
Future InBodied: A Framework for Inbodied Interaction Design

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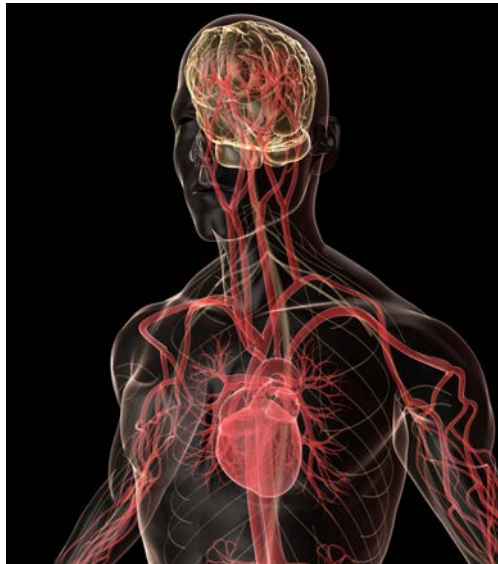
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Hands-On Inbodied Interaction Lenses for HCI Future Bodies: a design alternative to future bodies where technology supports cognitive-physical enhancement rather than replacement.

ABSTRACT

Inbodied interaction is an emerging area in HCI that aligns how the body performs internally with our designs to support and optimise human performance. Inbodied Interaction therefore relies on knowledge of our physiology/neurology/kinesiology etc, to blend with HCI methodology. Recent, Inbodied Interaction workshops and summer schools, have been designed to share models of these processes to accelerate access to these areas of specialisation for HCI researchers. As such this one-day-hands-on-studio presents an extension of this work – an Inbodied interaction framework - to (1) make inbodied sciences accessible and (2) usable for HCI practitioners when it comes to crafting experiences, whether for health, performance or play. Our framework also offers a design alternative to cyborging futures that seek to augment human performance, Inbodied Interaction seeks to help discover and optimise human potential. As such, in this studio, we will explore where inbodied interaction fits in the narrative of our future bodies.

KEYWORDS

Inbodied; body centric; health; wellbeing.

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CCS CONCEPTS: Human-centred computing ~ Interaction design ~ Interaction design theory, concepts and paradigms

INTRODUCTION

The goal of this studio is to present and test a new framework to open the design space for connecting the body with interactive technology to support/improve human performance. The framework is informed by the Inbodied Interaction paradigm [12] that suggests the better we know how we work in terms of our internal systems – from neurology to kinesiology – the more readily and effectively we can design to support those systems.

The concept of designing technology to support human performance is not new. Haraway’s *Cyborg Manifesto* [6] and Licklider’s *Human-computer Symbiosis* [7] are touchstone critique of our assumptions of how technology can be designed to augment our own capabilities. More recent trends in “health trackers” take another approach to performance, outsourcing monitoring and managing health actions to wearable devices. In Inbodied Interaction, we explore another future for interactive technology design to support performance by combining knowledge of the “inbodied” (like how balance supports strength, or movement memory). We design tools with the goal of insourcing knowledge, skills and practice of a performance experience, to build a foundation for that practice for the person to thrive without a dependency on the technology. This approach is not meant as a judgement on other approaches, it is rather, a design alternative to design for our future bodies.

FUTURE INBODIED: A FRAMEWORK FOR INBODIED INTERACTION DESIGN

The framework (Table 1) has 3 core stages: (1) *Building an Understanding* which focuses on selecting an area to explore, understanding its effects at large and the current user experience. (2) *Connecting & Experience with the IN5 Model* leverages our research [3, 8, 12] by leveraging any (or all) of what we have framed as 5 core “inbodied” fundamental volitional physical processes (Movement, Eat, Engage, Cogitate, Sleep) to support human performance. (3) *Bringing it Together to HCI* offers a playground where participants use the inbodied dimension from stage 2 to explore potential technologies and the resulting interactions to design HCI experiences that take the body as a starting point to support human performance. Finally, participants formulate ways in which they could study the user experience or measure improvement to the selected area.

Building an Understanding		
<p>1. Selecting an area to explore.</p> <p><i>Example:</i> Learning a new language</p>	<p>2. What are some statistics around this problem?</p> <p>1. According to the British Council’s research there are currently over 1 billion people learning English worldwide, its estimated that this number will double in five years [5].</p>	<p>3. Understanding the current UX, why, when, how?</p> <p>1. screen technologies, mobile phone, tablet, desktop, people learn anywhere at any time. It is limited to following a script in a learning game or course.</p>
Connecting & Experience with the IN5 Model		
<p>4. In5 knowledge - define questions</p> <p>1. what do we know that promotes and hinders human capability when it comes to learning a new language? 2. how can we boost our capacity to learn?</p>	<p>5. What do we know from IN5 that could aid this problem?</p> <p>1. Aerobic exercise improves spatial learning and memory [4]. 2. Engaging multiple sensory stimuli reinforces learning new contents [14]. 3. A good night of sleep helps with memory consolidation [15].</p>	<p>6. Choose one or many IN5 take-aways based on what we know</p> <p>1. Items 1 and 2, from step 5, can serve as the take-aways to start considering how technology can support these insights to mediate learning a new language (the selected area).</p>
Bringing it Together to HCI		
<p>7. Explore design interventions</p> <p>1. What technologies could support aerobic exercise and engaging multiple sensory stimuli to learn a new language? 2. Participants prototype ideas through a low fast fidelity approach.</p>	<p>8. Describe/draw how the user interacts with the tech and how the in5 take away is used</p> <p><i>After selecting a prototype</i></p> <p>1. Augmented Reality – where the user could be free to walk or jog while pointing at objects, which the system reads out or overlays in the virtual environment.</p>	<p>9. How would you Measure/Study the UX and improvement to problem?</p> <p>1. using semi structured interviews, and memory tests. 2. Measuring improvement comparing both screen-based vs our intervention 3. In the long term, two condition groups to learn contents for example.</p>

Table 1: Inbodied interaction framework for HCI - with example ‘learn a new language’ filled in.

What can Inbodied Interaction Experiences Offer to HCI Practitioners?

- inform design using inner bodily processes to improve human performance [11].
- facilitate users to develop a *functional awareness* of specific physio-neuro-relationships via interactive systems (e.g., why/how is movement improving cognitive performance or social interaction?) [2, 10, 13].
- facilitate UX where interactive systems use inner bodily processes as inputs: where the physical state acts as a system controller while it helps the user build a practice [1].

Topics This Studio Covers

- Introduction to Inbodied Interaction and the novel opportunities it opens for HCI.
- Example of collaborations with varied skills to achieve Inbodied Interaction projects.
- Resources to explore and leverage Inbodied interaction to take home.
- Hands on experience conceptualizing and prototyping Inbodied Interaction for future HCI experiences, including future bodies, using the Future Inbodied Interaction Framework.

Learning Goals and Discussion

- Participants will leave with both, (1) a new model (inbodied interaction) for approaching designs that either affects or relies on the body for their interaction.
- (2) direct shared experience of working with the *Future Inbodied Framework* (FID) to apply this approach in a reasoned, effective and efficient way for designing.

Inbodied Approach IN5: Move, Eat, Engage, Cogitate, Sleep (MEECS)

The state of the body (of which the brain is a part) affects all aspects of our performance. By performance we mean cognitive, social, physical and so on. A core model of Inbodied interaction is IN5 (“Move, Eat, Engage, Cogitate, Sleep”), these five processes are fundamental to our quality of life and provide functional ways to view the more formally defined 11 internal systems that keep us alive (endocrine, reproduction, integumentary, immune, skeletal, respiratory, muscular, digestive, urinary, cardiovascular, nervous). Each of the IN5 lens engages with each of the 11 internal systems to varying degrees. By leveraging the IN5 and focusing on how our internal systems inform all our embodied (mediated through the body) actions, Inbodied interaction design encourages us to ask how designing to engage these processes deliberately can support our aspirations for performance. For instance, if our aspiration is to improve cognitive performance, in5 gives us a way to achieve this aspiration by considering of any one, or combination, of the IN5 lenses (e.g., movement drives processes to support sleep, and in turn, enhanced sleep affects endocrine and nervous responses for taking in and processing information). Likewise, IN5 enables us to “start anywhere” for success. For instance, if one’s goal is to become more active, or “get ripped”, it may be easiest to begin this journey by first adding an hour to one’s sleep several nights a week for a time, and then – being better recovered – one has resource to move more.

Studio Schedule

Morning 1 – 9:30 – 10:45	Introduction to Inbodied Interaction and the potentials for HCI
Break 10:45 – 11:00	
Morning 2 – 11:00 – 12:20	Framework introduction with examples and team formation
Lunch 12:20 - 1:30	
Afternoon 1 – 1:30 – 3:00	Hands on: teams begin to use the framework
Break 3:00 – 3:15	
Afternoon 2 – 3:15 – 4:15	Hands on: teams continue to develop and refine their ideas
4:15 – 5:00	Teams showcase their journey and document the results
Post Studio - 5:00	Networking and discussion over drinks & dinner

Table 2: Break down of activities for the studio.



Fig 2. Using the framework to live sketch an interactive sleep garden at the first Inbodied Interaction Summer School.



Fig 3. Collaborative Design using in5 model (stage2 of the framework) at the Inbodied Interaction Summer School.

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CONCLUSION

Inbodied interaction is an emerging area in HCI that aligns how the body performs internally with our designs to support and optimise human performance. In this studio we introduce *The Future InBodied: A Framework for Inbodied Interaction Design*, to (1) make inbodied sciences accessible and (2) usable for HCI practitioners when it comes to crafting experiences, whether for health, performance or play. Our framework offers a design alternative to cyborging futures that seek to augment human performance, Inbodied Interaction seeks to help discover and optimise human potential. As such, in this studio, we will explore where inbodied interaction fits in the narrative of our future bodies. **Participate in this studio:** <https://wellthlab.soton.ac.uk/inbodiedfutures/>

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