PhD in DESIGN - 41st cycle

THEMATIC Research Field: INTERACTIVE EXTENDED REALITY (XR) ENVIRONMENTS FOR HEALTH

Monthly net income of PhDscholarship (max 36 months)
1300.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Recently, the use of eXtended Reality (XR) technologies has become more and more pervasive in the health field. The capabilities of XR to replicate real-life scenarios, while providing controlled and safe environments, are currently opening new possibilities to design new patient-centered approaches.Such approaches could contribute to making an earlier diagnosis, the treatment more engaging, and, in general, could reduce the level of anxiety, thus improving the person’s well-being throughout all the phases of the patient journey. Given the XR potential, the process of introducing XR technologies may seem straightforward. Nonetheless, designing an application that is not only effective but also perceived as meaningful and easy to use is not trivial. The design of XR-based solutions must, in fact, start from an accurate analysis of users’ needs (patients, plus their caregivers and therapists), and take into account the context in which it will be used. Moreover, it should proceed step-by-step, considering prototypes’ validation with healthy users (before) and target populations later on. Finally, as Artificial Intelligence may also be involved (e.g., to adapt the application to patients’ capabilities), ethical and acceptance constraints are also essential to assess.
Methods and techniques that will be developed and used to carry out the research	The PhD will employ different methodologies to explore, develop, and validate XR solutions for healthcare.

	In the initial phase, exploratory methods such as literature review, technology scans, ethnographic fieldwork, and, when possible, interviews with patients, clinicians, and therapists will be used to identify needs, challenges, and opportunities. After having defined the XR solution’s requirements, the XR solution has to be developed considering the specificity of the hardware devices to be employed and the context of use. Also, the development should consider software good practices, i.e., modularity, maintainability, scalability, security, and simplicity. The iterative design approach will be used to explore interaction modalities and user experience in the first prototypes. Usability studies will be conducted with both novice and expert XR users to assess interface and interaction improvements. Finally, when the XR application is considered satisfactory, it can be assessed in healthcare-related contexts. Feasibility, user engagement, and clinical relevance will be measured in an adequately designed study combining quantitative measures (e.g., standardized questionnaire and/or objective data) with qualitative feedback.
Educational objectives	The PhD aims to train an independent researcher-designer capable of creating, testing, and critically assessing XR solutions that address real healthcare challenges. More specifically, educational objective can be summarized as follows: (1) Increase research competence for conducting research autonomously, through the design, development, and validation of XR solutions for health. In all phases, while considering the needs of the involved stakeholders (patients, therapists, caregivers, NHSs, etc.). (2) Acquire advanced skills prototyping effective and acceptable XR applications, being able to integrate emerging technologies with healthcare practices.

	(3) Acquire skills to effectively perform interdisciplinary collaboration and work in interdisciplinary teams. Professionals included in the process of building an XR application for health span from clinical personnel to engineers, psychologists, technologists, and IT specialists. (4) Understand the functioning of healthcare environments, clinical workflows, and patient needs to design XR interventions that are feasible, acceptable, and ethical. (5) Contribute to academic knowledge in design research, HCI, and digital health through publications, conferences, and dissemination activities.
Job opportunities	Designing XR solutions for health will train a graduate with interdisciplinary expertise in design research, digital technologies, and healthcare innovation. In academia, the graduate will have the chance to proceed his/her studies focusing on design, human–computer interaction, and digital health, advancing knowledge in emerging fields. In the healthcare field, the PhD graduate can become a digital health designer or a health/innovation consultant, developing and implementing XR tools for rehabilitation, patient engagement, and training. This role would contribute to filling the current gap between clinicians and technicians. Industry roles may be XR designers, UX researchers, product managers, or human factors specialists in technology companies, medical device firms, or start-ups exploring VR, AR, and MR for health and wellbeing.
Composition of the research group	0 Full Professors 1 Associated Professors 2 Assistant Professors 4 PhD Students
Name of the research directors	Marco Sacco-Research Dir./Sara Arlati-PhDco-Superv

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents	--

Scholarship Increase for a period abroad	
Amount monthly	650.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences). Financial aid per PhD student per year: **5.300,25 euros per student (total for 3 years)** Teaching assistantship:availability of funding in recognition of supporting teaching activities by the PhD student: There are various forms of financial aid both for research and teaching activities. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations. Computer availability (1st year, 2nd year and 3rd year): Each research group may supply phd student with a desk, if necessary. Desk availability: 1st year, 2nd year and 3rd year: Each research group may supply phd student with a desk.