

HEI-Lab: Digital Human-Environment and Interactions Lab

ACTIVITY REPORT

2018 - 2019

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HEI-Lab at a glance

HEI-Lab conception is rooted on the human-context interaction paradigm that looks into human behavior and its contexts interchangeably. Our mission is to converge Psychology and Design knowledge into a transdisciplinary scientific platform aimed at studying human behavior within this interactive view. Digital technology, shaped after Psychology principals and created by Design and Engineer processes, will be the HEI-LAB signature, offering new psychological research and intervention opportunities. Such opportunities are still to exist in a consolidate fashion in the Portuguese context.

Our aim is thus to conduct research on applied Psychology and Design processes through digital systems. These systems (smart environments comprising virtual, augmented and mixed reality apps) will mimic physical and mental environments optimizing the human-context relationship and providing a deeper insight on this interrelation. Such approach will move from the classical stimulus-organism-response model, to the innovative stimulus-technology-organism-technology-response model, from which higher scientific and intervention standards can be achieved. The intersection between design, technology, and psychology will then be used to test models of human behavior (focusing on psychological processes underlying various forms of ab/normal behavior and well-being across the lifespan) and create new 3Ts (technological therapeutic/intervention tools) to be applied to the contexts of clinical/health, social/organizational, and justice/forensic psychology.

HEI-LAB will further focus on the transition between analog and digital environments in order to develop new products and services aimed at improving individuals' health and well-being. Product and services development (e.g., VR apps and AI systems for psychological intervention programs) will boost the translation of 3Ts outside academy. HEI-LAB will be also devoted to the advance of education and training of young scientists and practitioners within this digital-real world methodology, as well as to the scientific dissemination of knowledge resulting from this transdisciplinary vision. Indeed, this transdisciplinary working frame is expected to improve our scientific outputs' competitiveness and ensure efficient knowledge transfer.

HEI-LAB organizing structure comprises five levels: direction board (encompassing HEI-LAB director, strategic board, technical board, and academy liaison board), ethical board, integrate research members, collaborate research members, and external consultancy board. Our research team and direction board embrace researchers with distinct backgrounds: psychology (including clinical, cyberpsychology, forensic, organizational, or experimental psychology), designers and video-game designers, motion-capture engineers, or street intervention artists. While this medley reflects well HEI-LAB transdisciplinary view, it is worth noting that our current proposal builds on previous consolidated work. HEI-LAB integrates a core group of researchers who have worked within this frame from the last 15 years. This group has a proven track record of developing and integrating information and communication technology tools, namely virtual reality and serious games, into cognitive-behavioral therapies and programs for neuropsychological assessment and rehabilitation. These programs have been tested for efficacy and are currently being used in a set of national and international mental health institutions. Similarly, our design and video-game design researchers have developed human-centric models and solutions for both real-world and virtual settings, including solutions for education, leadership, environmental behaviors, and health interventions.

In all, HEI-LAB results from the will of setting a new agenda that will bring the cognitive-behavioural paradigm into the digital age, reaching a wider range of populations and needs, with solutions that fit today's societal challenges. We call it E-CB.

HEI-Lab ruling bodies

HEI-Lab is run by four bodies: The Scientific Council (SC), the Direction (D), an Ethical Commission (EC), and an External Advisory Board (EAB). HEI-Lab is not divided into research groups. Instead, transdisciplinary work is organized into two streams HEI-CCL (Contextual Change Lab) and HEI-HCL (Human Change Lab) and - in each of which any researcher can participate and is carried out in four laboratory spaces provided by ULHT: LabPsiCom, LabPsiExp, MovLab, and Delli.

The SC consists of all integrated members with a PhD, including the members of the D., and is responsible for advising the D on scientific and strategic matters, with a special focus on emerging trends and opportunities. It meets regularly four times a year.

The D is the strategic and executive branch of HEI-Lab. It is appointed by the administration of ULHT from among the senior researchers and follows a principle of balance between the fields of Psychology and Design. It is responsible for setting the strategic agenda of HEI-Lab and for translating it into R&D processes, products and services (PPS). D comprises three levels: Research and Development (R&D), Academic Liaison (AL) and University Extension (UE). Four researchers manage R&D: Américo Mateus and Joana Carvalho will be responsible for implementing the strategic agenda; Jorge Oliveira and Filipe Luz will lead the operational procedures concerning laboratory activities and digital developments. Inês Jongenelen will manage AL, namely the connection with the postgrad courses. Pedro Gamito is the Director and Principal Investigator, with the responsibility for overseeing day-to-day HEI-Lab activities. Pedro is also responsible, together with Américo Mateus, for UE (interaction with HEI-Lab partners' institutions), and for translating the PPS developed and researched at HEI-Lab to the community.

An Ethical Commission (EC) consisting of one president and two researchers appointed by the SC will supervise the ethics aspects of HEI-Lab activities, including ethics of research with human participants and ethics of impacts on society and public health. It follows standard guidelines in the diverse fields in which HEI-Lab works, and will partly draw on guidelines and advice from the EAB, to establish and maintain a standard of ethical rules in research and intervention at HEI-Lab.

EAB consists of a group of high-profile international scholars. Three, Albert Rizzo, Stéphane Bouchard, and Thomas Parsons, are clinical psychologists and psychotherapists with a long career investigating and implementing digital solutions for mental health conditions. Joaquim Soares is Professor Emeritus from Mid Sweden University. His scientific tracking record reveals mastery in different methods of data collection and analysis in the fields of public health, women's health, violence towards old people, epidemiology and coronary artery disease. Soumitri Varadarajan is associate professor of Industrial Design at the School of Architecture and Design, RMIT University Melbourne. He is a leading researcher in design theory, design systems and design for health and wellbeing, and Senior lecturer (hon) of Olivia Newton-John Cancer and Wellness Centre, Austin Health. Paul Chamberlain is a senior expert reviewer and leading researcher on art and on design theory and practice focused on social care, health and wellbeing, and director of Lab4Living (Sheffield Hallam University). Telmo Baptista is the president of the European Federation of Psychologists' Association and the former president of the OPP (Portuguese Psychologists' Association).

HEI-Lab researchers

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List of the Integrated Researchers of the R&D Unit who do not hold a PhD degree (+ORCID number)

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List of the Collaborator Researchers of the R&D Unit (+ORCID number)

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Activities from June 2018 to July 2019

During this first semester of activity, the following actions took place:

Monthly direction meetings

We held 6 Board of Directors meetings, with the following agenda:

Board Meeting #5:

18/09/2018 - 14.00h, Room D1.3:

1. Preparation of works transversal to the Degree of Psychology, Videogames and Design;
2. Preparation of the visit of the evaluation committee;

3. Discussion of the transdisciplinary works;
4. Review of the HEI-Lab website;
5. Other matters.

Board Meeting #6

30/10/2018 - 14.00h, Room D1.3:

1. Transversal semester work;
2. Other matters

Board Meeting #7

27/11/2018 - 14.00h, Room D1.3:

1. Site;
2. Internal Regulation;
3. Transversal semester work;
4. Other matters.

Board Meeting #8:

29/01/2019- 14.00h, Room D1.3:

1. Discussion of proposals for regulations, financing criteria and self-assessment;
2. Appreciation of the semester works of the PAs;
3. Consideration of the work of the three action lines;
4. Integration of researchers into lines of action;
5. Consideration of the transversal project;
6. eCB
7. Contracting Plan
8. Schedule of six-month CC;
9. Other matters.

Board Meeting #9:

26/02/2019 - 10.30h, Room D1.3:

1. Preparation of the visit of the evaluation committee of the FCT.

Board Meeting #10:

30/04/2019 - 14.00h, Room D1.3:

1. Consideration and discussion of the visit of the evaluation committee;
2. Consideration and discussion of the final document of the proposed regulation;
3. Appreciation and discussion of semester interdisciplinary work;
4. Assessment and discussion of the work inserted in the current R & D lines.
5. Other matters.

General Research Assembly

12/02/2019 – 12.00h, DELLI.

1. Discussion and voting of the HEI-Lab Regulation;
2. Discussion and voting on the allocation of funding;
3. Preparation of the visit of the FCT Evaluation Committee;
4. Other matters.

18/06/2019 – 11.30h, DELLI.

1. Consideration and vote on the HEI-Lab Regulation;
2. Evaluation of researchers;
3. Studies and ongoing projects;
4. Studies to start next school year;
5. Submission of projects to FCT competitions, Aga Khan Foundation, and other sources of funding;
6. Other matters.

HEI-Lab research activities

- Focus research groups
 - Avatar Task Force

The Avatar Task Force (ATF) is an “open doors” structure working on the definition of the use of avatars for psychology and design purposes. There are three ongoing lines of action: forensic psychology, social psychology, and clinical/health psychology.

Forensic psychology: we are creating a 3D immersive experimental paradigm aimed at capturing juvenile offenders’ affective and emotional responses during exposure to critical events, encompassing physical and emotional threat.

Social psychology: we are defining the movements and characteristics of Avatars in close interpersonal interactions, with a focus on immediate facial/emotional and gestural responses and on intergroup effects.

Clinical/health psychology: we are developing a responsive avatar to be integrated on our VR biofeedback system to guide patients in relaxing exercises to help managing anxiety disorders.

Neuropsychology: we are working in the development of an interactive avatar to aid the patients in their daily routines of cognitive training within virtual reality environments.

The first study on this line was accepted to APA - Technology, Mind and Society Conference in Washington, DC, de 02 – 05 de 2019

- Education of the Future

Design for Education Innovation

This Project, Design for Education Innovation it's a contribution to take Design processes and System thinking to secondary schools.

In conjunction with business and academic partners, we are developing a project focusing on the "future classroom / space Makers" with national secondary schools.

Our main goal is to Re-think and Design, based on a participatory process, innovative Makers classrooms / spaces for implementing in several secondary schools in Portugal. The pilot project comprises the school groups of Aveiro, Alcanena, Montijo and Alvalade.

The focus is not only the design of space concept itself or the pure integration of technology or equipment, but rather to design, validate and disseminate a co-creation model, community activation, change of pedagogical practices, integration of other complementary activities to enrich the cognitive models of learning and implementation of these spaces and this holistic approach according to the following principles:

Involving all Stakeholders - Teachers, Students, Parents, Market and Local Governance. This involvement from the beginning of the project should create the "roots" for this Change aiming a high level of ENGAGEMENT.

Since the focus is not the space itself, but the **CHANGE of the teaching / learning model**, our applied research project is transdisciplinary, it implies individual dimensions (of teachers, students and parents, for example) and collective dimensions / social (community).

APPLIED RESEARCH METHODOLOGY

It intends to implement a research model based on methodologies: (a) Research in Action and (b) "Model building", characterized by a "Quali-Quanti" approach, ie a combination of qualitative and quantitative methods and instruments.

The differentiating factors of other Future Classroom projects underway by other groups and / or research teams involve the creation of a "Rich and INTEGRATED Research Environment". In complementarity with other existing projects, it is intended that the environment be complex and integrated, by integrating more areas of knowledge into research design.

The classroom object of this study should not only be seen as a Project Based Learning approach, collaborative, modular, prepared for experimentation and where purely and simply

a set of "disciplines" will be taught in a different way from "Traditional" through the use of new active pedagogical practices, for example. That example of context of research we call it "poor research environment", whose result is the validation of hypotheses by means of inductive or deductive.

- HEI-Lab research pipeline

Having on board researchers with diverse scientific backgrounds is a competitive plus but requires us to work on building common ground. HEI-Lab embraces both qualitative and quantitative approaches and the pipeline we present here offers a methodological overview on how to link research based on different methodological assumptions.

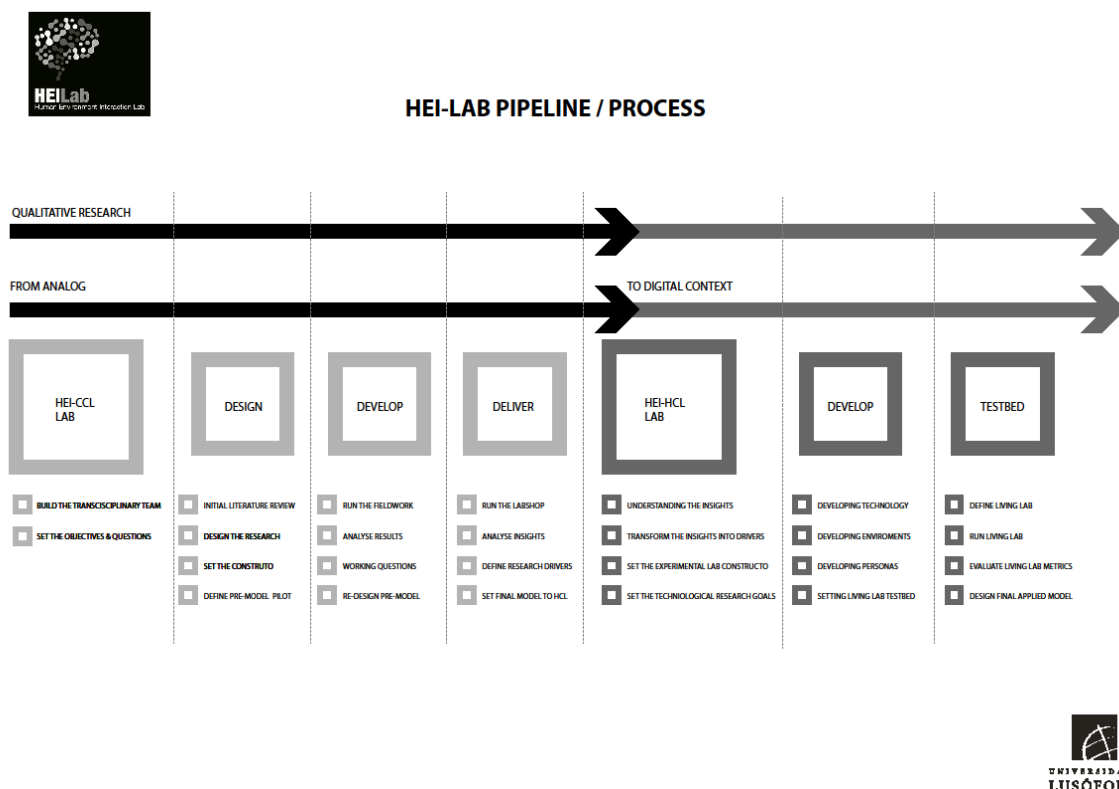


Figure 1. HEI-Lab Research Pipeline

Funded FCT projects

Under several FCT research exercises, the following HEI-Lab researchers' projects were funded:

Joana Carvalho's R&D project "FEMOFFENCE - The myth of innocence: A mixed methods approach toward the understanding of female sexual offending behavior" was funded by the Portuguese Science Foundation with € 127.993,70.

Pedro Gamito's R&D project "AUTOMOTIVE: AUTOMatic multiMODal drowsiness deteCTIon for smart VEHicles" was funded by the Portuguese Science Foundation. The consortium is led by INESC TEC, with the participation of HEI-Lab, ISEL and CARDIOID, having been funded with 238.786,63€.

Filipe Luz's R&D project "GamiLearning II (UTAP-EXPL/CD/0090/2017)" was funded by the Portuguese Science Foundation.

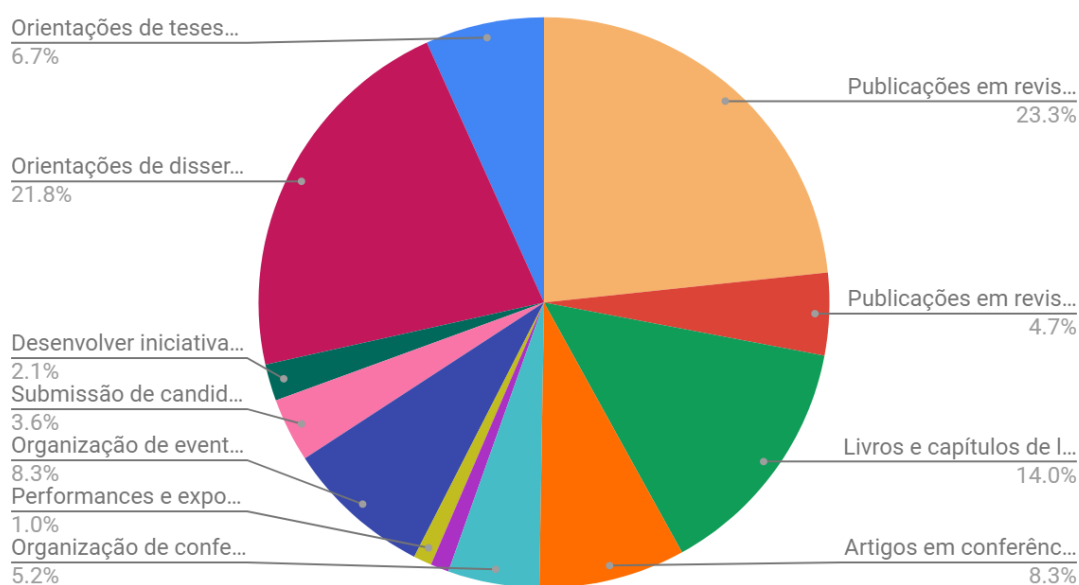
Pedro Gamito and Jorge Oliveira are VR consultants at MarES - Alterações nos usos e valores dos serviços de ecossistemas marinhos na região do Ártico Norueguês, financiado pela FCT, Ref: MarNoruega/0002/2016. 12.000€.

HEI-Lab scientific indicators

From a grand total of 193 indicators, 50% resulted from publications (97 papers on journal, books and conferences) and 28,5% (55) from dissertation and theses orientation.

https://docs.google.com/spreadsheets/d/1r-jzIDrhvEIG4WBYndRhiuF6bcEXoSgv5DaalQ_ZzKc/edit?usp=sharing

production indicators JUL'18 - JUN'19



HEI-Lab academic activities

- Integration of academic activities

During our Board of Directors meetings, we discussed and approved the plan that in 2018-2019, students from Psychology, Design and Videogame degrees will have common practical work assignments, following a cross-disciplinary pedagogical approach, on the following courses: SPA - Sensation, Perception & Attention, Cyberpsychology (Psychology), Design Management 3ºyear (Design) and Entertainment Systems (Videogame).

HEI-Lab extension

During this period the following projects with our partners' institutions have continued:

- Santa Casa da Misericórdia da Amadora. RCT with Alzheimer's samples for cognitive stimulation
- Polícia de Segurança Pública. Stress Inoculation study with VR anxiogenic cues.
- Casa do Telhal. Controlled study of cognitive stimulation on Opioid Use Abusers.
- Centro Hospital Psiquiátrico de Lisboa. Exposure therapy to anxiety disorder patients with the use of VR cues.
- Centro Hospital Psiquiátrico de Lisboa. Cognitive Stimulation of Bipolar Disorder patients
- Steelcase Education
- Promothean Education
- Impersol
- Agrupamento escolas de: Alcanena, Aveiro, Montijo e Alvalade

CCIEC: Centro de Competências em Inovação para a Educação e Cidadania

The Competence Centre will focus on the transfer of knowledge / technology (through Models, Processes and Tools) to the Education sector, aimed at:

- 1- The effort and innovation orientation of the models of school governance;
- 2- Re-design of teaching / learning models;
- 3- The co-creation of classroom spaces / school spaces;
- 4- The development of active pedagogical practices;
- 5- The technological integration
- 6- The development of models focused on creative processes and Innovation;
- 7- The development of technological solutions to monitor and monitor indicators improving school performance based on digital environments created from the knowledge of psychology (CB);
- 8- The creation of programs / actions oriented to the preparation and activation of schools for Change;
- 9- The development of Intensive and Continuing training programs focused on Change of the teaching ecosystem: Managers, Teachers, Students, Parents, Community and other Stakeholders
- 10- Creation of school innovation networks and Education spaces of the Future through the connection of the various National and International players associated to our Competence center - Ensures knowledge management regarding best practices.

Our competence center CCIED was created in partnership with the CEid - research centre of the ULHT School of Education. Our joint intervention will be through the provision of services - research, development and continuous training of teachers.

Portuguese Psychological Association

HEI-Lab has participated in the process of public consultation in the framework of the Guidelines for the Provision of Psychological Services Mediated by Information and Communication Technologies of the Portuguese Psychological Association