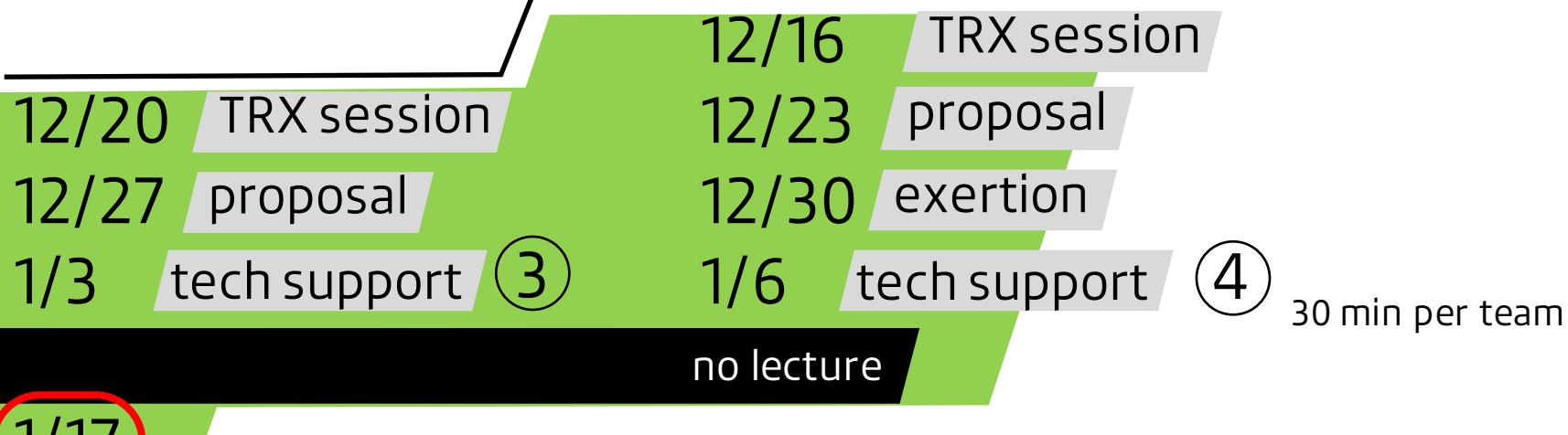


Unity TRX-kit is ready

Vibro-chair is on the way



1/17

Finals

- **Demo**
- **Poster** (interaction explained here)
- **Video**
- **At 3-Page write-up (Extended Abstract Format)**
refers to exertion game (can submit after 1/17)

Potential dates for final demo

13th, Friday

14th, Saturday

17th, Tuesday

AUTHORS

Papers and Notes

Late-Breaking Work

Workshops/Symposia

Interactivity

alt.chi

Case studies

Courses

Panels

Doctoral Consortium

Student Competitions

SIG Meetings

Video Showcase

Art Program

Career Development Symposium

CHI Stories

Remix

ATTENDING

SPONSORING

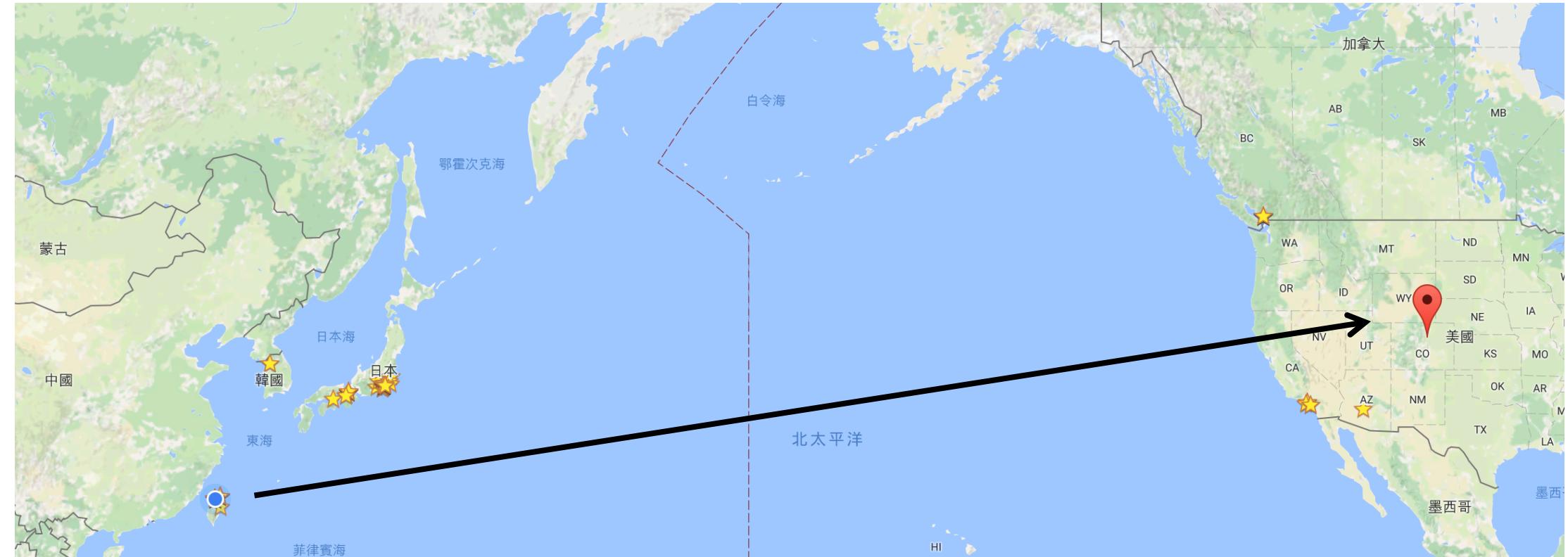
RECRUITING

EXHIBITING

ORGANIZERS



Interactivity: Call for Participation





Interactivity: Call for Participation

Quick Facts

Important Dates:

- Installations
 - Submission deadline: 12 October 2016 (20:00 EDT)
 - Notification: 12 December 2016
- Demonstrations
 - Submission deadline **11 January 2017 (20:00 EST)**
 - Notification: 10 February 2017
 - Publication-ready deadline: 15 February 2017

Submission Details:

- Online Submission: [PCS Submission System](#)
- Template: [Extended Abstracts Format](#)
- Submission Format: 4-page [Extended Abstract](#), video preview, still image, and a supplemental PDF describing what attendees will experience as well as technical and space requirements.
- **Submissions are not anonymous and should include all author names, affiliations, and contact information.**



Student Game Competition: Call for Participants

Quick Facts

Important Dates:

- Submission deadline: 13 January 2017 (20:00 EST)
- Notification deadline: 2 February 2017
- Publication-ready deadline: 9 February 2017

Submission Details:

- Online Submission: [PCS Submission System](#)
- Submission Format: 4 page paper in [Extended Abstracts Format](#), Game Demonstration, Video Trailer, and proof of all team members' student status.
- **Submissions are not anonymous and should include all author names, affiliations, and contact information**

Exertion Games

Designing Sports: A Framework for Exertion Games

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ABSTRACT

Exertion games require investing physical effort. The fact that such games can support physical health is tempered by our limited understanding of how to design for engaging exertion experiences. This paper introduces the Exertion Framework as a way to think and talk about Exertion Games, both for their formative design and summative analysis. Our Exertion Framework is based on the ways in which we can conceive of the body investing in game-directed exertion, supported by four perspectives on the body (the Responding Body, Moving Body, Sensing Body and Relating Body) and three perspectives on gaming (rules, play and context). The paper illustrates how this framework was derived from prior systems and theory, and presents a case study of how it has been used to inspire novel exertion interactions.

Author Keywords

Exertion Interface, whole-body interaction, exergame, exergaming, bodily interaction, kinesthetic, sports.

ACM Classification Keywords: H5.2. Information Interfaces and presentation (e.g., HCI); User Interfaces.

General terms: Design, Human Factors

INTRODUCTION

Within the field of HCl, there is a trend towards interactions that place the human body at the center of the

systems. The Nintendo Wii and Microsoft Kinect, along with research projects such as virtual reality stationary bikes [32], mobile games fueled by exercise [8, 26] and our own systems [35, 36, 38] have all contributed to a design space that highlights the value of such mediated exertion experiences. We define an Exertion Game (sometimes called exergame [52]) as a digital game where the outcome of the game is predominantly determined by physical effort.

Researching these exertion games is important, as they can offer physical health benefits [24, 29], which can contribute to weight loss and address the obesity epidemic. Research has also found that exertion facilitates social behavior in games, suggesting that we can create more engaging and social experiences if we know how to design for exertion [5, 27]. Unfortunately, at present we have a limited understanding of how to describe and design for compelling exertion experiences [11, 57].

Framing exertion games as “sports” helps illustrate why this understanding is difficult to attain. Sport is a highly complex social phenomenon centered on moving bodies [15] which engage in a wide spectrum of physical behaviors. These behaviors are often mediated by tools – both simple (e.g. a ball) and complex (e.g. a bike), and take place anywhere from small backyards to national stadiums. In addition, the complex cultural processes that shape our desire to engage in sport often focus on extreme experiences and emotions ranging from delight and

Wii, Kinect

A trend towards interaction that place
human body at the center of the experience.

TRX VR Game

Suspension.

Physical effort



Exertion Game.

Framework.

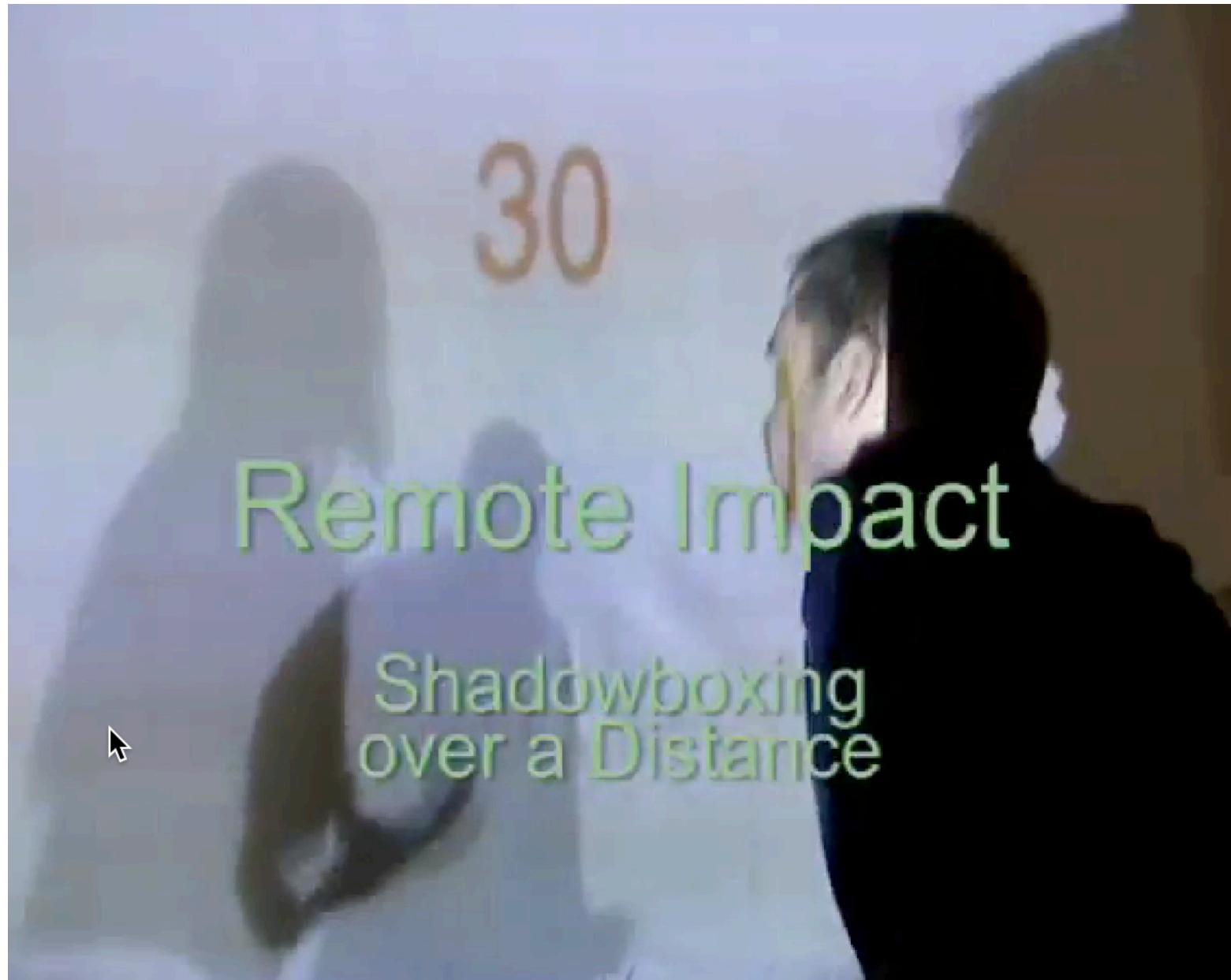


review

Exertion Games ::

games that require users
investing physical efforts.





Remote Impact

Shadowboxing
over a Distance

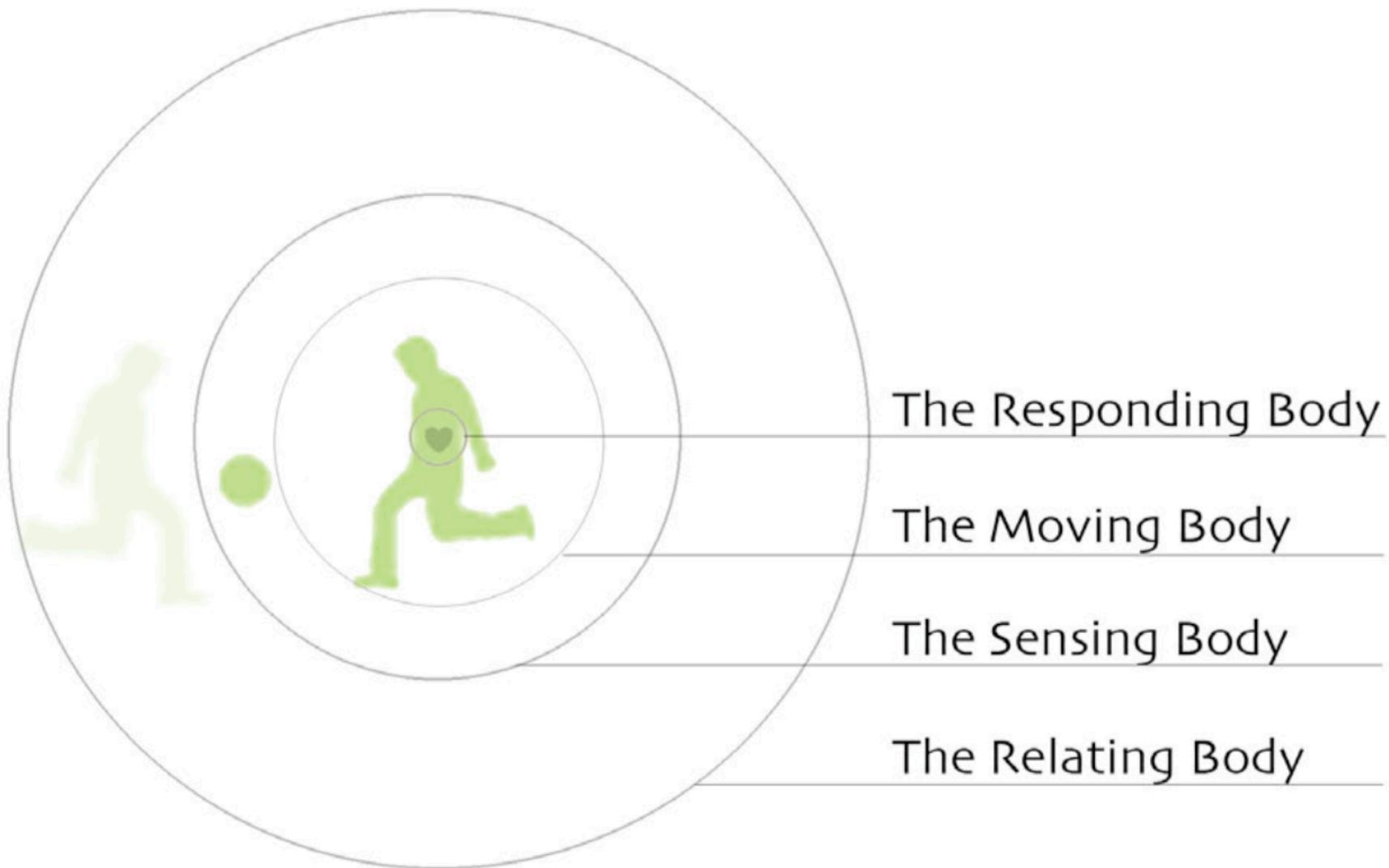


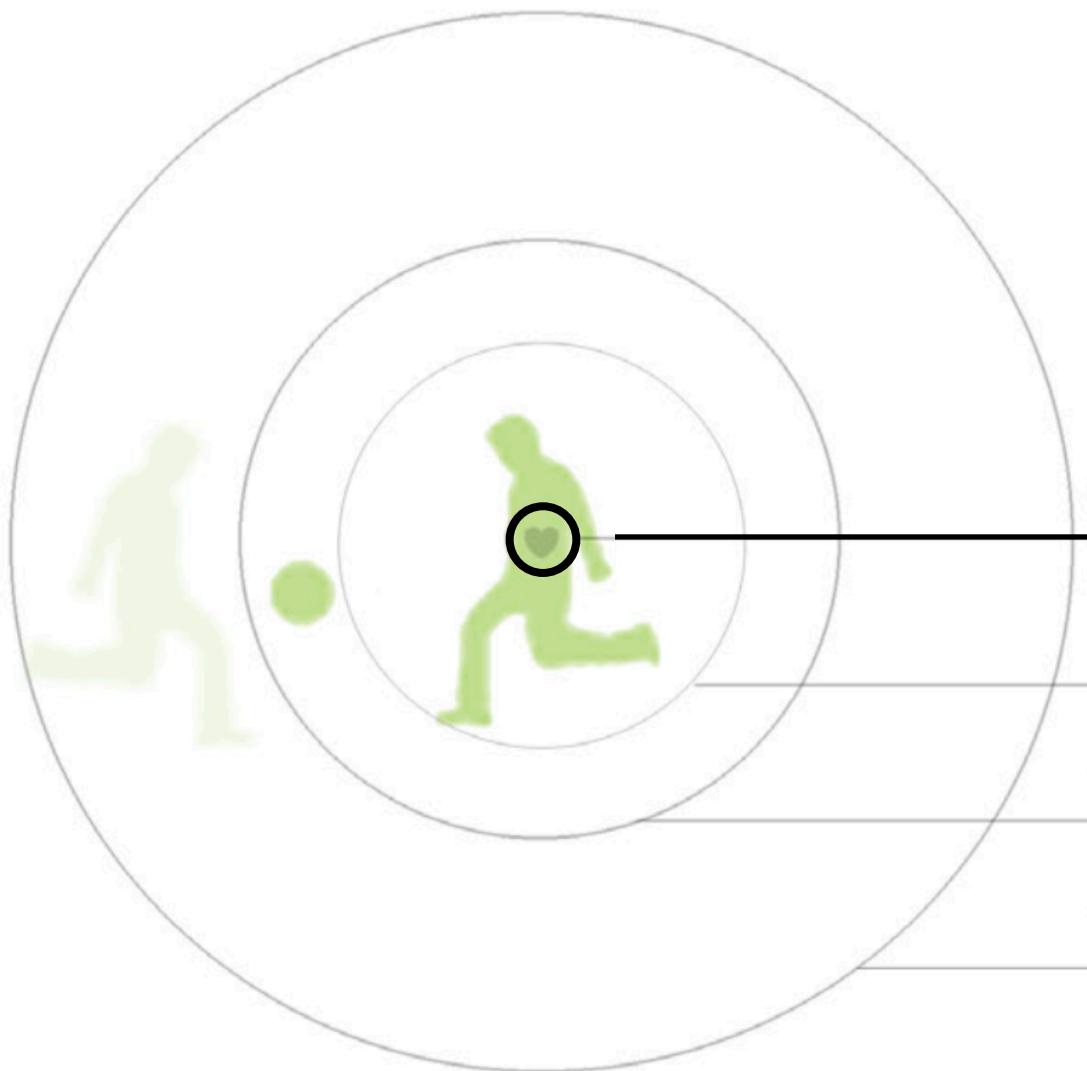


Design for engaging exertion experiences.

Exertion → physical health benefits

	The Responding Body	The Moving Body	The Sensing Body	The Relating Body
Rules		Uncertainty of exertion Awareness of exertion		
Play		Expression of exertion Rhythm of exertion		
Context		Risk of exertion Understanding of exertion		





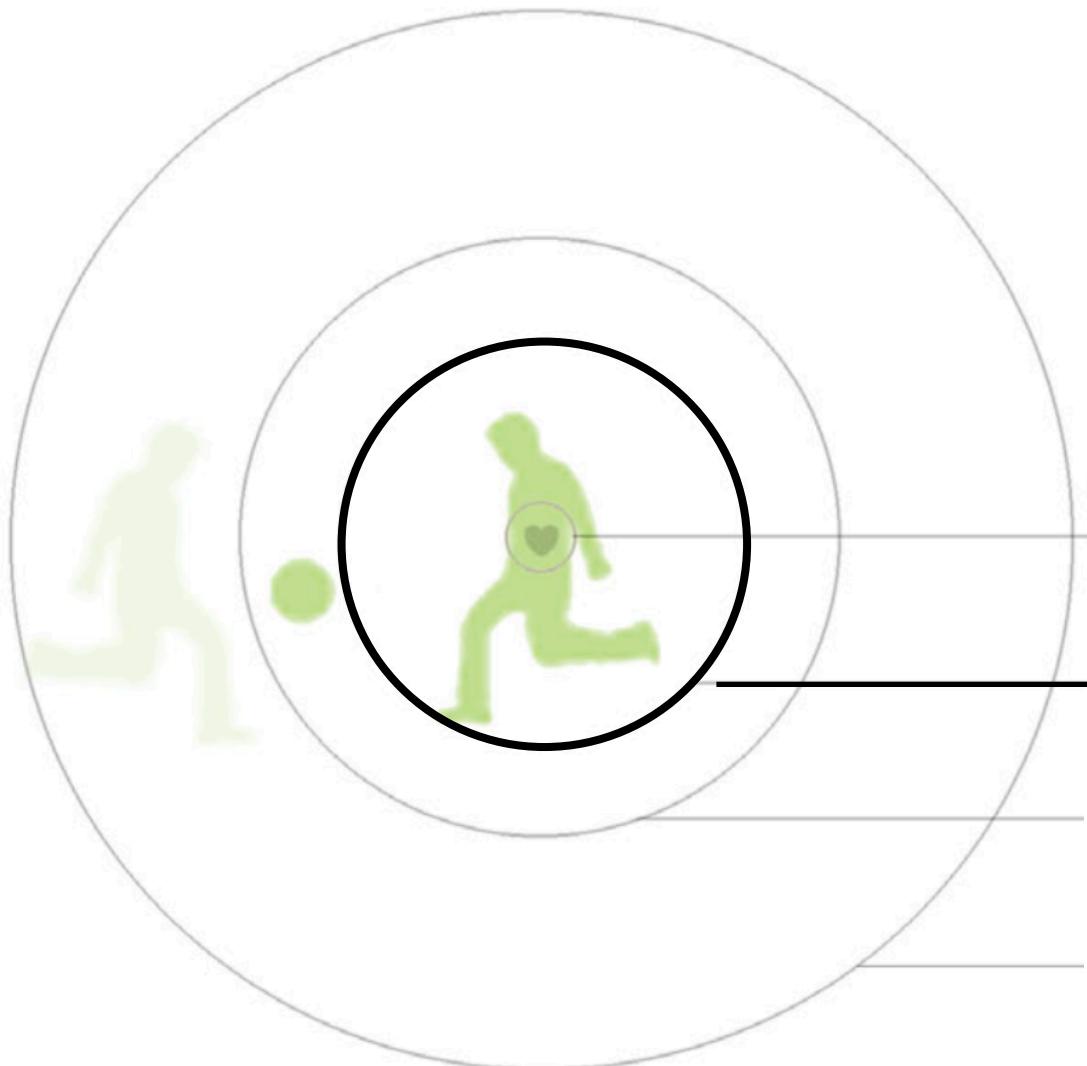
The Responding Body

how the body's internal state changes over time as a result of the exertion.

- heart rate
- breathing
- sweating

responses after the exertion activities.

- lose weight
- increase of muscle- mass
- repair broken tissue



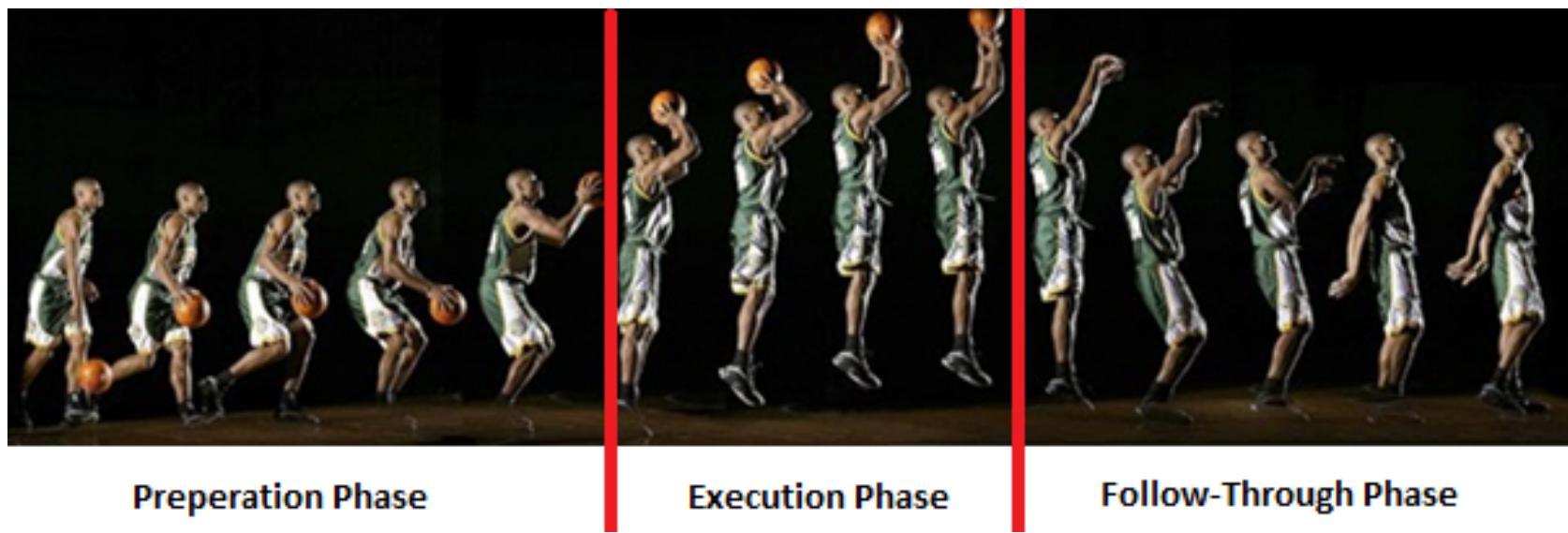
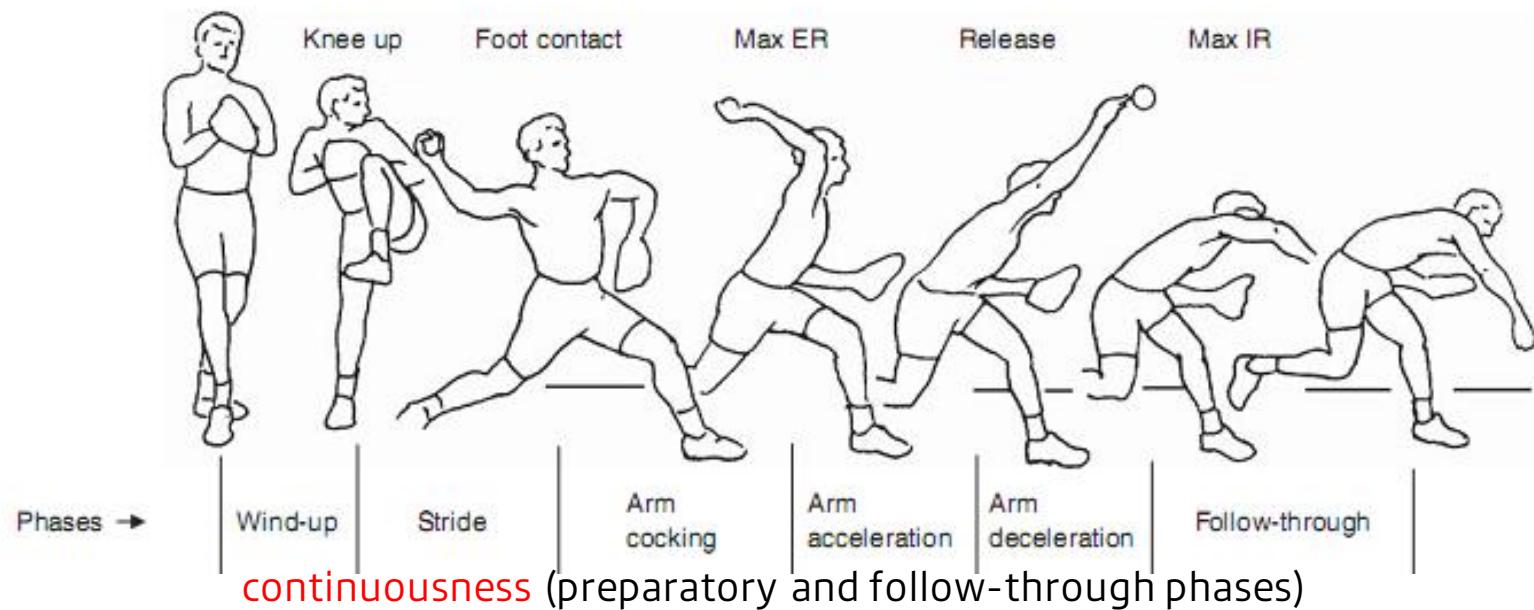
The Moving Body

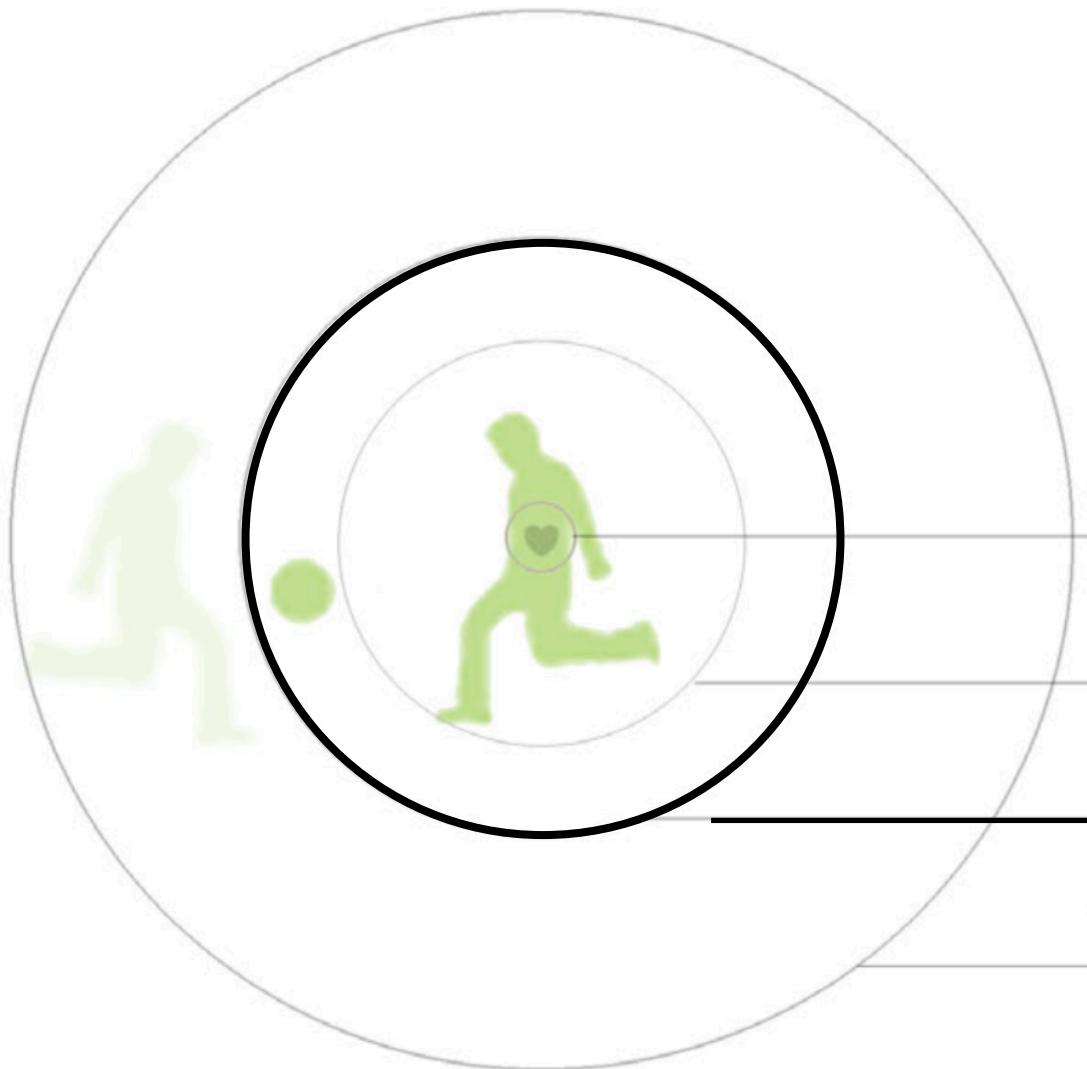
participants' muscular repositioning of body parts, during the course of physical activity.

- **intensity** (carry "weight")
- **continuousness**
- **variety** (the richness of movement)

space, weight, time and continuousness as constraints or resources

kinesthetic sense /
proprioception



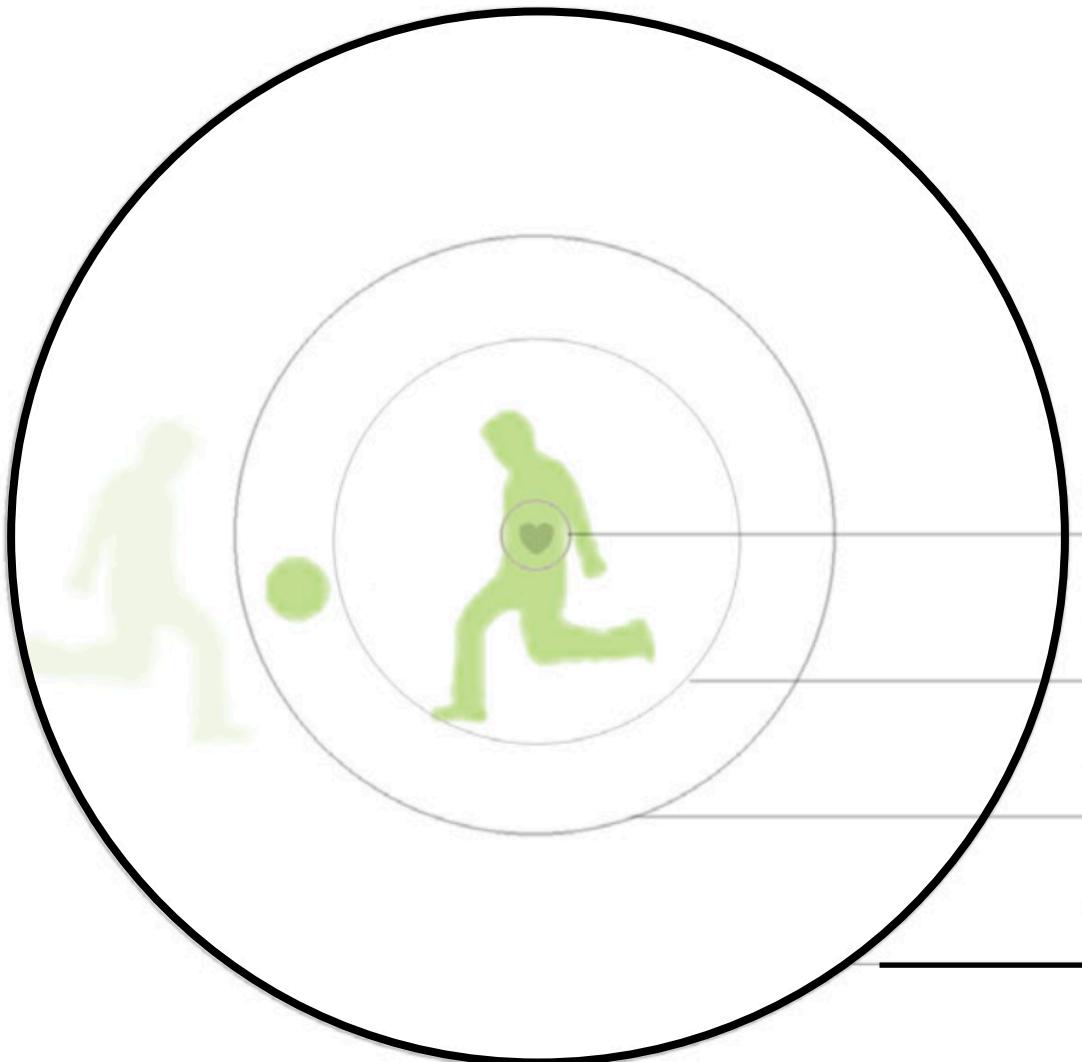


Adding physical/virtual objects can intrigue more activities, i.e., exertion.

The Sensing Body

how the body is sensing and experiencing the world

- **physical objects and spaces**
- **virtual objects and spaces**



- co-players, opponents, audiences
- joint exertion - can contribute positively to social outcomes

The Relating Body

How bodies and people relate to one another

	The Responding Body	The Moving Body	The Sensing Body	The Relating Body
Rules		Uncertainty of exertion Awareness of exertion		
Play		Expression of exertion Rhythm of exertion		
Context		Risk of exertion Understanding of exertion		

Uncertainty of exertion

To deal with the uncertainty arising from the **body** and the programmed uncertainty in the **virtual world**.

Body -

how long can I keep up?

variety of bodily movements can cause even simple actions to go wrong

Virtual world

the ball balancing on top of the net before dropping off either side.

(randomness)

Awareness of exertion

selectively hide bodily information from players as well as reveal it

Reveal

entice participants to compare their energy expenditure with others

Hide

Use distraction (e.g., playing music) to dissociate the user from the discomfort that comes with exertion.

Expression of exertion

Exertion as a form of self-expression beyond the merely pragmatic

require the **expenditure of bodily energy**

do not support making progress towards the goal of the game,
they can significantly **contribute towards the experience**

- Making heart rate visible to co-players
- Reward through gameplay (e.g., bonus for lifting up the guitar in a guitar game)

Rhythm of exertion

Rhythm of exertion is about the ability of a system to support a uniform or patterned recurrence of bodily action.

the **rhythm of music** during exertion activities can

- regulate arousal
 - improve athletic performance
 - positively impact the acquisition of motor skills
 - dissociate from the discomfort of exercise
-
- Dance Dance Revolution

Risk of exertion

the vulnerability of the body to overexertion and injury as a result of the exertion activity.

risk is a key differentiator between virtual and physical experiences

With no real risk in virtual worlds, choice becomes meaningless.

exposing oneself to risk, and the realization of this **risk** can **lead to a complex emotional response** such as **thrill**. → **how to strike the right balance**

- Visualizing the exertion might help.

Understanding of exertion

support the development of knowledge about the body.

Knowledge (learn how to do better)

heart rate helps understand their body,
plan future runs.

Skill (gain the ability to do better)

predominantly through training and practice
Punch without hurting yourself (e.g., hitting skill)

- 1) manual selection of difficulty level;
- 2) transformation of athletic abilities by “handicapping”;
- 3) pairing with similarly-skilled opponents
- 4) dynamic manipulation of game challenges

	The Responding Body	The Moving Body	The Sensing Body	The Relating Body
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