function, such as preserving abilities, enhancing memory, and increasing attention in older adults. It also shows promise in improving cognitive function and the quality of life in older adults with dementia. Studies suggest that VR-based reminiscence therapy could positively impact cognitive decline among older adults with cognitive impairment. Furthermore, immersive VR has been found to have a positive effect on psychological well-being by improving mood, reducing anxiety, and alleviating depressive symptoms among institutionalised older adults. The use of immersive VR reminiscence in enhancing the health of older adults has attracted significant global attention due to its observed effects on cognitive function and psychological well-being. Conducting further research is recommended to validate the observed results. In light of existing knowledge, a study aimed to investigate the immediate and 3-6-month effects of immersive VR reminiscence therapy in individuals with dementia [12]. This investigation sought to ascertain the potential impact and duration of immersive VR reminiscence on mood elevation and potential cognitive function sustainability among elderly dementia patients during the intervention period. It's crucial to note that while VR is increasingly applied across diverse domains, evidence about its application in reminiscence interventions for dementia remains limited. One highlighted limitation was the absence of complete personalization in VR reminiscence due to time and cost constraints in generating computer-generated content, potentially impacting efficacy [12]. Nevertheless, this pilot study sheds light on the potential and duration of immersive VR reminiscence in dementia patients, offering objective insights into its impact on caregiver burden in remote healthcare, especially amid the COVID-19 pandemic [12].

Personalization of VR scenarios Personalization of VR scenarios has become a burgeoning area of research, revealing advantages such as heightened immersion and user involvement within the virtual realm [13,14]. Crafting customizable and soothing VR settings involves predicting conditions aligning with user preferences, enabling control over potential environmental disruptors [13,15,16]. This individual-centric approach holds significance for those with cognitive impairments, fostering comfort and reassurance within the VR environment [17]. However, further exploration is imperative to gather more robust data.

Cognitive telerahabilitation in neurodegenerative diseases employs network-based cognitive rehabilitation programs delivered through home-based virtual technology to enhance cognitive abilities remotely. Leveraging advancements in telecommunication and digital platforms, this approach offers accessible and effective interventions for conditions like Alzheimer's, Parkinson's, or multiple sclerosis. These programs incorporate diverse cognitive exercises, games, and activities targeting specific cognitive functions such as memory, attention, problem-solving, and language skills. Technology integration allows personalized and adaptive interventions tailored to individual needs and progression. The benefits of cognitive telerehabilitation in neurodegenerative diseases encompass accessibility, personalization, remote monitoring,

and enhanced engagement. Despite its promise in improving cognitive abilities and quality of life, ongoing research endeavors aim to refine these programs, optimize effectiveness, and establish their long-term benefits in managing these conditions.

Research Objectives The primary aim of the proposed study is to assess the feasibility of a telerehabilitation Reminiscence Therapy for patients with dementia with virtual reality. Specifically, the objective is to evaluate the preliminary impact on acceptability, engagement, emotions, psychological state, depressive symptoms, and cognitive functions of exposure to personalised virtual contexts based on previous life experiences of users with cognitive impairment. The assessment phase will occur immediately after each VR exposure and 3-6 months after intervention. The following table summarises the Specific Objectives (SO).

Table 1. Specific Objectives of the RETURN-VR project

SO0	To develop an innovative Reminiscence Therapy approach leveraging customisable VR content that can be used to enable tele-rehabilitation and remote monitoring of patients from remote Measurable outcomes A prototype of an RT-based application running on VR headset that can be easily customised by a remote healthcare professional through a mobile device according to each patient's need.
SO1	To evaluate the impact of VR on self-reported and observational levels of motion-sickness, engagement, and pleasantness in non-hospitalized older adults living with mild-moderate cognitive impairment. Measurable outcomes **Tolerability** (based on the frequency of time spent in the VR context, emotions expressed, and the weight of the head-mounted display). **Motion Sickness Symptoms** (based on the Virtual Reality Symptom Questionnaire [18,19]). **Patient reported experiences (PREMs) such as engagement, pleasantness, and satisfaction** related to using the VR apparatus (based on measures developed and described by Appel et al. [20,21] composed of self-reported and open-ended questions).
SO2	To investigate if customized, virtual environments can be acceptable to the target group and positively impact on psychological and cognitive functions in the framework of the proof-of-concept study. Measurable Outcomes: **Emotions, Psychological state, and Depressive symptoms** (based on the Observed Emotion Rating Scale [22], the Ad Hoc Observation Form, and the State-Trait Anxiety Inventory-Y1 modified version, inspired by Appel et al. [20,21] will be administered to obtain information on the psychological state experienced before and after the VR session. The current study will investigate relaxation, worry/anxiety, sadness, tightness, annoyance, and anger. **Cognitive functions** (based on the Esame Neuropsicologico Breve 3 [23]).
SO3	To investigate the usability of the VR apparatus from the perspective of caregivers and health staff. Measurable Outcome: **Usability** (based on the System Usability Scale [24-26]) focusing on caregivers and health professionals who assisted users during the VR experience. Issues discussed during the focus group were the strengths and weaknesses associated with using virtual reality, the future perspectives, and the risks associated with using virtual reality with users affected by cognitive impairment).

Section b. Methodology

The RETURN-VR project will be characterised by three major activities: (i) co-design and implementation of a novel VR-based Reminiscence Therapy; (ii) setup, recruiting, and execution of a clinical trial to explore the effectiveness of the aforementioned digital therapy; (iii) dissemination.

b.1 Co-Design and implementation of a novel VR-based Reminiscence Therapy

The RETURN-VR project will conduct a thorough analysis of existing literature on technology-enabled interventions in patients with neurodegenerative diseases with a special focus on VR-mediated reminiscence therapy and tele-rehabilitation. This activity will trigger co-design sessions involving various stakeholders (patients, clinical professionals, informal caregivers, associations, etc.) to define specific VR-content for the design of interventions targeting different neurodegenerative disease needs. The co-design sessions will be aimed at identifying additional requirements to expand the existing VR application developed by the DHRes

Research Unit at FBK (described in Section c.) and will focus on the application of a RT-based approach that could be applied to patients at home with the remote monitoring of a healthcare professional. In this perspective, our main idea is to leverage on the recently added features of the VR application described in Section c. by introducing two new functionalities:
1) Tele-rehabilitation: to extend the mobile device-based dashboard by enabling the remote interaction between the healthcare professional and the patient exposed to a VR-based RT session. The role of a caregiver at home will be fundamental to help the patient wearing the headset and collect verbal feedback during/after each session.
2) RT-based exposition of immersive content: to extend the VR application running on the headset by enabling a partial interaction with previously uploaded 360º pictures through the superimposition of digital objects that can be easily manipulated by patients through their hands, leveraging on the recent advancements of Oculus primitives on hand-gestures recognition (thus removing the difficulties patients may face in using "clumsy" VR controllers).

b.2 Setup, recruiting, and execution of a clinical trial

Participants At least 40 individuals with mild to moderate dementia and their family caregivers (n= 40 family members who currently live with patients with dementia) will be recruited to participate in the study. Printed and digital flyers will be posted in the community surrounding Trento city (such as health facilities, community centres, Facebook, Twitter, and Instagram using the researchers' institutional accounts), and other platforms or organisations, such as Association and Facilities for People with dementia (e.g., APSP "Grazioli" in Povo, Trento, Associazione Alzheimer Trento, Associazione Parkinson Trento among the others). To control for possible selection bias related to socio-demographic features, we intend to recruit equal samples of males/females for both the patients and the caregivers.

Experimental design The study design is based on a mixed-methods methodological approach inspired by the Obesity-Related Behavioral Intervention Trials (ORBIT) framework [27] for the design (Phase Ib) of digital interventions and their preliminary testing (Phase IIa). In this phase, a proof-of-concept implementation of the RETURN-VR VR application will be realised, and preliminary feasibility testing will be completed to investigate the level of engagement, user experience, and autobiographical memory with a sample of patients with cognitive impairment. In this context, we will also enroll a sample of patients as a control group to compare the experimental condition with a group exposed to an 'as-usual' intervention. The sample size can be small because the focus is mainly on the user experience outcome, and sample size estimation is not required. Moreover, the sample can be selected from accessible individuals since this phase will aim to understand if the intervention deserves an increased depth of analysis, improvement, and future testing.
Patients with dementia will be randomly assigned to one of the following conditions:

- Experimental condition: This group will be exposed to personalised virtual reality scenarios characterized by audio and visual stimuli in which familiar contexts are represented.
- Control condition: Participants in this group will be exposed to the "as usual" treatment.

Consent Caregivers and patients with dementia will fill out a copy of the consent form by email and will be asked to sign the informed consent form and provide a completed copy to a member of the research team via email or file share. The substitute decision-maker will be contacted for patients who cannot provide informed consent. All participants must give their written consent to take part in the research.

Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Patients	-60 years of age or older. -living at home with at least a family caregiver. -diagnosed with mild to moderate dementia.	-history of seizures or epilepsy. -cardiac pacemaker or other metal devices. -severe neurological damage (such as head trauma or stroke). -palliative care. -diagnosis of psychosis. -cervical conditions or infectious or gastrointestinal disorders or injuries or open face wounds that would make it unsafe for them to use the VR headset. -alcohol/related dementia, Korsakoff syndrome. - motor or visual dysfunctions and neuromuscular pain that prevent the use of Oculus.

		-cannot speak and understand Italian.
Caregivers	-live with a patient with dementia. -in a role as a primary caregiver for a patient with dementia. - have the possibility to use a PC and have an internet connection.	-not able to understand and speak Italian. -in a role as a professional caregiver for the patient with dementia. -unable to provide informed consent for themselves.

Procedure The VR intervention will be administered twice weekly over 3 months [12]. The experimental VR procedure will take place at Associations and Facilities sites to which patients refer for their daycare treatments. The experimenter and the health staff operator will follow each VR session remotely connected by Google Meet with the caregiver and the patient. The HMD images will be mirrored to a laptop to let the researcher see what the participants viewed and interacted with. The participants remain seated during the VR intervention to reduce motion sickness when using the HMD and to minimize the risk of falls in the elderly. The participants will be provided with the controllers to interact with the VR space, and the researcher will be beside them to assist and guide them when needed. Cognitive Functions and depressive symptoms will be assessed before the entire VR procedure and after 3 and 6 months. Tolerability, motion-sickness symptoms, usability, engagement, pleasantness, satisfaction, emotions, and general psychological state will be investigated before, during, and after each VR exposure.
At least 40 patients and the corresponding caregivers will be enrolled to participate in the study. 20 individuals will be randomly allocated to the VR group (experimental condition), and the other 20 participants will be part of the "treatment as usual" group (control condition). A flow chart representing the proposed procedure can be found in Appendix 2.

Data collection
Socio-demographic questionnaire: to obtain information about socio-demographic information.
Mini-Mental State Examination and **UCLA Neuropsychiatric Inventory**: to assess the cognitive impairment and psychological symptoms from the medical record.
Esame Neuropsicologico Breve 3 (ENB-3): to obtain an accurate and comprehensive assessment of the cognitive functions.
Cornell Scale for Depression in Dementia (CSDD) is a 19-item clinician-administered instrument designed for the rating of symptoms and signs of depression in patients with dementia.
Observed Emotion Rating Scale (OERS): adapted from the original version of Lawton et al.41. It is used as an observation tool to assess the presence and frequency of negative and positive feelings experienced during the sessions.
Ad Hoc Observation Form: to record the type and frequency of vocalizations, phrases, facial expressions, body movements, reminiscences, and pleasant memories elicited during the VR exposure.
Virtual Reality Symptom Questionnaire (VRSQ): this measure assesses the general and eye-related physical symptoms of exposure to a virtual reality environment.
The VR experience tolerability was primarily estimated based on the frequency of time spent in the VR context, positive and negative emotions expressed, and the weight of the HMD. The usability, engagement, pleasantness, and satisfaction experienced in using the VR apparatus were inspired by a measure developed and described by Appel et al. 20,21 composed of both self-reported questions and other queries that the experimenter answered by observing the participant's behavior during the experience
System Usability Scale (SUS): to obtain information from caregivers about usability and the perceived quality rating of the VR set-up deployed, and the SUS will be filled in by caregivers and health staff operators who participated during the VR sessions.
Focus group: at the end of the experimental phase, a focus group was conducted with the caregivers and health staff operators who assisted users during the VR experience.

b.3 Dissemination
Dissemination activities will focus on RETURN-VR project objectives, methods and results. The main target will be on communication and scientific dissemination of (i) the results of the application of participatory and patient-centred design principles in the context of neuro-degenerative diseases; (ii) the set-up and analysis activities regarding the clinical trial; (iii) the impact of the VR-based intervention developed so that the highest number of neuro-degenerative diseases specialists and institutions may consider their adoption.

Section c. Available instrumentations and resources

VR Application

The DHRes research unit at FBK has recently developed an innovative VR application whose objective is to facilitate the exposition to customisable relaxing environments based on natural contexts aiming at facilitating a positive impact on behavioral and psychological symptoms of older adults with cognitive impairments (including patients affected by neurodegenerative diseases) [28]. The software requirements, encompassing the interface and interaction with virtual reality along with visual and auditory elements that can be selected to include in the virtual context, were gathered among domain experts and test users. The application was composed of a series of 360° 3D virtual natural environments that were characterised by auditory stimuli drawn from the freesound database and visual stimuli developed leveraging on Unity®, with assets from the Unity official asset store, Polyhaven, and HDRIhaven. Specifically, users may choose to experience relaxation, based on their preference, in one of three realistic scenarios, a mountain, a marine, and a countryside environment, that may be selected and personalised with the support of a healthcare professional. For each selected environment, the participants had the option to personalise a series of sub-categories of the elements, including different types of sounds (e.g., animal sounds, wind rustle, type of music), visual elements (e.g., the presence of people, objects, or animals), the position in the virtual space, the presence of people, and to change the time of day and weather conditions. The healthcare professional had the possibility of customising each scenario based on a dashboard interface running on a laptop connected to the VR headset via a wired link that allowed her to see what the participant is observing during the experience. However, the VR exposition was based on an **in-presence** setting since the targeted users were older adults living in long-term care facilities.

To overcome these constraints, the VR application has been recently extended in two new directions: on one side, the dashboard can now run on a wireless mobile device (an Android smartphone or tablet) to simplify VR session control & monitoring by a healthcare professional. Also the VR scenarios can now run on stand alone Oculus Quest 2, sacrificing computational power for more portability. The VR application has been also extended to host immersive scenarios obtained from 360º pictures of real-life settings (i.e. the main square of a city; a mountain lodge; a lake or a marine location; etc). These recent advancements of the VR application prototype paves the way toward hosting scenarios that can trigger memory reminiscence especially in patients affected by neurodegenerative diseases as described in Section b. This will be obtained showing personalised content to the user (photos, videos, audio tracks), selected by the healthcare professionals and/or relatives of the patient.

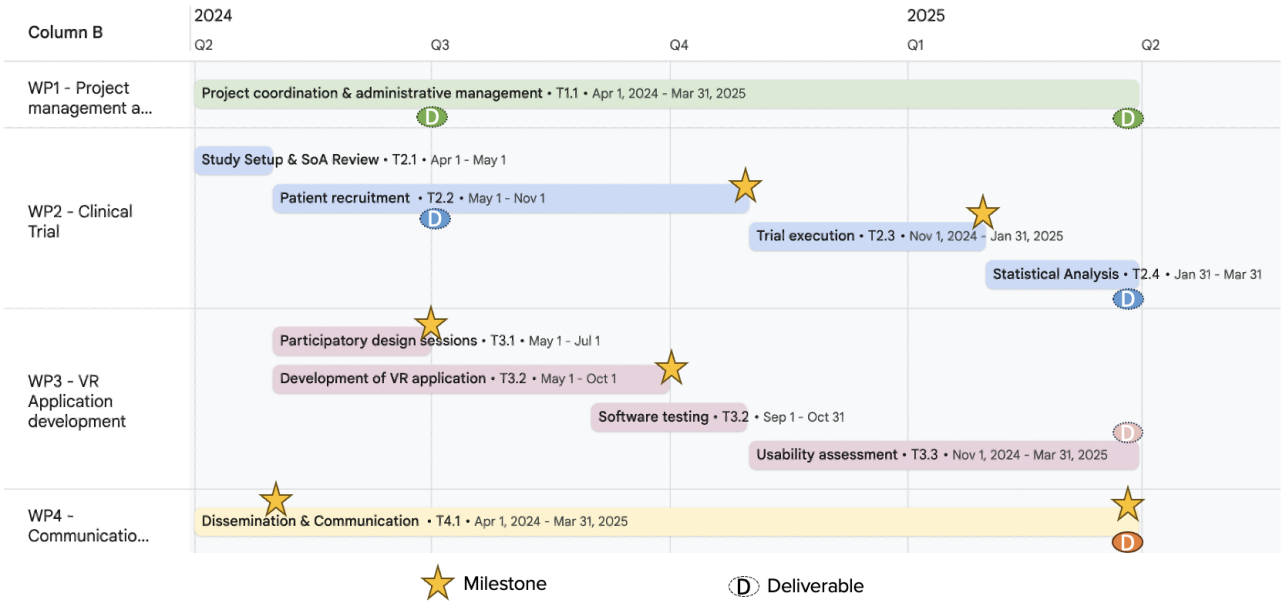
Hardware equipment

The DHRes research unit at FBK is equipped with a Virtual Reality Lab facility that includes the following hardware devices:

- n. 3 Oculus Quest 2
- n. 3 Oculus Quest 3
- n. 2 Pico 4
- n. 5 Android smartphones
- n. 3 Android tablets
- n. 1 laptop Windows Alienware X16 with GeForce RTX 4080
- n.1 Desktop Windows Alienware R15 Aurora with GeForce RTX 4090 and Monitor

The available equipment will be used to run the clinical trials specified in Section b.

Section d. GANTT diagram



WP1. PROJECT and DATA MANAGEMENT

This WP will set the basis for ensuring the successful execution of the project activities. The project management ensures the positive implementation of the activities in accordance with the principles of PNRR (such as the DNSH) and within the foreseen budget, and supports effective coordination of the team members. Finally, it provides ongoing support for the data management throughout the project.

Deliverables:
D1.1 Data Management Plan [M3]
D2.2 Updated Data Management Plan [M12]

WP2. CLINICAL TRIAL

The main goal of this WP is to carry out a feasibility study with a Virtual Reality Telerehabilitation Reminiscence Therapy in patients with neurodegenerative diseases (dementia). To underpin this effort, we will i) setup the feasibility study and perform an in-depth review of the state-of-art; ii) submit the project to the institutional ethical committee and wait for approval before starting with the enrollment of participants iii) recruit patients and their family caregivers, iv) execute the trial and perform the assessment at 3 months (after the end of the entire intervention), and at 6 months, v) perform the statistical analysis on clinical data collected.

T2.1 Study setup & SoA - Study Setup including pre-registration with ClinicalTrials.gov before including the first participant. In this task, we will contact a number of associations to verify their availability to involve their members in our experimental activity. The approval from the competent authorities and regulatory and institutional ethics board approval is included in this task. We will also thoroughly analyze the SoA in the literature about RT and VR.
T2.2 Patient recruiting - In this task we intend to recruit participants based on flyers, both in print and digital formats, which will be distributed across the Trento city community through various channels, including health facilities, community centers, and social media platforms such as Facebook, Twitter, and Instagram using the researchers' institutional accounts. Additionally, dissemination will extend to other platforms and organizations, including the Association and Facilities for People with dementia, such as APSP "Grazioli" in Povo, Trento, Associazione Alzheimer Trento, Associazione Parkinson Trento, among others. To mitigate potential selection bias related to socio-demographic characteristics, we aim to recruit equal numbers of male and female participants for patients and caregivers.
T2.3 Trial execution - Trial design: longitudinal, between-subject design. Participants will be randomly exposed to (1) Experimental condition (Active Intervention) or (2) Treatment As Usual condition (Active Control Condition). Elaboration of an eCRF containing all socio-demographic and clinical data: All data

necessary for the study will be registered into eCRF (electronic case report form) ad hoc prepared for each study group. We also intend to train the health staff operator to participate during the VR procedure in the utilization of the Software and Hardware equipment as well as in the assessment administration.
T2.4 Statistical Analysis - The statistical analysis will be conducted after the last participant has completed his/her intervention, analyzing three dimensions:

a. Feasibility (drop-out rate and compliance) and acceptability as well as an "experience of patient" design to all participants involved exploring their suggestions about potential ways to improve the intervention, strategies for disseminating, etc
b. To investigate if the intervention positively impacts psychological and cognitive functions in the framework of the proof-of-concept study.: i) ANCOVA to compare post-treatment AIM scores between both arms controlling for baselines scores. The dependent variable will be the post-treatment AIM score. The independent variable will be the arm allocation. The covariates will include baseline AIM score, age, gender, psychiatric medication and adherence. ii) We will perform analog analyses for the secondary outcomes, using logistic models for binary variables.

Milestones:
M2.1 End of recruitment activity. [M7]
M2.2 Finalisation of the clinical trial. [M10]

Deliverables:
D2.1 Final version of the study protocol to be approved by the ethics committee [M3]
D2.2 Report on the results of the feasibility study and approved study protocol. [M12]

WP3. VR APPLICATION DEVELOPMENT
The main goal of this WP is to understand and refine the main requirements to properly extend the existing VR application to enable Reminiscence Therapy exposition to patients with neurodegenerative diseases while making the mobile-based control dashboard robust to a tele-rehabilitation setting.

T3.1 Participatory design sessions - This task refers to the participatory design sessions involving proper stakeholders to define the requirements of the RT-based VR application targeting different neurodegenerative disease needs
T3.2 Development of VR application - This task will leverage on the requirements identified in T3.1 to properly extend the VR application with new customisable content that can be configured by healthcare professionals from remote.
T3.3 Software testing - This task refers to the proper software testing needed to make the application ready for the clinical trial performed in T2.3.
T3.4 Usability assessment - This task will refer to the assessment of the usability of the VR application by the patients (also considering caregivers point of view) and by the healthcare professionals.

Milestones:
M3.1 End of participatory design activity. [M3]
M3.2 VR application finalised and properly tested before experimental activities. [M7]

Deliverables:
D3.1 Technical documentation of the RETURN-VR application. [M12]

WP4. COMMUNICATION, DISSEMINATION & STAKEHOLDERS ENGAGEMENT
We will implement a targeted communication strategy over the 12 project months. Utilizing channels such as social media, leaflets, and a dedicated project website we aim to clearly convey the groundbreaking impact of our VR application for dementia care. Dissemination activities include submitting research papers with clinical and technical focus (i.e. JMIR) and organizing at least two workshops involving the different stakeholders involved such as clinical partners, patients associations, VR research community, etc. To raise awareness and working knowledge of the solution developed by RETURN-VR, an important part of this WP is aimed at exploring possibilities for development of the solution beyond TRL level 5. A moment of communication and dissemination of project results will be the participation to a closing webinar presenting project outcomes as well as focusing on future perspectives of the research results.

Milestones:
M4.1 Preparation of the communication campaign (e.g., printed and digital flyers) to support patient recruitment. [M2]
M4.2 Closing workshop. [M12]

Deliverables:
D4.1 Publication on the review of the State of Art. [M12]
D4.2 Report on project outcomes and potential future implications. [M12]

References

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2. Black W, Almeida OP. A systematic review of the association between the Behavioral and Psychological Symptoms of Dementia and burden of care. Int Psychogeriatr 2004;16(3):295-315. [doi: 10.1017/s1041610204000468]

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7. Brimelow RE, Dawe B, Dissanayaka N. Preliminary Research: Virtual Reality in Residential Aged Care to Reduce Apathy and Improve Mood. Cyberpsychol Behav Soc Netw 2020;23(3):165-170. [doi: 10.1089/cyber.2019.0286]

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17. Triberti, S. & Liberati, E. G. Patient centered virtual reality: An opportunity to improve the quality of patient's experience. In P.Cipresso & S. Serino (Eds.), Virtual reality: Technologies, medical applications and challenges, 3–30 (Nova Science Publishers, 2015).

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Curriculum vitae Oscar Mayora Ibarra - Principal Investigator

PERSONAL INFORMATION

Family name, First name: Mayora Ibarra Oscar Arturo
Researcher unique identifier: ORCID 0000-0002-5773-3876
Date of birth: 06/09/1967
Nationality: Mexican, Italian
URL for web site: https://digitalhealthlab.fbk.eu/

EDUCATION

2000	PhD: Speech Recognition with Holographic Neural Network Model Departement of Biophysical and Electronic Engineering, University of Genova, Italy. PhD Co-Supervisors: Prof. Daniele Caviglia, Prof. Francesco Curatelli
1994	Master: Holographic Associative Memory Tec de Monterrey, Mexico
1991	Bachelor Degree: Electronics and Communications Engineering Tec de Monterrey, Mexico

CURRENT POSITION(S)

2020	Head of Digital Health Research at Fondazione Bruno Kessler, Italy
2018	Adjunct Professor at FH-Burgenland, Austria

PREVIOUS POSITIONS

2004 – 2016	Head of Ubiquitous Health Unit, Create-Net, Trento, Italy
2001 – 2004	Associate Professor and Head of Computer Science Department Tec de Monterrey, Campus Morelos, Mexico
2000 – 2001	Visiting Research Scientist, VTT Electronics, Oulu, Finland

FELLOWSHIPS AND AWARDS

2014	Augmented Human Conference, Honourable Mention Award, Tokyo, Japan
2003	Banco Nacional de México (Banamex) Award - Evolution over Internet: First Prize
2003 – 2016	Awarded as SNI – Level 1(Member of the Mexican National Research Council)
2001	Best Paper Award. Applied Voice I/O Society 2001 Conference, San Jose CA, USA
2000 – 2001	ERCIM Fellowship, VTT Electronics, Oulu, Finland
1996 – 2000	CONACYT PhD Scholarship, University of Genova, Italy

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS (if applicable)

PhD Students:

- Andrei Popleteev (PhD advisor - now Associate Professor at University of Luxembourg)
  PhD thesis: "Indoor positioning using FM radio signals"
- Aleksandar Matic (now R&D Director at Koa Health spinoff from Telefonica-Alpha)
  PhD thesis: "Sensing Social Interactions Using Non-Visual/Auditory Mobile Sources"
- Alban Maxhuni (now post-doc at Technical University of Denmark)
  PhD Thesis: ”Managing the Scarcity of Data through ML in Healthcare Domain”

Visiting PhD Researchers:

- Alexandr Talitsky (PhD at Univ. Arizona, USA – 2019)
- Sergio Muñoz López (PhD at Universidad Politécnica de Madrid, Spain – 2019)
- Jose Carlos Carrasco Jimenez, (PhD at Tec de Monterrey, México - 2015)
- Enrique Garcia Ceja, (PhD at Tec de Monterrey, México - 2013)

Sabbatical Visitors:

- Enrique Sucar, Full Professor and Director at INAOE, Mexico. Awarded with the National Award for Science (Highest distinction for a Mexican Scientist). 2016
- Jim Regh, Full Professor at Georgia Tech, USA. 2011

ORGANISATION OF RELATED SCIENTIFIC MEETINGS

2006 – 2020 Founder and Steering Committee Member of Pervasive Health Conference
2023 Ubicomp Workshop on Digital Therapeutics Future, General Chair, (50 participants)
2022 MUM Workshop on Virtual Reality for Health and Wellbeing, General Co-Chair (50 participants)
2021 Mexican Human Computer Interaction Conference (MexIHC), General Chair, (100 participants)
2019 Pervasive Health Conference, General Chair, Trento, Italy (200 participants)
2013 Pervasive Health Conference, General Chair, Venice, Italy (200 participants)

INSTITUTIONAL RESPONSIBILITIES

Since 2022 EIT Health, FBK Scientific Coordinator
Since 2020 Trentino Salute 4.0 Joint Research Unit, Scientific Coordinator
Since 2018 Trentino Reference Site on Active and Healthy Ageing (EIP-AHA), Scientific Coordinator

REVIEWING ACTIVITIES

Since 2000 Guest Editor for different peer-reviewed Journals (Springer Mobile Networks and Applications, IMIA Methods of Information in Medicine, IEEE Pervasive Computing, MDPI Sensors. IEEE Intelligent Systems)
Since 2000 Evaluator and Reviewer for different peer-reviewed Conferences (IMWUT Ubicomp, IEEE Percom, EAI Pervasive Health, ACM CHI, ACM Mobile HCI)
Since 2016 Evaluator for "La Caixa" Foundation's Fellowships Programme, Spain and Portugal
Since 2010 Evaluator and Reviewer for EU Commission (FP7, H2020, Horizon Europe)
Since 2016 Evaluator and Reviewer for Swiss National Science Foundation
Since 2000 Evaluator and Reviewer for National Research Council (CONACYT), México

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

Since 2020 European Alliance for Innovation, Fellow
Since 2016 Mexican Society of Computer Science, Member
Since 2010 IEEE Info Communications Journal, Editorial Board Member
Since 2004 ACM - Association for Computer Machinery, Senior Member
Since 2004 ACM-SIGCHI – ACM Special Interest Group on Computer Human Interaction

MAJOR COLLABORATIONS

- Trentino Salute 4.0 Competence Center - Role: Joint Research Unit Scientific Coordinator. Main collaborators: Province of Trento and Provincial Healthcare Trust, Italy.
- EU Collaboration under foundational Project MONARCA on Monitoring and Interventions for Bipolar Disorder and mental health Management. Role: Project Coordinator. Main collaborators: DFKI – Germany, REGIONH and ITU – Denmark.
- International UBIHEALTH Network – Ubiquitous Computing for Healthcare. Role: Project Coordinator. Main collaborators: University College London - UK, University of California at Irvine - USA, Georgia Tech - USA, Tsinghua University - China, INAOE - Mexico

Curriculum vitae - Susanna Pardini (Co-Principal Investigator)

PERSONAL INFORMATION

Family name, First name: Pardini, Susanna

Researcher unique identifier(s) (ORCID.): Susanna Pardini (0000-0002-6692-8923) - ORCID

Date of birth: 12/08/1988 Nationality: Italy

URL for web site: Susanna Pardini - Google Scholar

EDUCATION

2020-2023 Ph.D. program- (My Ph.D. viva has been approved to be defended. The Ph.D. thesis was evaluated positively without the need for corrections by the reviewers; assessment: very good/excellent). Brain, Mind & Computer Science- Computer Science for Societal Challenges and Innovation, XXXVI series. Department of General Psychology, University of Padova, Italy
PhD Supervisor: Prof. Caterina Novara

2015-2020 Psychotherapist- Istituto di Terapia Cognitiva e Comportamentale – Italy
2019-2019 Post Graduate Master in Sport Psychology, Psymedisport group, Italy
2018-2019 Post Graduate Master in Eating disorders and Obesity, Istituto Miller –Italy
2011-2014 Master's Degree in Clinical Psychology, Department of General Psychology, University of Padova, Italy
2008-2011 Bachelor's Degree in Cognitive Psychology and Psychobiological Sciences, University of Padova, Italy

CURRENT POSITIONS

2023 Researcher - Digital Health Research, Bruno Kessler Foundation, Italy
2018–2024 Teaching activities: Department of Developmental Psychology and Socialisation (DPSS) University of Padova, Italy
2020 Psychotherapist
2016 Psychologist

PREVIOUS POSITIONS

May 2022-August 2022 - Visiting PhD student
School of Health Policy and Management York University (Toronto, ON) Canada
Open Lab University Health Network (Toronto, ON) Canada
Participation in studies on Virtual Reality-therapy programs devoted to improving well-being in people affected by Dementia, living at home and in acute-care settings.
October 2020 – September 2023 Brain, Mind & Computer Science (BMCS) PhD student
Human Inspired Technology Research Centre (HIT) Department of General Psychology (DPG) University of Padova, Padova (Italy) Bruno Kessler Foundation, Trento (Italy)

FELLOWSHIPS AND AWARDS

2019–2019 Schoolarship - Department of General Psychology (DPG) University of Padova
2017–2018 Schoolarship - Department of General Psychology (DPG) University of Padova
Associazione Nazionale fra Lavoratori Mutilati e Invalidi del Lavoro (ANMIL onlus)- Rovigo (Italy)

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

2018-2024 Supporting supervisor (Co-relatore) - For both bachelor's and master's degrees final dissertations. Department of General Psychology (DPG) University of Padova. Number of Master Students: 15; Number of Bachelor Students: 16

INSTITUTIONAL RESPONSIBILITIES

2018–2023 Member of Committee during the Counseling and Psychotherapy course and the Clinical Psychological course examination; Department of Developmental Psychology and Socialisation, Department of General Psychology, University of Padova, Italy.

REVIEWING ACTIVITIES

2021 – Reviewer for Scientific Journals (Virtual Reality Journal Springer, Digital Health Sage Journals, BMC Psychiatry Springer Nature**,** Journal of Affective Disorders Elsevier, BMC Public Health Springer Nature, Cogent Psychology Taylor & Francis, Journal of Eating Disorders Springer Nature, Journal of Medical Internet Research - Formative Research**,** Journal of Environmental Psychology Elsevier, Journal of Medical Internet Research - Mental Health**,** Psychology Research and Behavior Management DovePress, PlosONE**,** International Journal of Human-Computer Interaction (IJHCI), Frontiers in Psychology- Health Psychology**,** Stress &Health)

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2023 Member E-CARE: Early CAreer REsearchers' Network (Psychology Italian Association)
2022 Member SIPSIOL (Italian Association of ONLINE Psychology)
2021 Member AIP (Psychology Italian Association)
2017 Member ANSES (Stress and health Italian Association)
2015 Member ACBS (Association for Contextual Behavioral Science).
2015 Member SIPO (Italian Association of Psycho-Oncology)
2015 Member AIAMC (Associazione Italiana di Analisi e Modificazione del Comportamentale e Terapia Comportamentale e Cognitiva) - European Accreditation by EABCT (European Association for Behavioural and Cognitive Therapies)

MAJOR COLLABORATIONS

2015- Support Investigator-Project Manager: Istituto Oncologico Veneto-IOV-IRCCS.
2017- Co-Investigator: Department of General Psychology, University of Padova.
2019- Co-Investigator: Department of General Psychology – University of Padova & Department of Clinical and Health Psychology, SWPS University of Social Sciences and Humanities, Katowice Faculty of Psychology, Poland.
2022- Co-Investigator: Michael Garron Hospital (Toronto East Health Network), OpenLab- University Health Network (Toronto, Canada), York University (Toronto, Canada).
2022- Principal Investigator: Fondazione Bruno Kessler (Trento), Department of General Psychology, University of Padova (Padova), Azienda Pubblica di Servizi alla Persona "Grazioli" (Trento).

SCIENTIFIC PUBLICATIONS ***Susanna Pardini - Google Scholar***

Appendix 1: All current grants and on-going and submitted grant applications of the PI (Funding ID)

Mandatory information (does not count towards page limits)

Current grants (Please indicate "No funding" when applicable):

Project Title	*Funding source*	*Amount (Euros)*	*Period*	*Role of the PI*	*Relation to current Proposal*
PNC-Dheal-Com	PNRR-PNC Program	€ 1.078.000	2023-2026	FBK PI	VR-enabled support as digital therapies for mental health
VR4Anxiety	No funding	No funding	2023	Project Coordinator	Environments for anxiety management for early Alzheimer patients
XR4A	EIT Digital	€ 95.000	2022	Project Coordinator	XR enabled social skills therapy for adolescents with Autism and neurodevelopment disorders
VRT-VR	Fondazione VRT, Trento	€ 23,879	2021	PI	Fund for a VR Lab for psycho-education interventions

Submitted Grant Applications (Please indicate "No funding" when applicable):

Project Title	*Funding source*	*Amount (Euros)*	*Period*	*Role of the PI*	*Relation to current Proposal*
DARLENE	Interreg Alpine Space	€3 million	2024-2026	Project coordinator	VR-enabled support for mental health of adolescents in rural alpine areas
VR Health Champions	Interregional Innovation Investments (EU funds)	€ 247,803	2024-2026	FBK PI	Disrupting the European Healthcare Systems with Virtual Reality and Augmented Reality Applications

Appendix 2: Flowchart of the proposed feasibility study

The following figure represents the procedure of the feasibility study explained in section b.2.

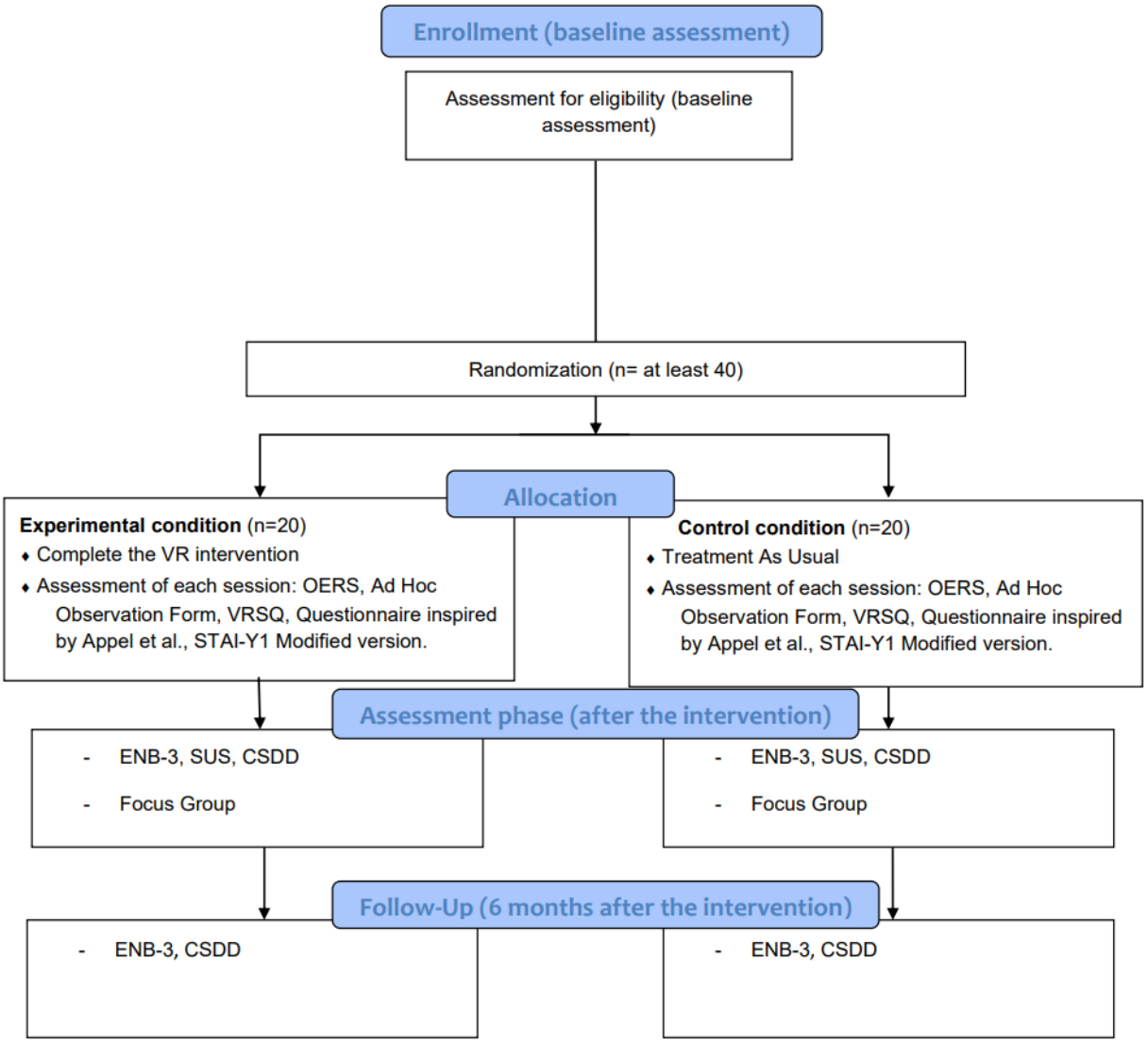

TABELLA COSTI PERSONALE STANDARD				COSTO DEL PERSONALE
FASCIA DI COSTO /LIVELLO	**NUMERO SOGGETTI**	**COSTO ORARIO vedi nota**	**MONTE ORE**	
Basso	**2**	27 €	980	26,460 €
Medio	**1**	43 €	500	21,500 €
Alto	**2**	75 €	750	56,250 €
TOTALI	**5**		**2230**	**104,210 €**

COSTO ORA si deve far riferimento al Decreto Interministeriale n. 116 del 24/1/2018

BUDGET DI PROGETTO	COSTO DEL PERSONALE	OVERHEAD	Costi per servizi di Consulenza Specialistica	Costi per licenze direttamente imputabili al progetto	Costi per materiali e attrezzature direttamente imputabili al progetto	Costi per altre tipologie di spese direttamente imputabili al progetto	COSTO TOTALE
	104,210 €	15,631.50 €	4,000.00 €	4,000.00 €	0.00 €	17,000.00 €	144,841.50 €