



EXTENDED REALITY TRAINING

Neue Möglichkeiten für die Bewegungsförderung

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Überblick

- Technologie x Sport: Extended Reality im Sport
- Gaming x Sport: Exergames
- How to: Exergame Design, Forschung und Implementation
- Konklusion

+ Interaktive Übungen



TECHNOLOGIE x SPORT



(iStockphoto)



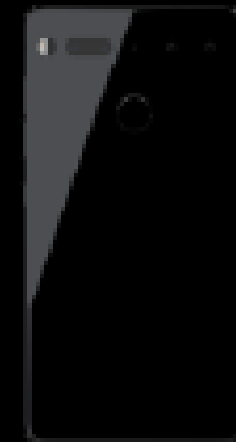
(kreiert mit midjourney.com)

EXTENDED REALITY (XR)

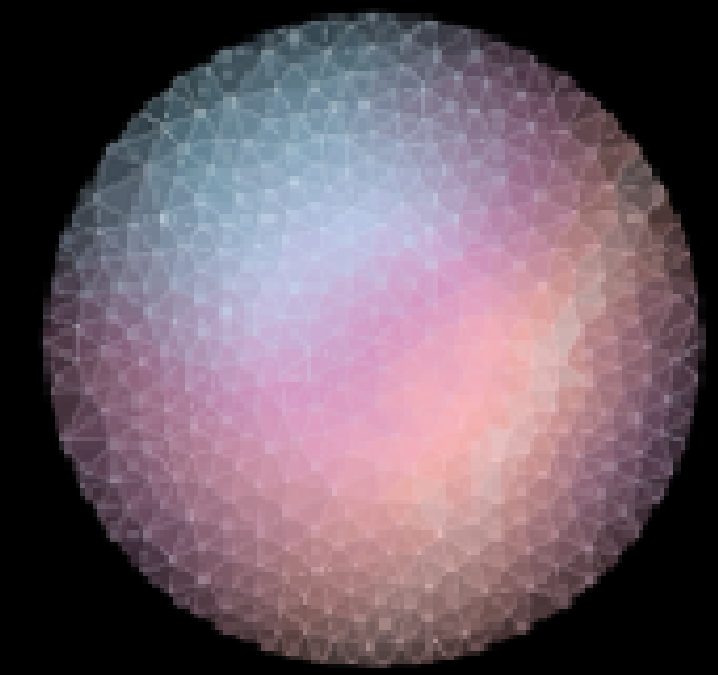
Virtual Reality (VR) // Augmented Reality (AR) // Mixed Reality (MR)

EXTENDED REALITY

PHYSICAL WORLD



DIGITAL WORLD



AUGMENTED REALITY

VIRTUAL REALITY

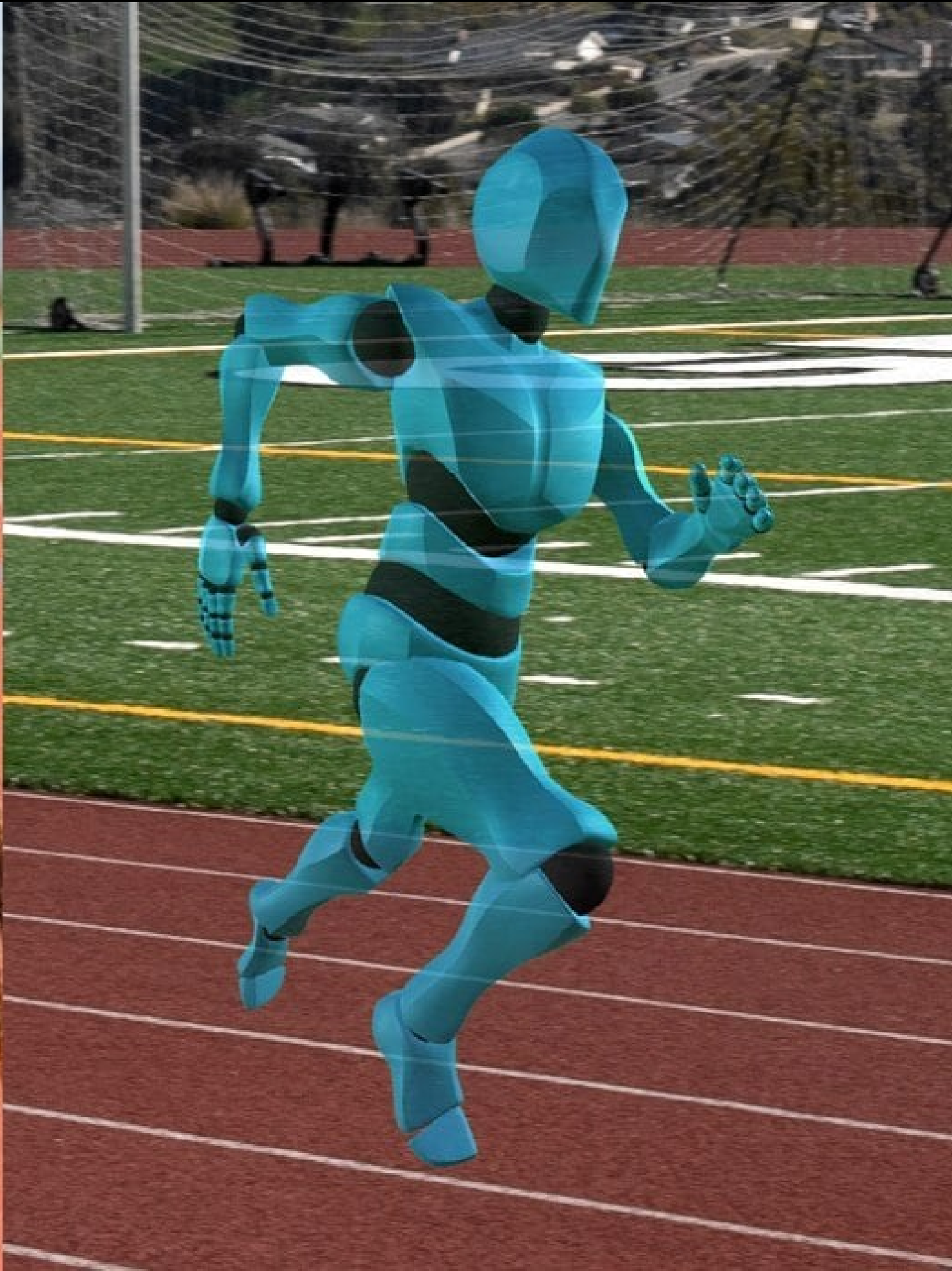
MIXED REALITY SPECTRUM

(Modifiziert nach: Milgram & Colquhoun, 1999)

Augmented Reality Sports

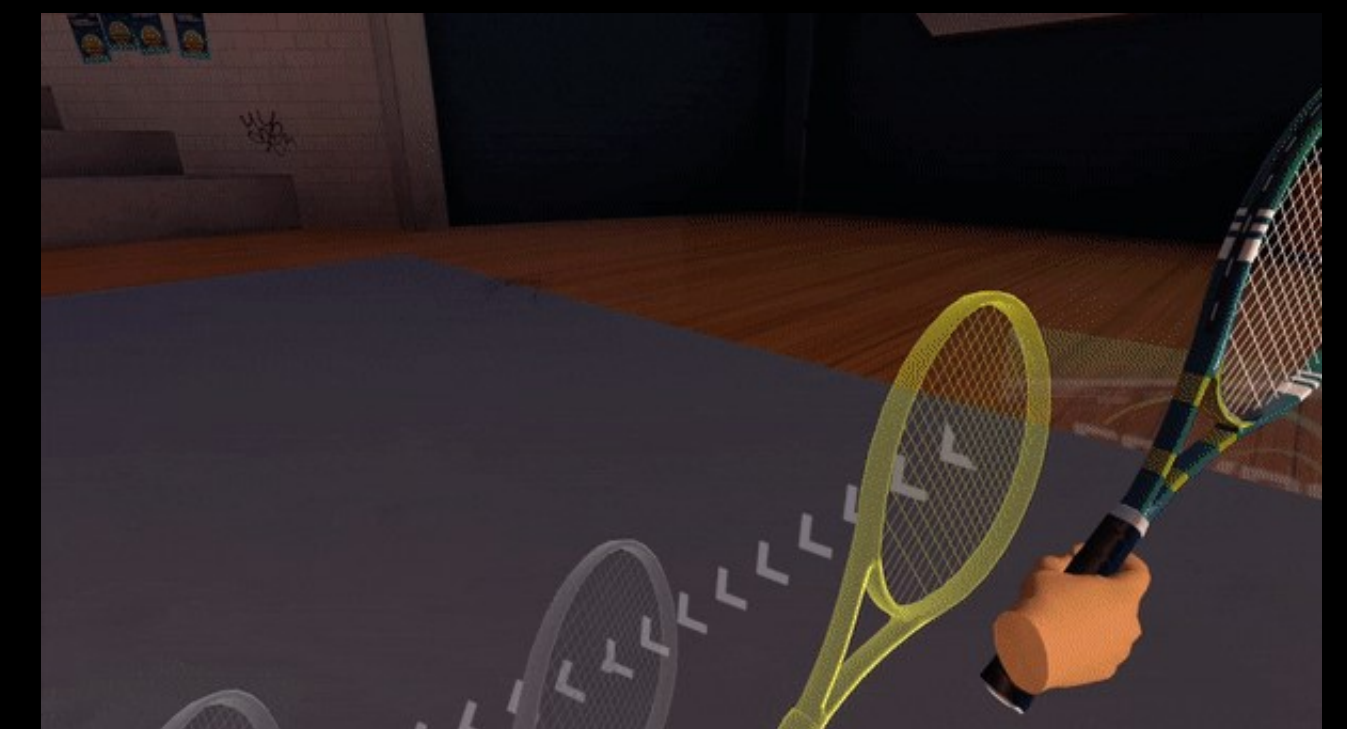
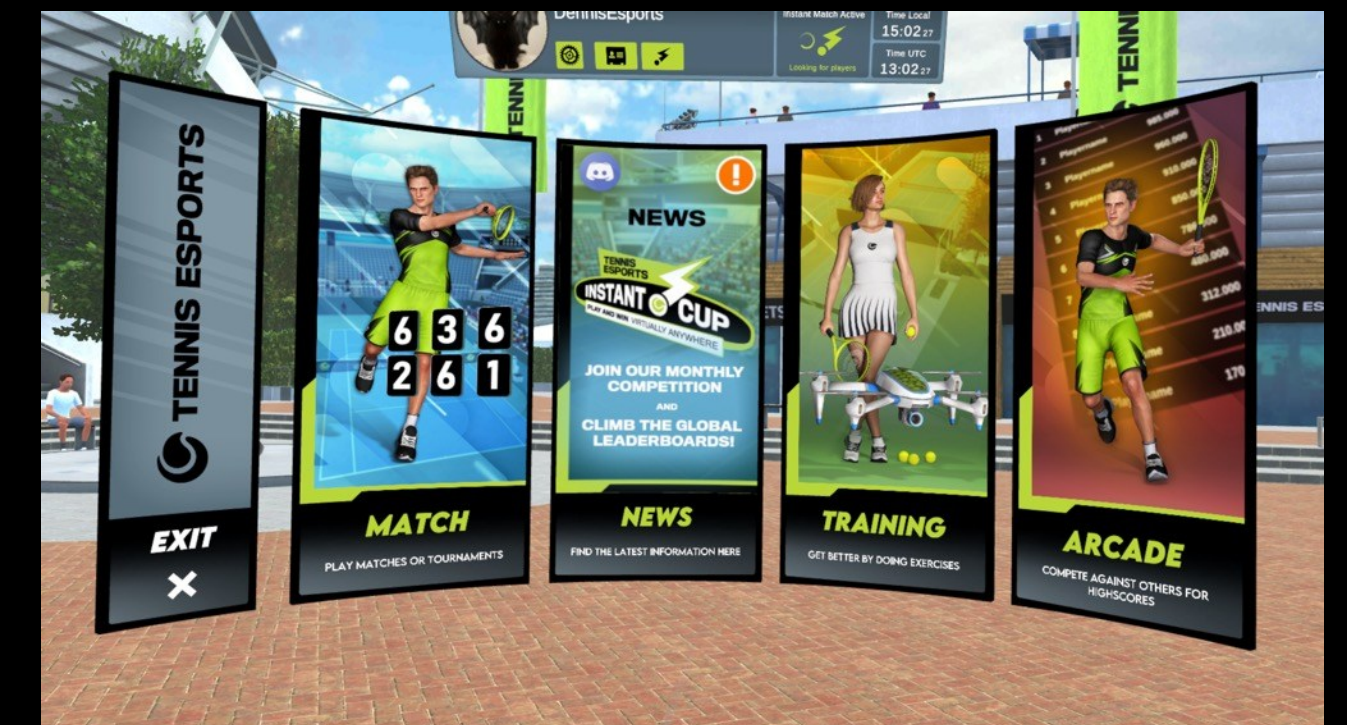


Augmented Reality Sports



Ghost Pacer

Virtual Reality Sports



Tennis Esports

Mixed Reality Sports



Aber...



***SWEET SPOT
OF IMMERSION...***

MOTIVATION...



8 MRD. MENSCHEN

3.7 MRD. GAMERS

1.5 MRD. KÖRPERL. AKTIVE

HOMO LUDENS?!

Typischer Gamer?!





DURCHSCHNITTSGAMER:IN

GAMIFICATION

«The use of game-elements and game-design techniques in non-gaming contexts.»

(Deterding et al., 2011)

- Points
- Badges
- Leaderboards
- etc.



	SCORE	NAME	AGE	BLOOD
1	50000	GAPLUS	20	AB
2	50000	GAPLUS	21	O
3	50000	GAPLUS	22	B
4	50000	GAPLUS	23	A
5	50000	GAPLUS	24	AB

CREDIT 0

SERIOUS GAMES

«Games with a purpose beyond fun.» (K. Werbach & D. Hunter, 2012)

- Gesundheitswesen & Therapie
- Bildung & Lernen
- Berufliche Ausbildung & Simulation
- Soziales & emotionales Lernen
- Bürgerschaftliches Engagement & Bewusstsein
- (Citizen) Science & Forschung

Beispielhafte Serious Games for Health:



DEEP VR: Eine virtuelle Realität (VR)-Meditationserfahrung, die durch die Atmung gesteuert wird



That Dragon, Cancer ist ein emotionales narratives Spiel, das die Erfahrung einer Familie mit der Krebserkrankung ihres kleinen Sohnes erkundet.



Re-Mission unterstützt junge Krebspatient:innen dabei, ihre Krankheit zu verstehen und während der Behandlung motiviert zu bleiben.

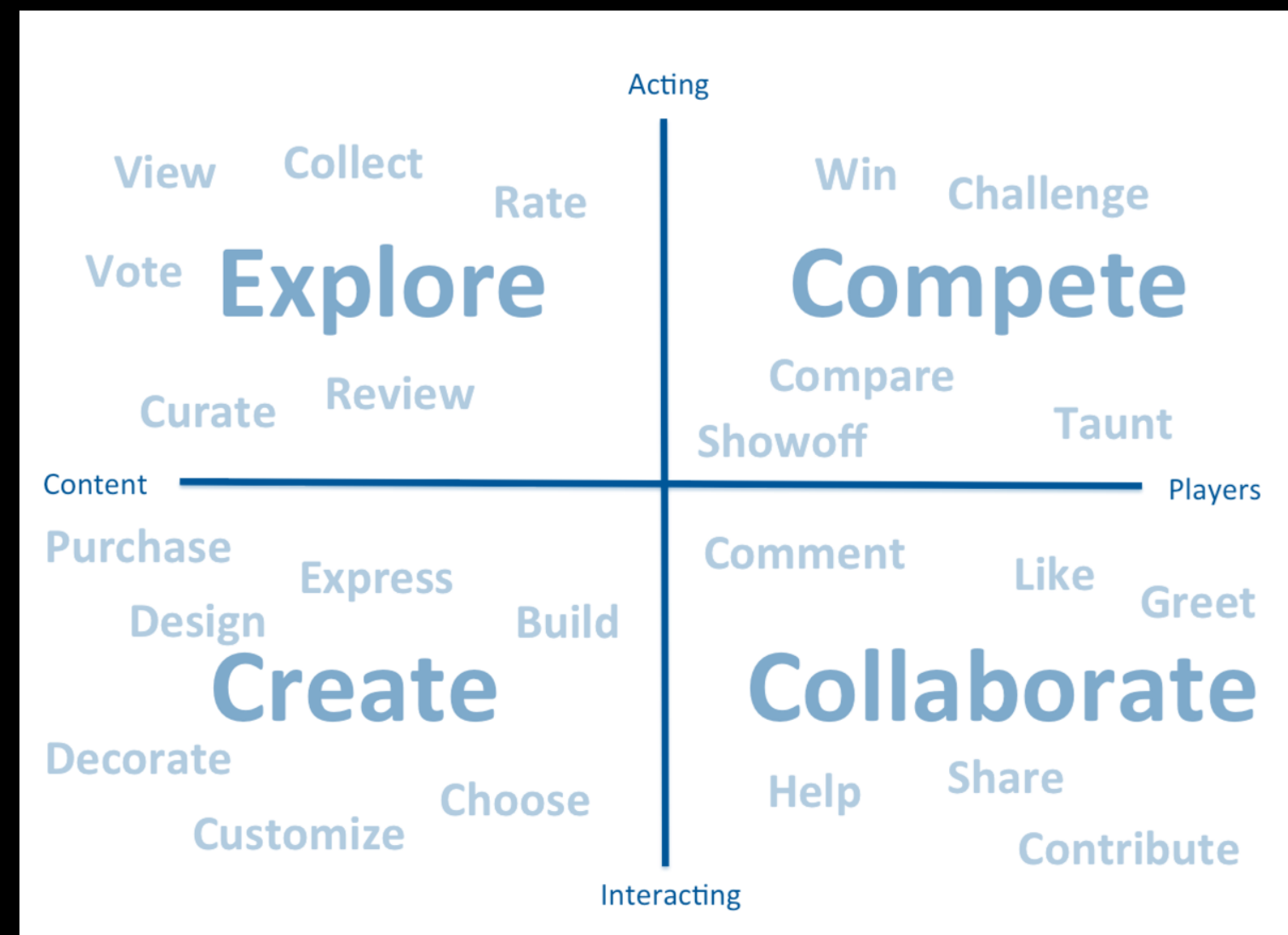


EVE Online Project Discovery – Citizen Science für die Krebsforschung

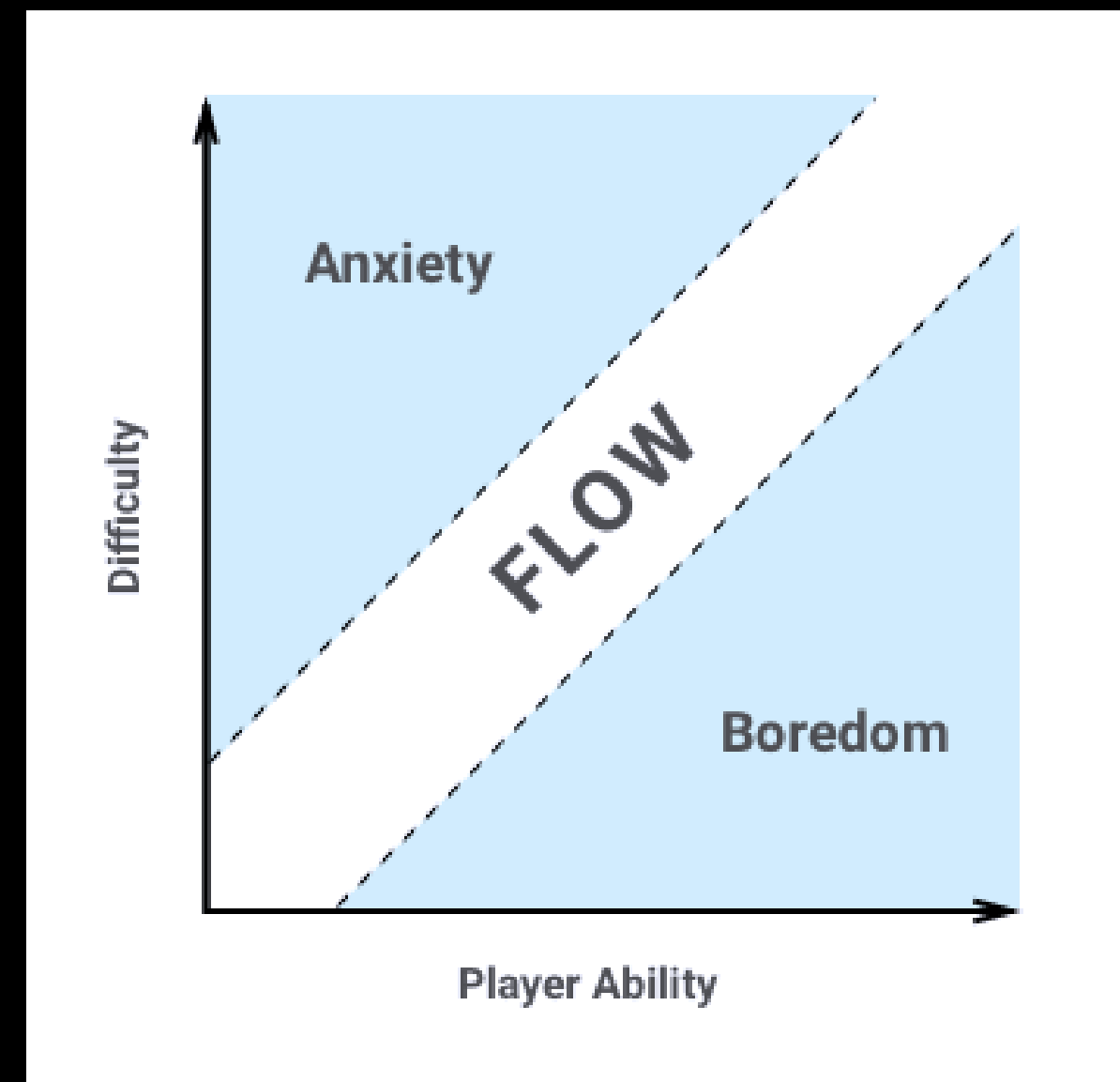
Gameplay Experience: Theorien & Modelle

«Spiel ist eine freiwillige Handlung oder Beschäftigung, die innerhalb gewisser festgesetzter Grenzen von Zeit und Raum nach freiwillig angenommenen, aber unbedingt bindenden Regeln verrichtet wird, ihr Ziel in sich selber hat und begleitet wird von einem Gefühl der Spannung und Freude und dem Bewusstsein des *Andersseins* als das *gewöhnliche Leben*.»

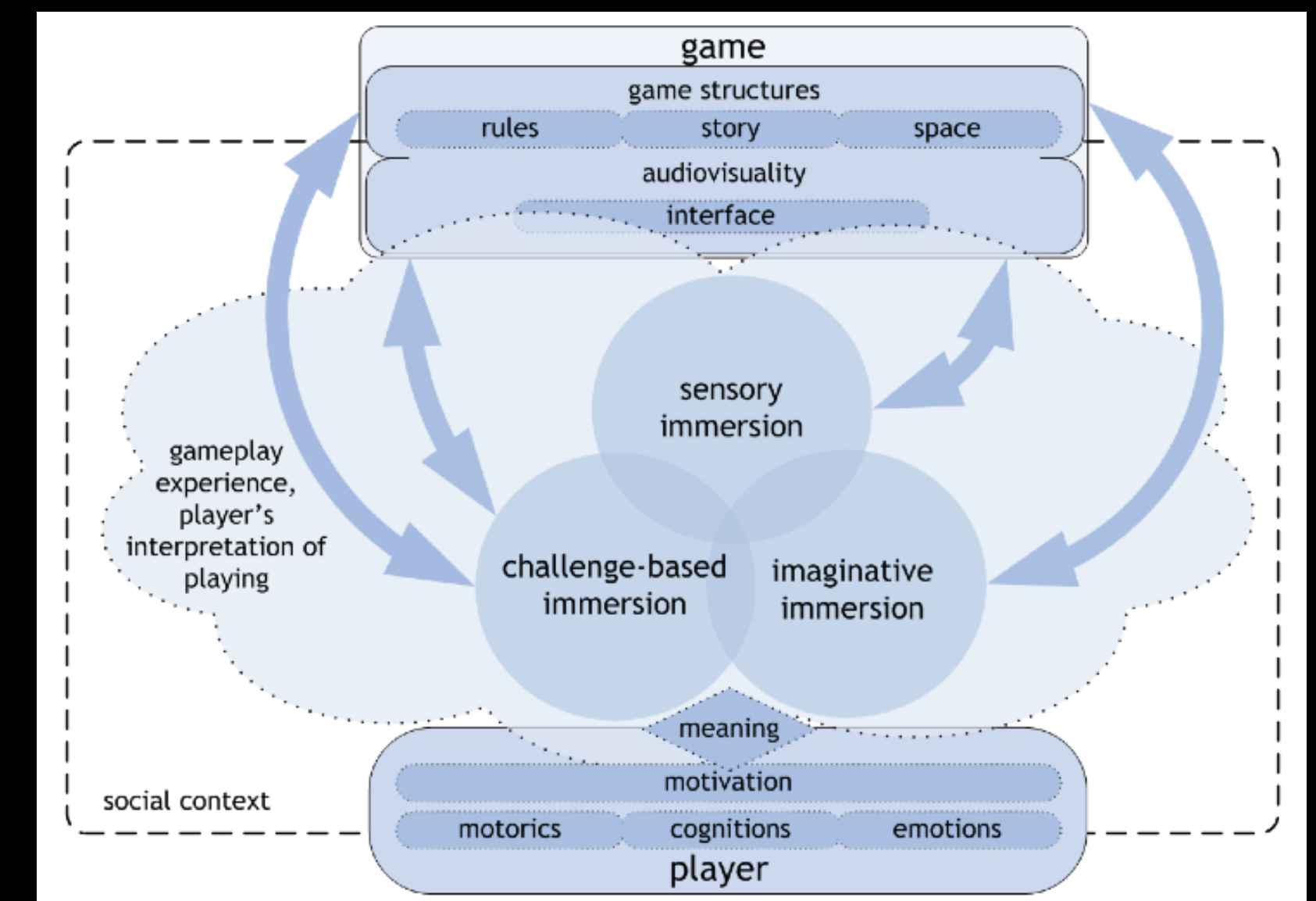
(Johan Huizinga, Homo Ludens – Vom Ursprung der Kultur im Spiel, 1938, S. 37)



(Bartle, 1996)



(Csikszentmihalyi, 1990)

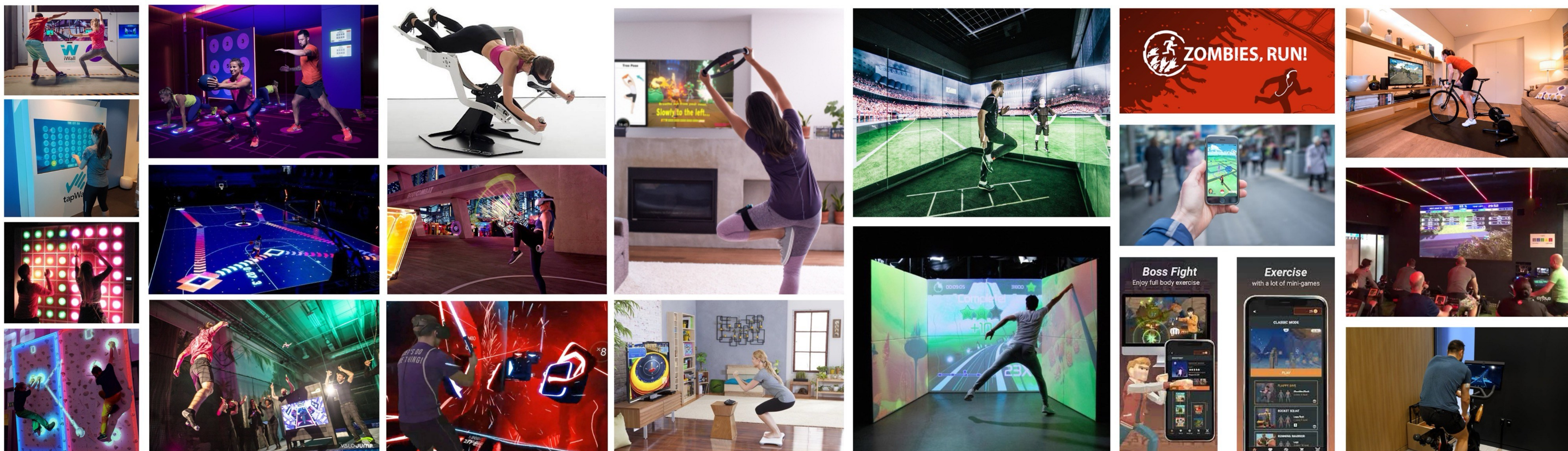


(Ermi & Mäyrä, 2005)

GAMING x SPORT

EXERGAMES

(Exercise + Gaming)



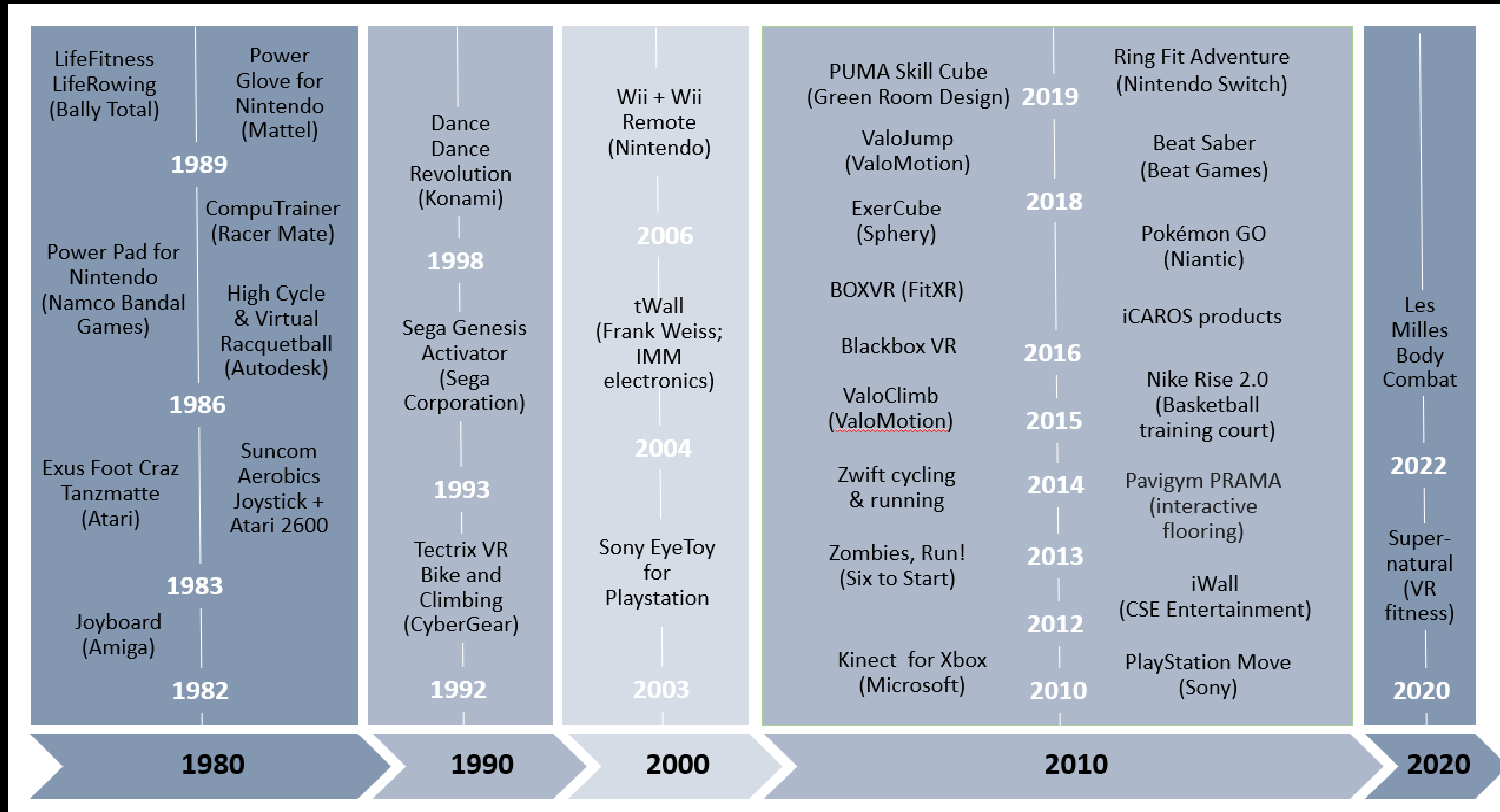


(Martin-Niedecken, 2020)

FLYING STAR EXERGAME



Exergame-Geschichte



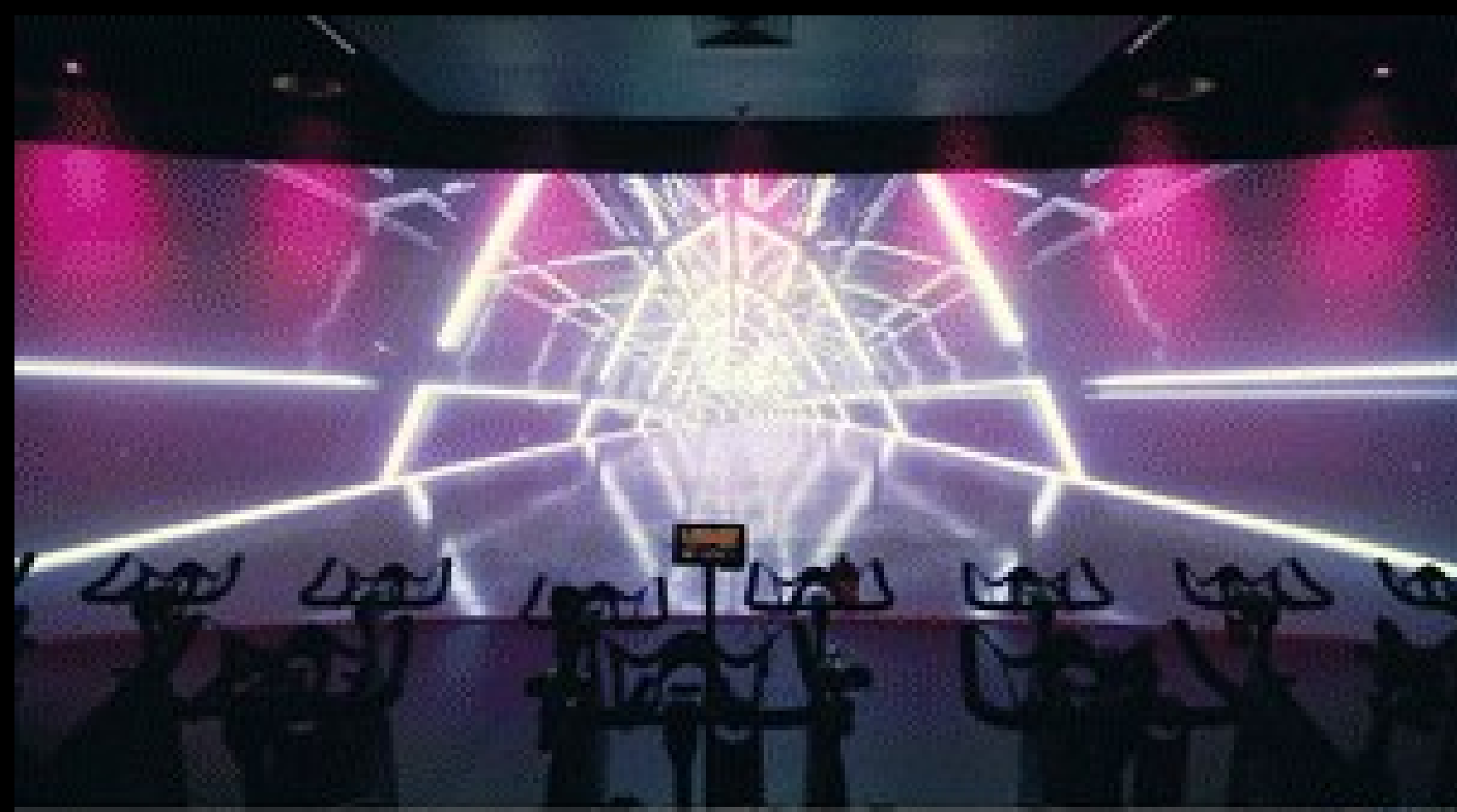
Exergames @Home



Spielbasierte Rehabilitation



VR Fitness – Immersive Fitness – Gamified Fitness



Mixed Reality Sports x Gaming

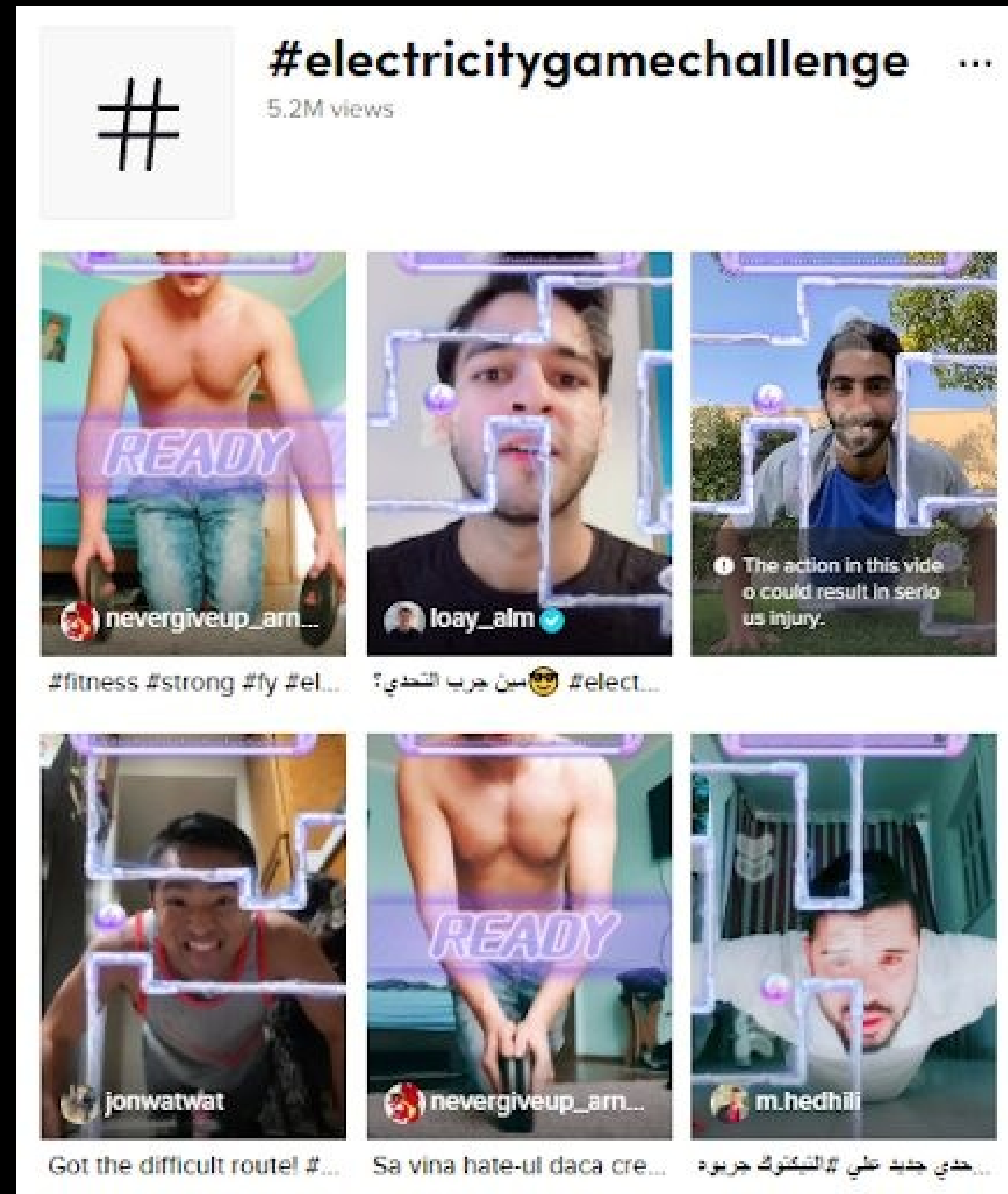


Augmented Reality Sports x Gaming

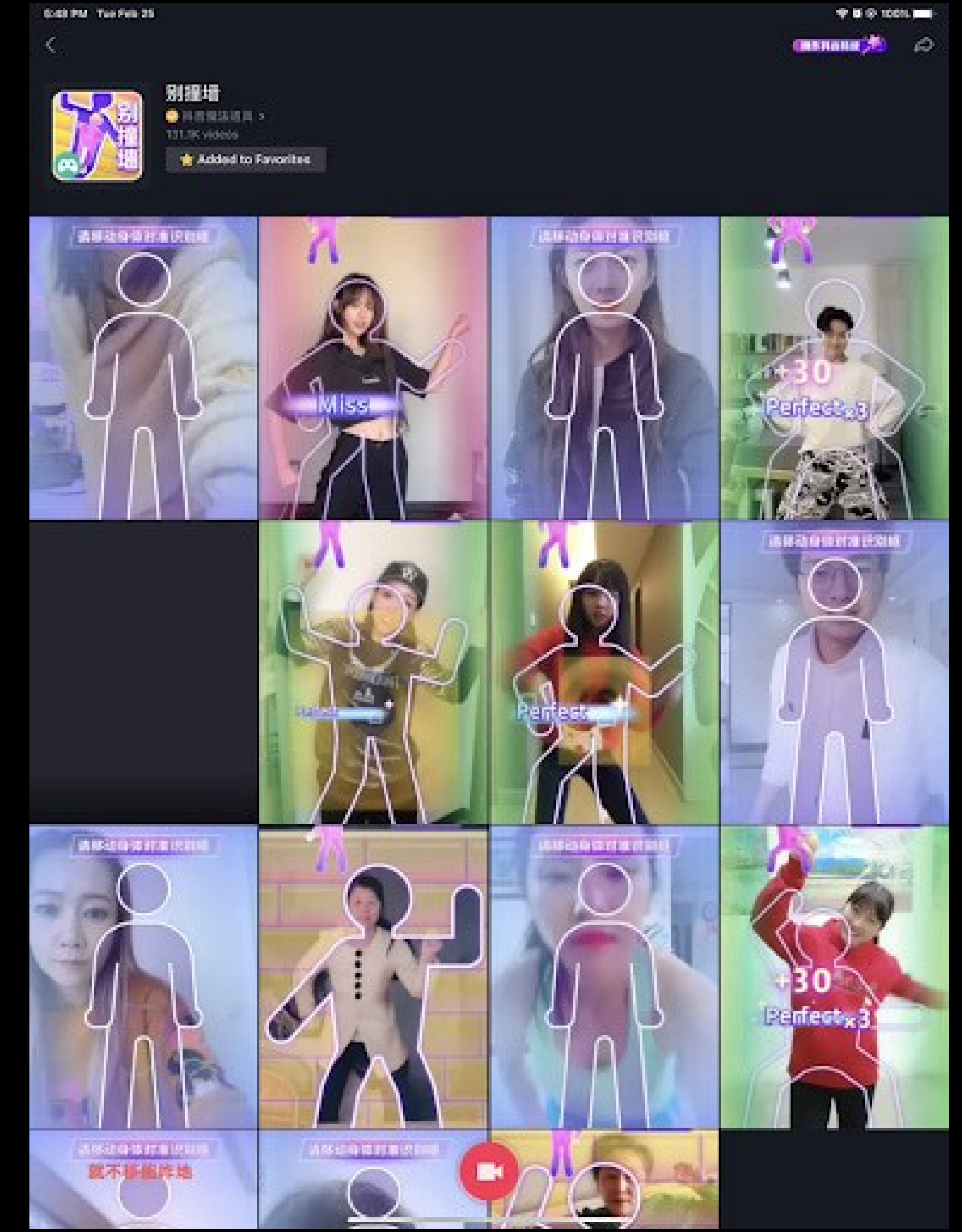


Hado AR

Augmented Reality Sports x Gamification



The Physical Education @ Tik Tok



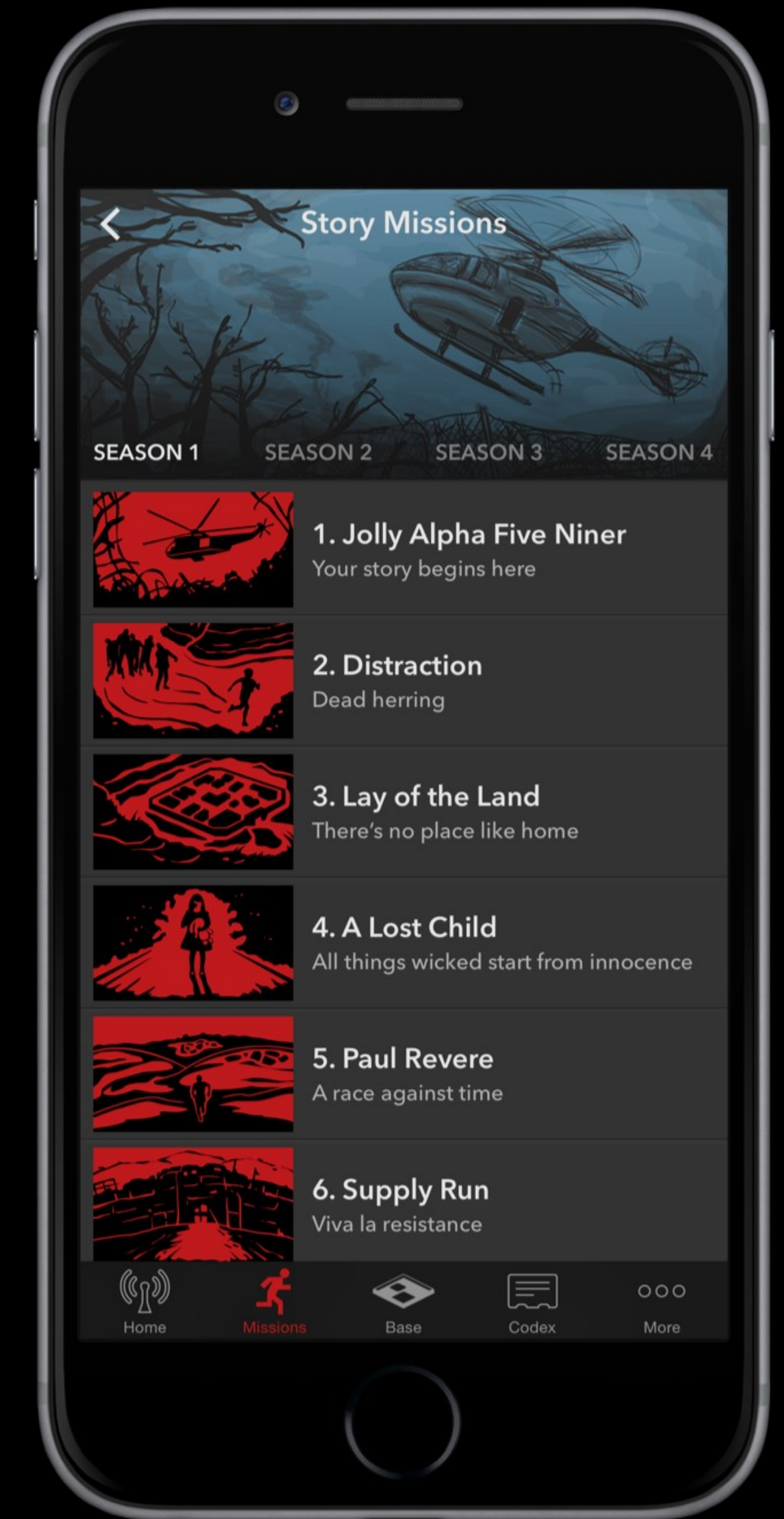
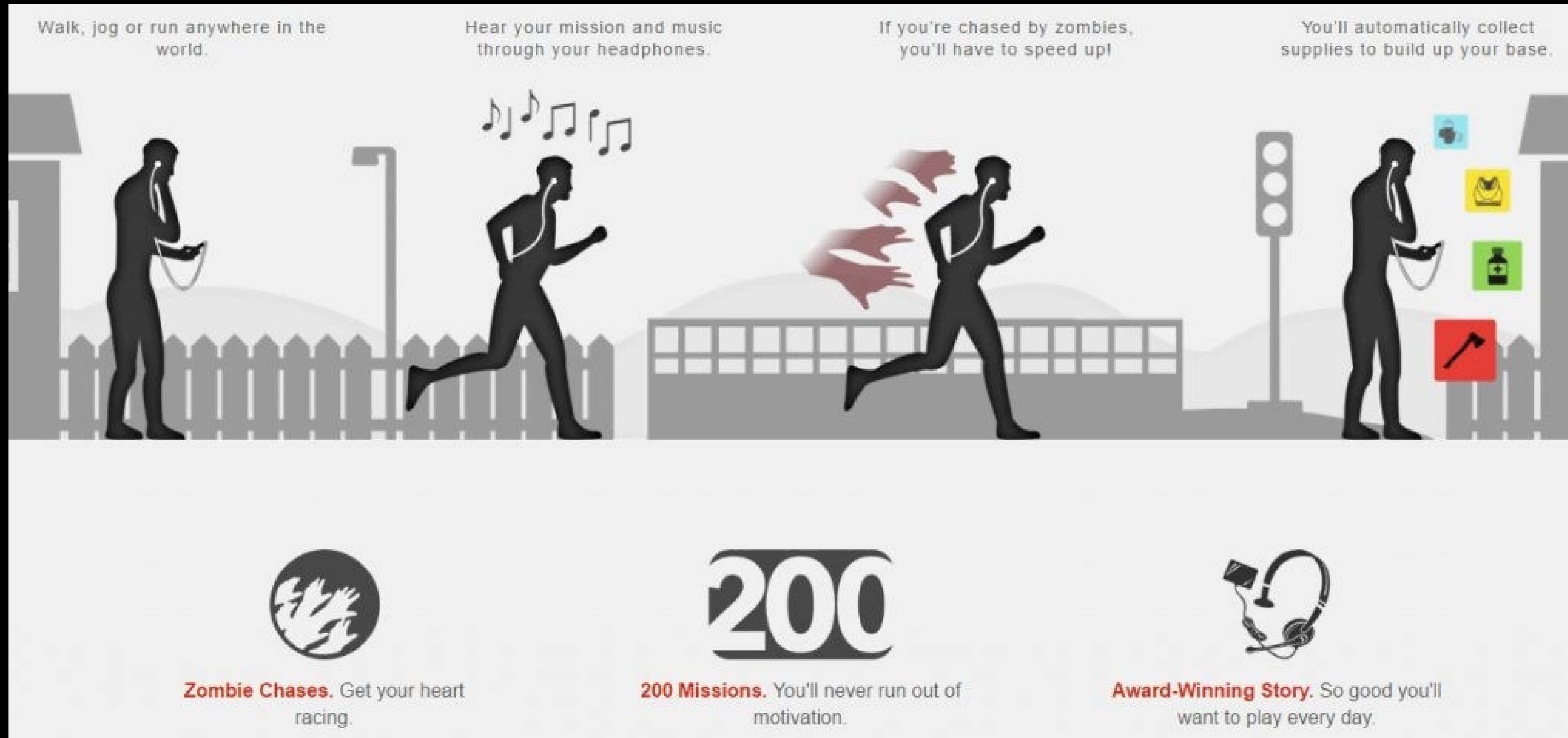
Fill the Shape @ Tik Tok

Mobile Exergames



Pokemon Go!

Sound-based Exergames



Zombie Run



Mixed Reality Exergames



INTRODUCING
ROXs 

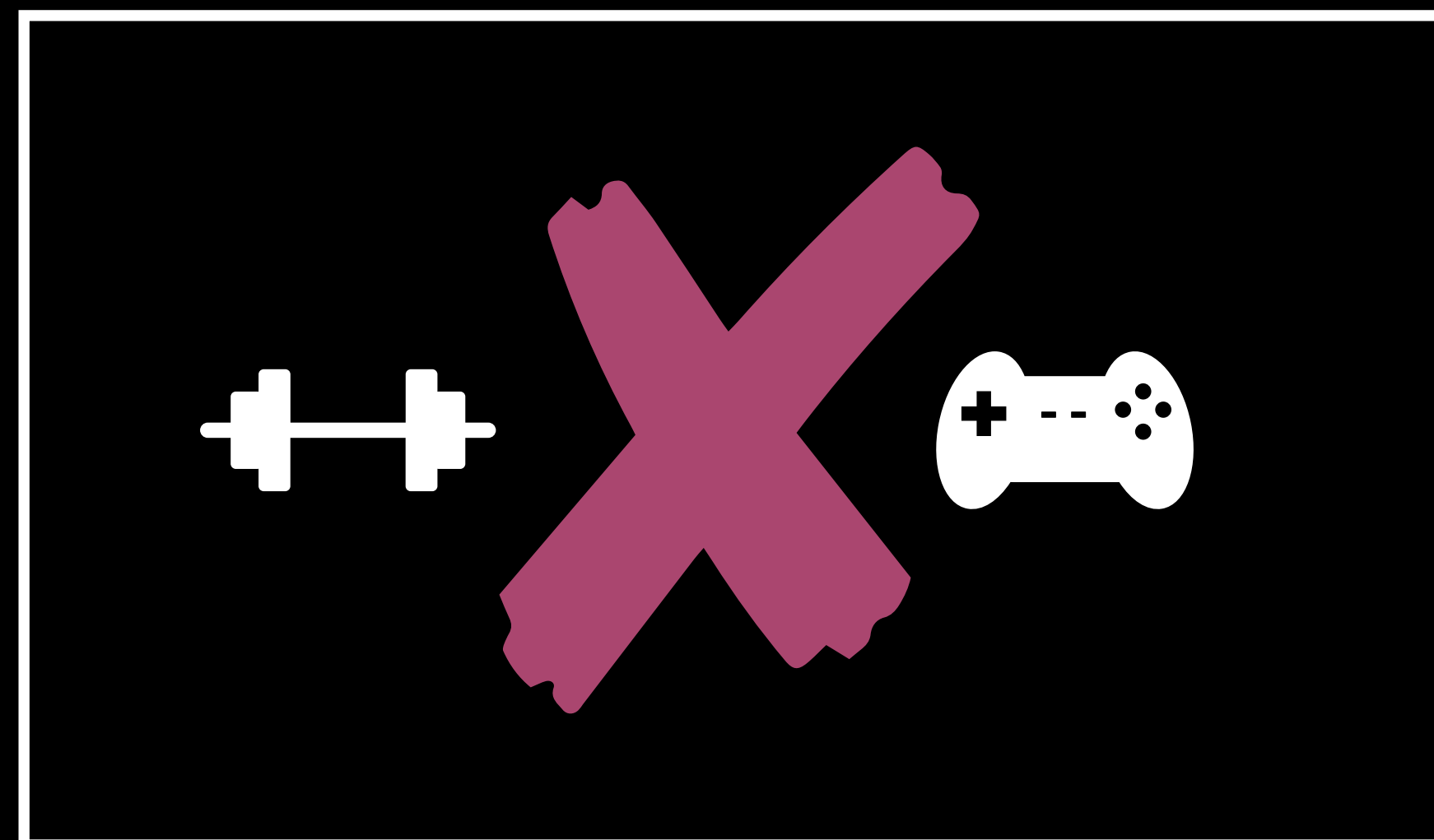
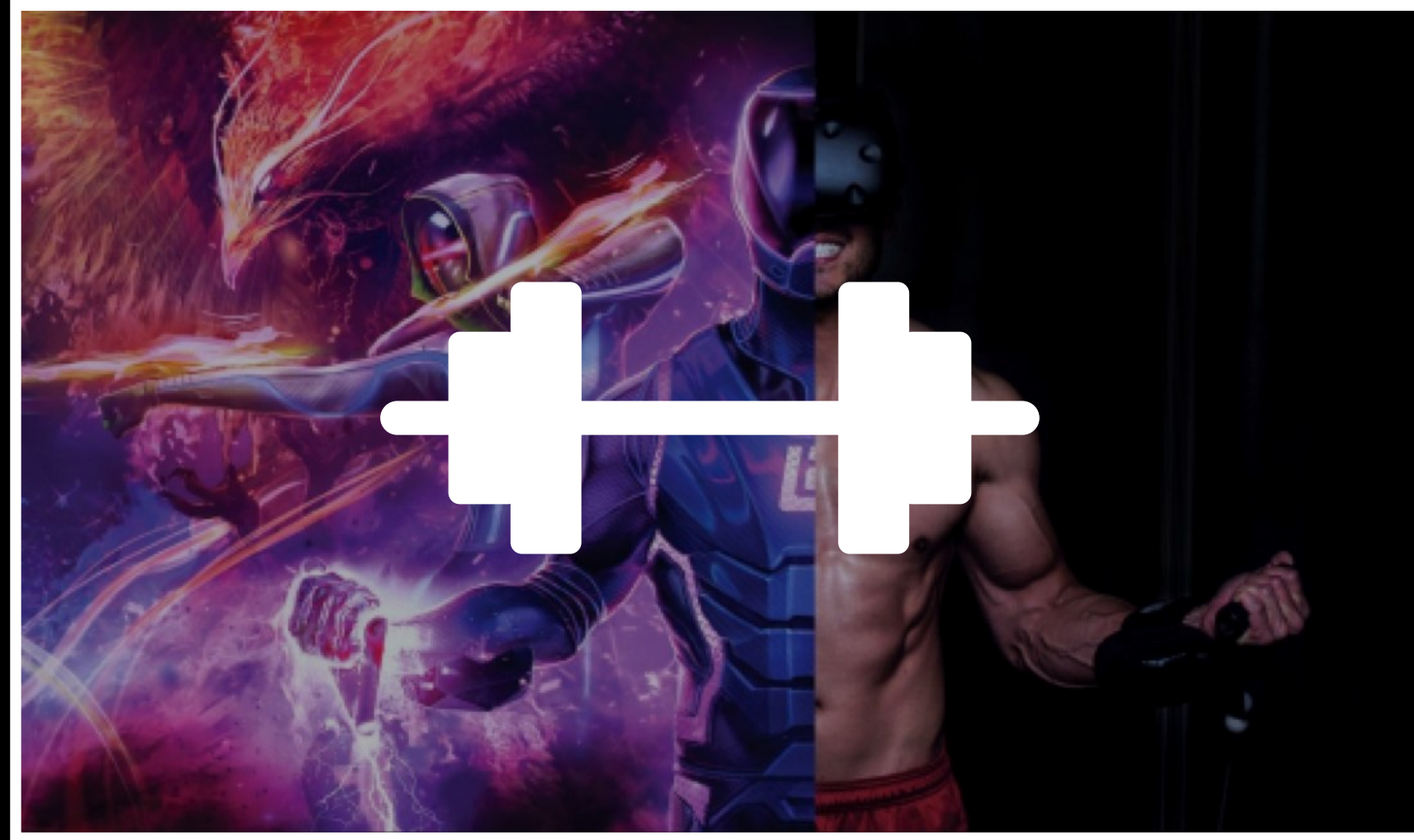


ROXs is a screen-free gaming system that gets kids and their families running, jumping and playing outside!

Rox, A-Champ

*FROM SPORTIFICATION
OF GAMES TO
GAMIFICATION OF
SPORTS*

What's missing?



Potenzielle Effekte von Exergames

- **Kognitiv:** Exekutive Funktionen, Aufmerksamkeit u. visuell-räumliche Fähigkeiten verbessern
(Benzing et al., 2016; Best, 2015; Mura et al., 2017; Staiano & Calvert, 2011; Stojan & Voelcker-Rehage, 2019; Xiong et al., 2019)
- **Physisch:** Energieverbrauch, körperliche Aktivität und Herzfrequenz steigern
(Best, 2015; Kari, 2017; Staiano & Calvert, 2011; Sween et al., 2014)
- **Mental:** Stimmung, Motivation, soziale Interaktion und Selbstwertgefühl fördern
(Byrne & Kim, 2019; Joronen et al., 2017; Lee et al., 2017; Li et al., 2016; Staiano & Calvert, 2011)
- **Physisch-/Motor-kognitiv:** Kombinierte motorisch-kognitive Leistung verbessern
(Ballesteros et al., 2018; Egger et al., 2019; Schättin et al., 2016; Stojan & Voelcker-Rehage, 2019)

Potenzielle Attraktivität von Exergames

- **Ansprechend** für weniger aktive Populationen (e.g., Kappen et al., 2019; Lu et al., 2013)
- bessere **Adhärenz** (e.g., Valenzuela et al., 2018)
- bessere **Langzeitmotivation** (e.g., MacRae & Robbters, 2013)
- besseres **Engagement** (e.g., Lyons, 2015)

Unausgeschöpfte Potentiale

- **Skalierbare Trainingsintensität:** Bedarf an skalierbaren motorisch-kognitiven Trainingskonzepten
- **Ganzheitliche Systeme:** Erfordert anpassbares und individualisierbares Gameplay
- **Generische Designansätze:** Bedarf an Co-Design mit spezifischen Zielgruppen
- **Unzureichende wissenschaftl. Grundlage:** Erfordert evidenzbasierte Designprinzipien
- **Mangel an Interdisziplinarität:** Bedarf an Zusammenarbeit über verschiedene Fachbereiche hinweg

***HOW TO:
ATTRACTIVE & EFFEKTIVE
EXERGAMES***

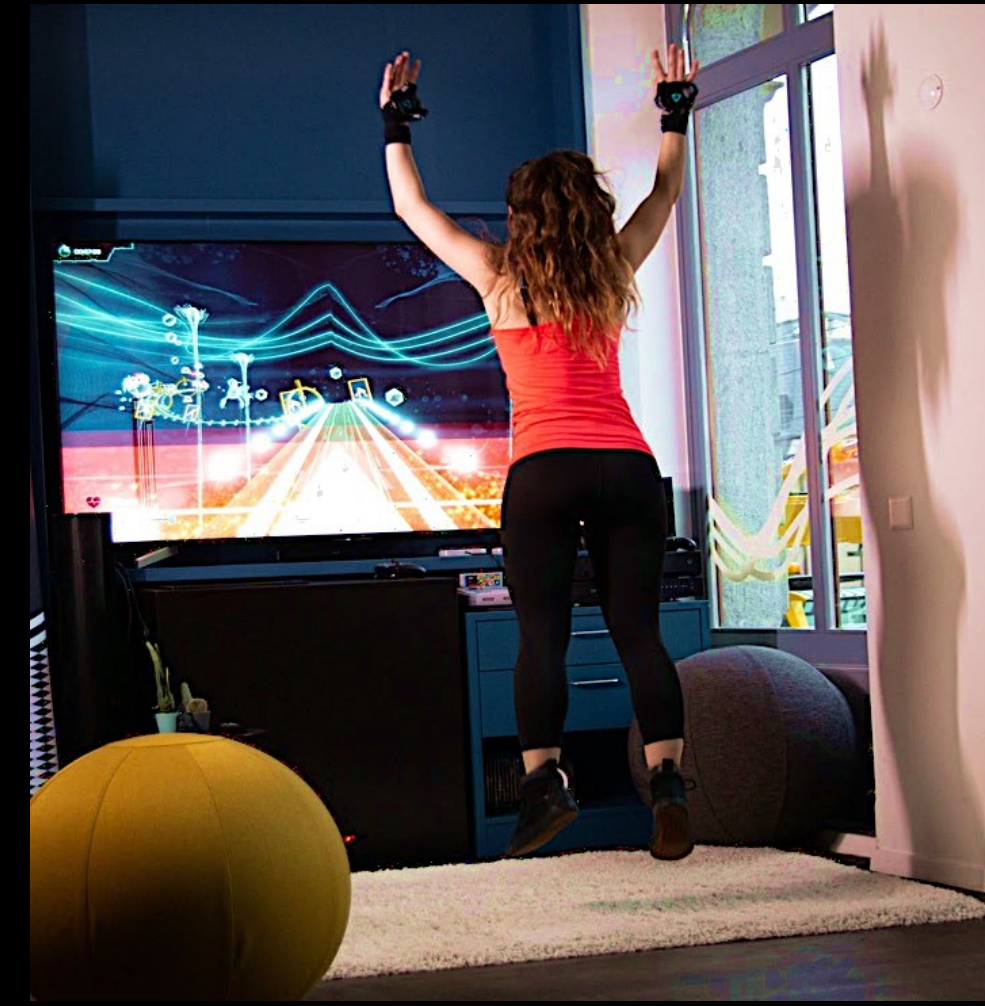
Projektübersicht



(Martin et al., 2014)



(Martin-Niedecken et al., 2018, 2019, 2020)



(Martin-Niedecken et al., 2020)



(Martin-Niedecken et al., 2016)



(Schättin, Martin-Niedecken et al., 2020)



(Martin-Niedecken et al., 2017, 2018)



(Ringgenberg et al., 2022; Herren et al., 2025)

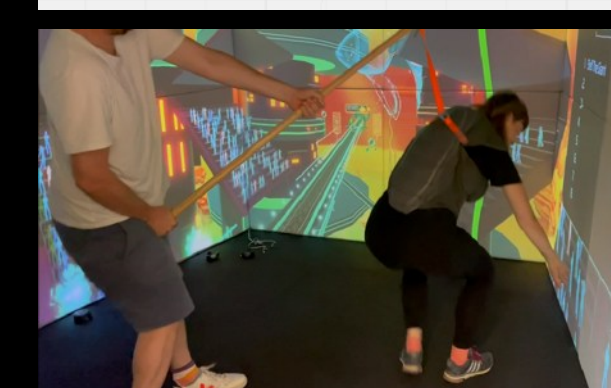
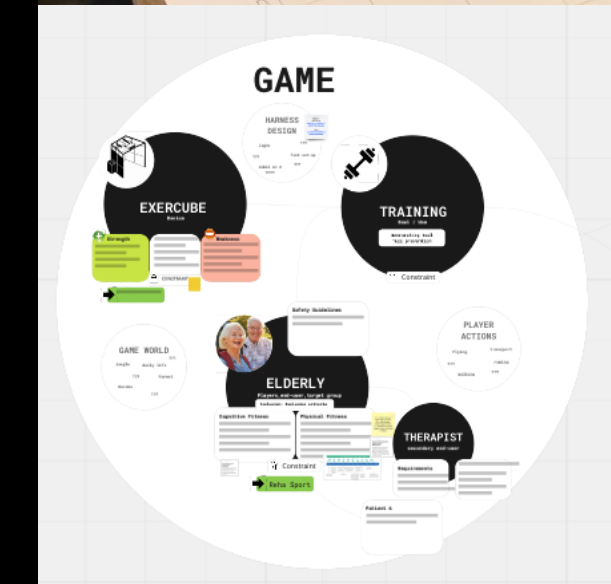
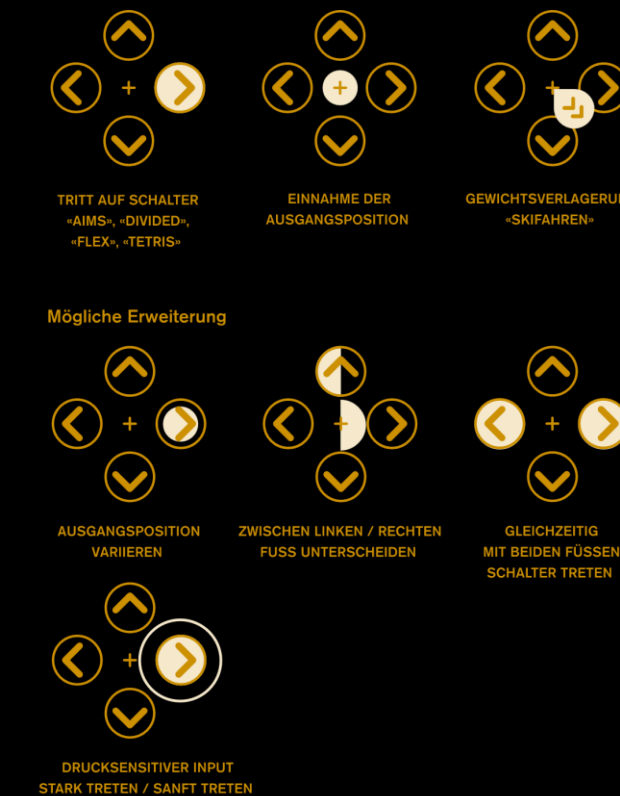


(Martin-Niedecken et al., 2019)

***INTERDISZIPLINÄRER,
NUTZER:INNEN-
ZENTRIERTER,
FORSCHUNGS-BASIERTER
& ITERATIVER
DESIGNPROZESS***

Interdisziplinäre «Mixed Methods»

- Literatur-Review
- Analyse anderer Anwendungen
- Fokusgruppen
- Partizipative Beobachtung
- Kontextanalyse
- Co-Creation Workshops
- User Journey & Empathy Mapping
- Bodystorming
- Sketching
- Walkthrough
- Technologische Exploration
- Feldtestungen
- Usability Study
- User & Player Experience Fragebögen
- Lab-Studien
- RCT
- ...





SENSO EXPLORIA

F&E Projekte (2018-2021) / Innosuisse

Senso Exploria: Exergames für MS Patient:innen

The logo for Dividat is displayed on a glass door. The word "Dividat" is written in a sans-serif font, with "Divid" in blue and "at" in yellow. Below the text is a horizontal line that is blue on the left and yellow on the right, ending in a small yellow circle. The background shows a reflection of a modern building and a green landscape.

Dividat

(Schättin et al., 2021)

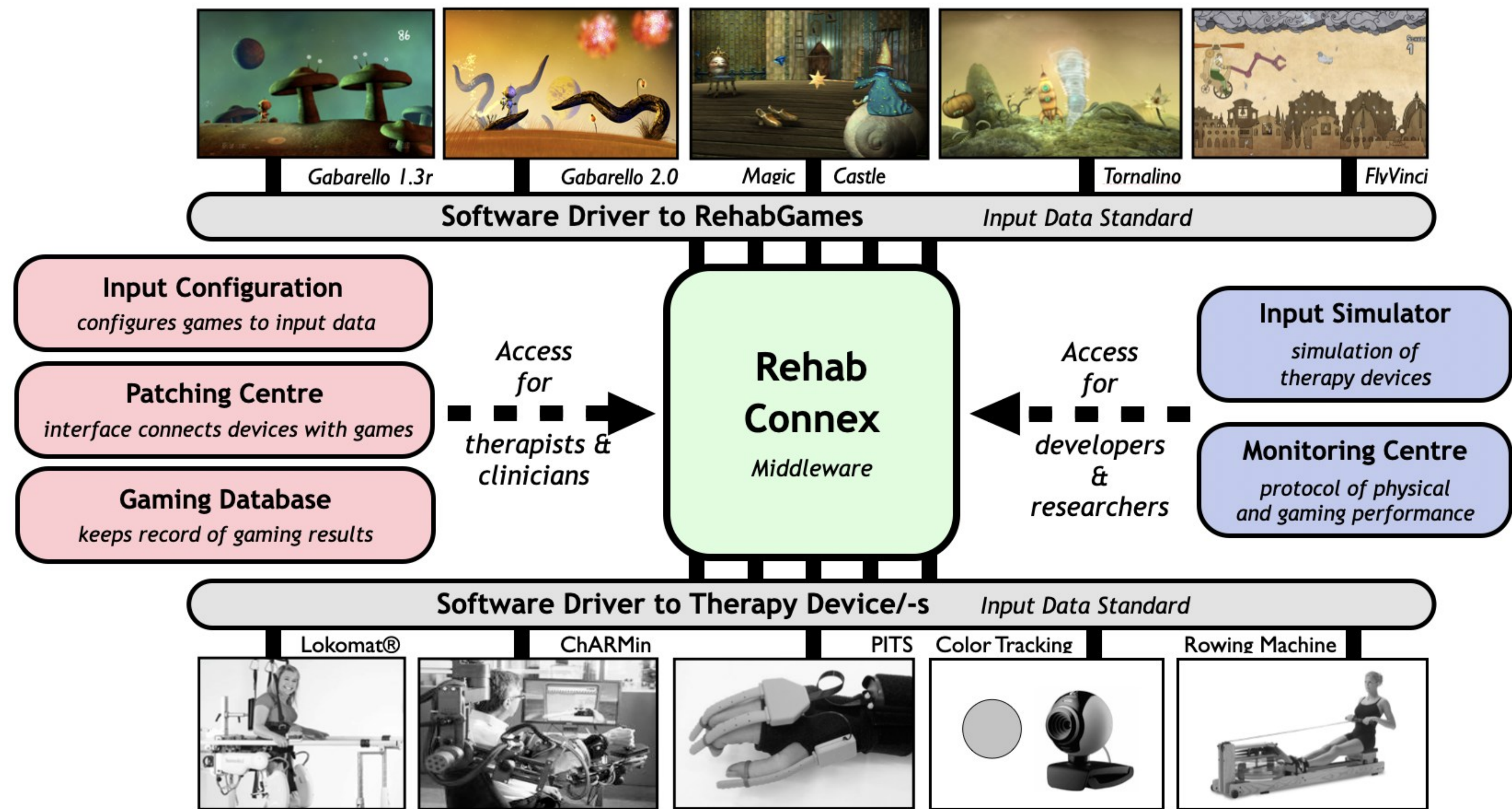


IMIC

INNOVATIVE MOVEMENT THERAPY IN CHILDHOOD

F&E Projekt (2008-2015) / Mäxi Stiftung

IMIC: Spielbasierte, robotergestützte, pädiatrische Bewegungstherapie



A child in a green shirt is standing on a platform, interacting with a large projection screen displaying a desert landscape. The child is holding a blue controller and has one leg raised. The setup includes motion capture equipment, blue circular markers on the floor, and studio lighting. The title 'PLUNDER PLANET' is overlaid in large white letters.

PLUNDER PLANET

F&E Projekt (2015-2018) / Sportfonds Kanton Zürich



THE EXERCUBE

PhD & F&E Projekt – ZHdK-SpinOff (ausgegründet 2018)

EXPLORATION

«Plunder Planet» & «The ExerCube»

PLUNDER
AN ADAPTIVE EXERGAME ENVIRONMENT
PLANET



***EINFLUSS
UNTERSCHIEDLICHER
DESIGNPARAMETER***

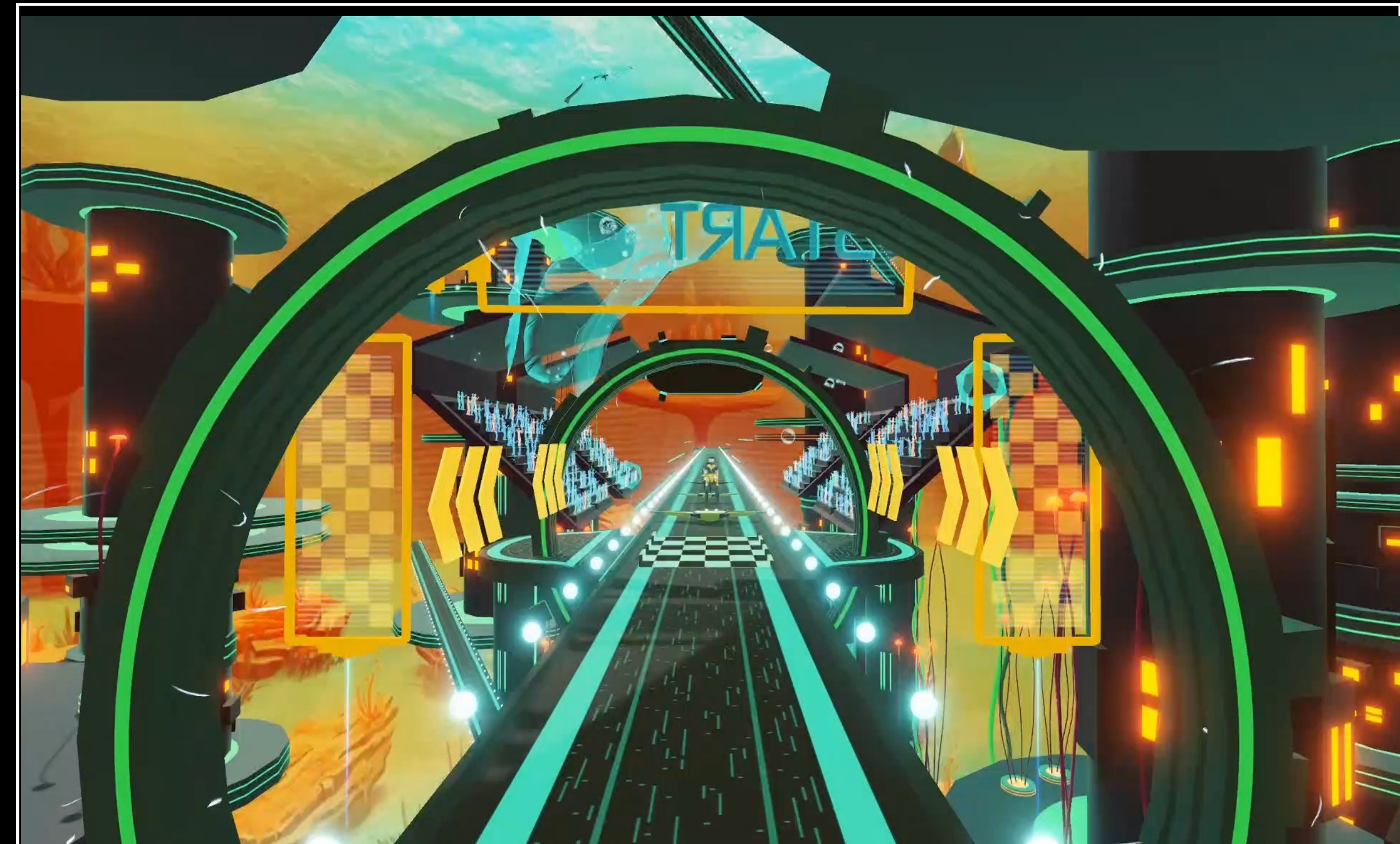
BEWEGUNGSKONZEPT

Bewegungskonzept



***AUDIO-VISUELLES,
NARRATIVES DESIGN &
MECHANIKEN***

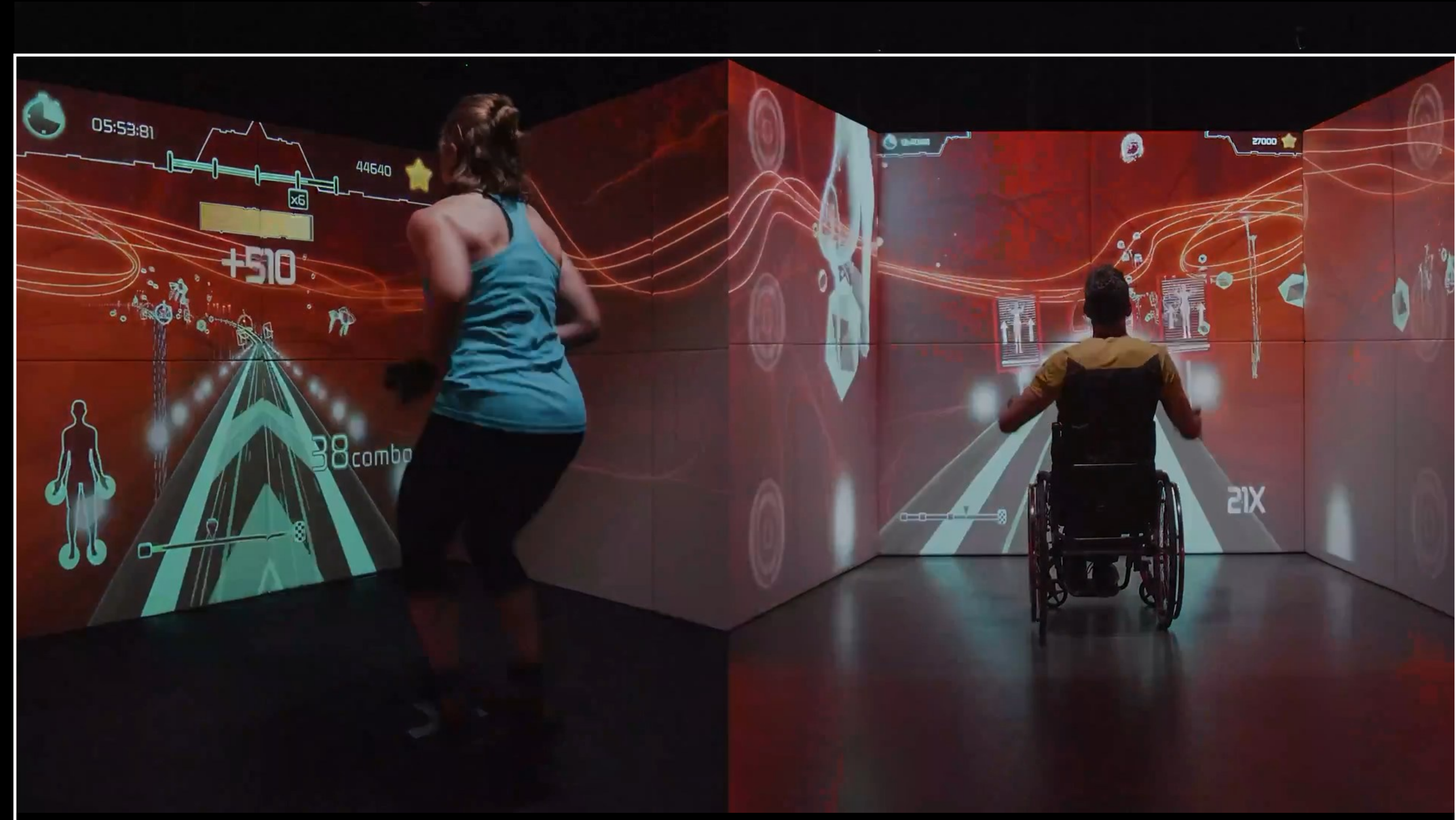
Game Scenarios & Mechaniken



CONTROLLER

Controller

FULL-BODY-MOTION CONTROLLER

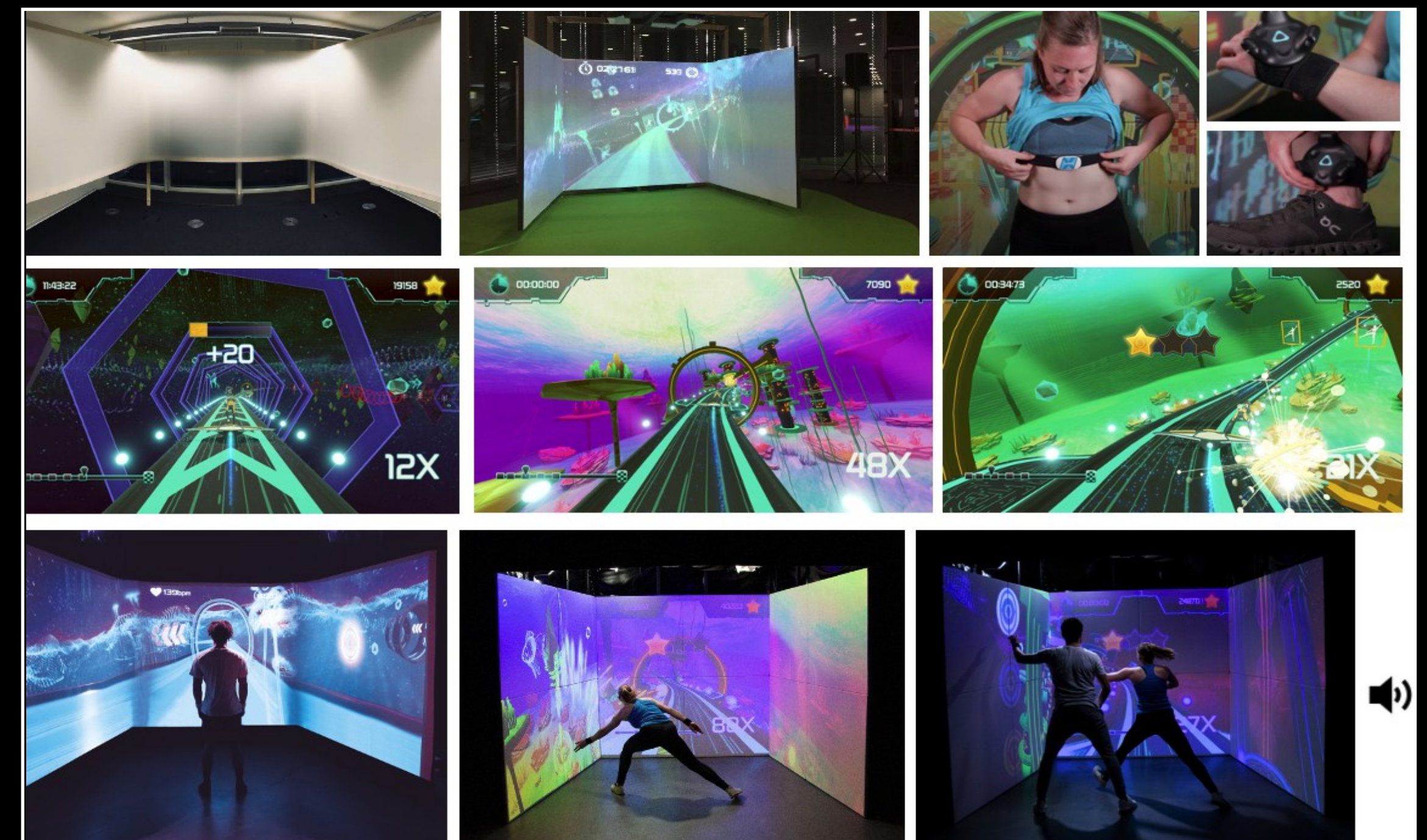


PLAYER MODE

Player Mode



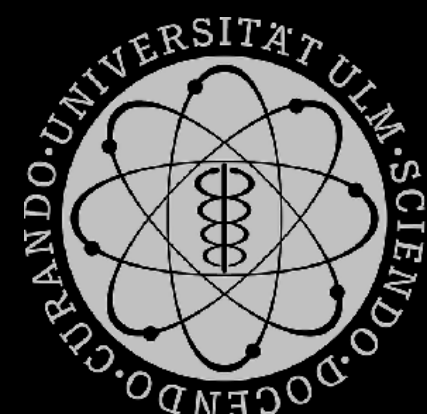
Forschungsbasierte, nutzerzentrierte Designiterationen







Internationales Forschungsnetzwerk


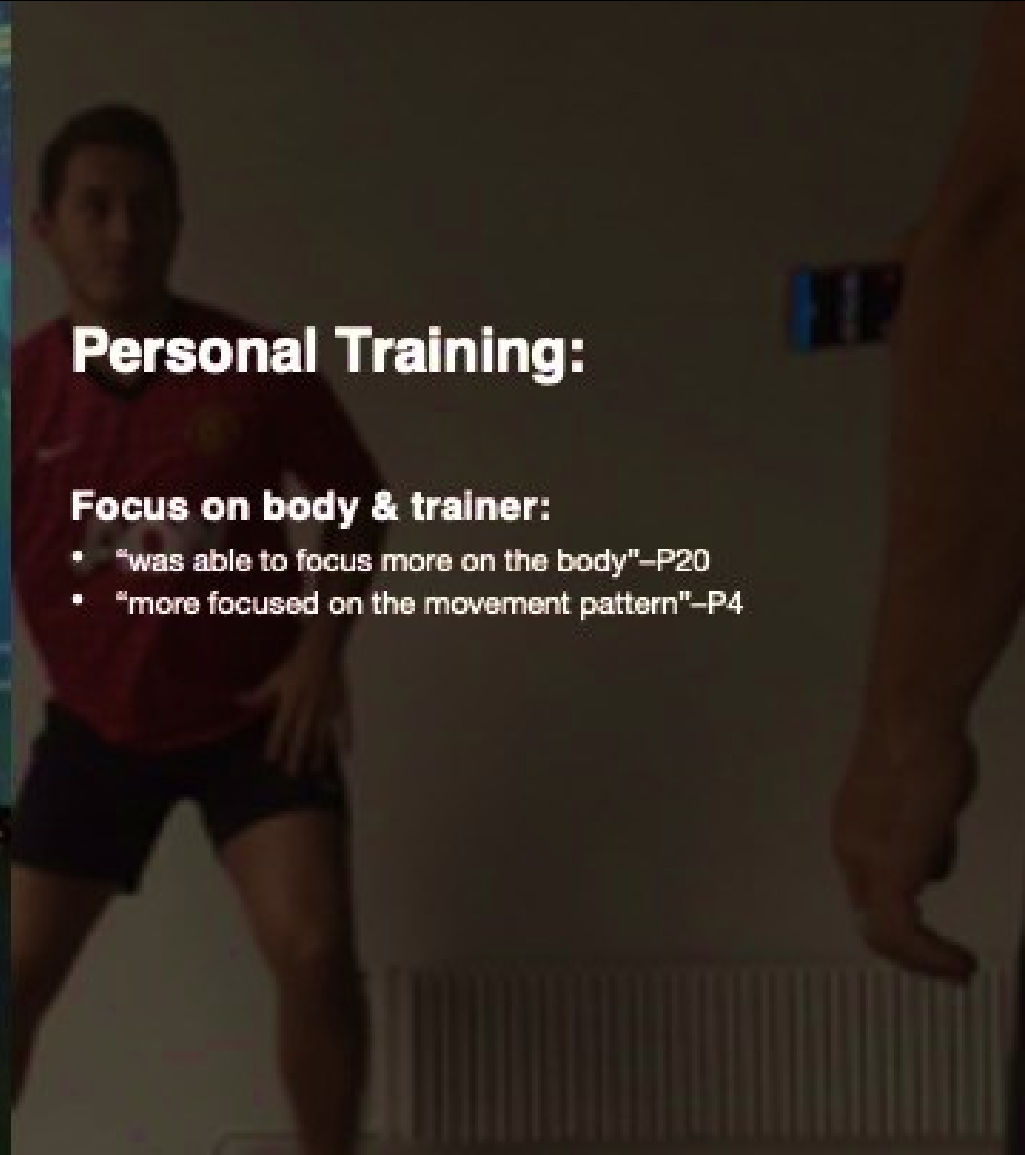
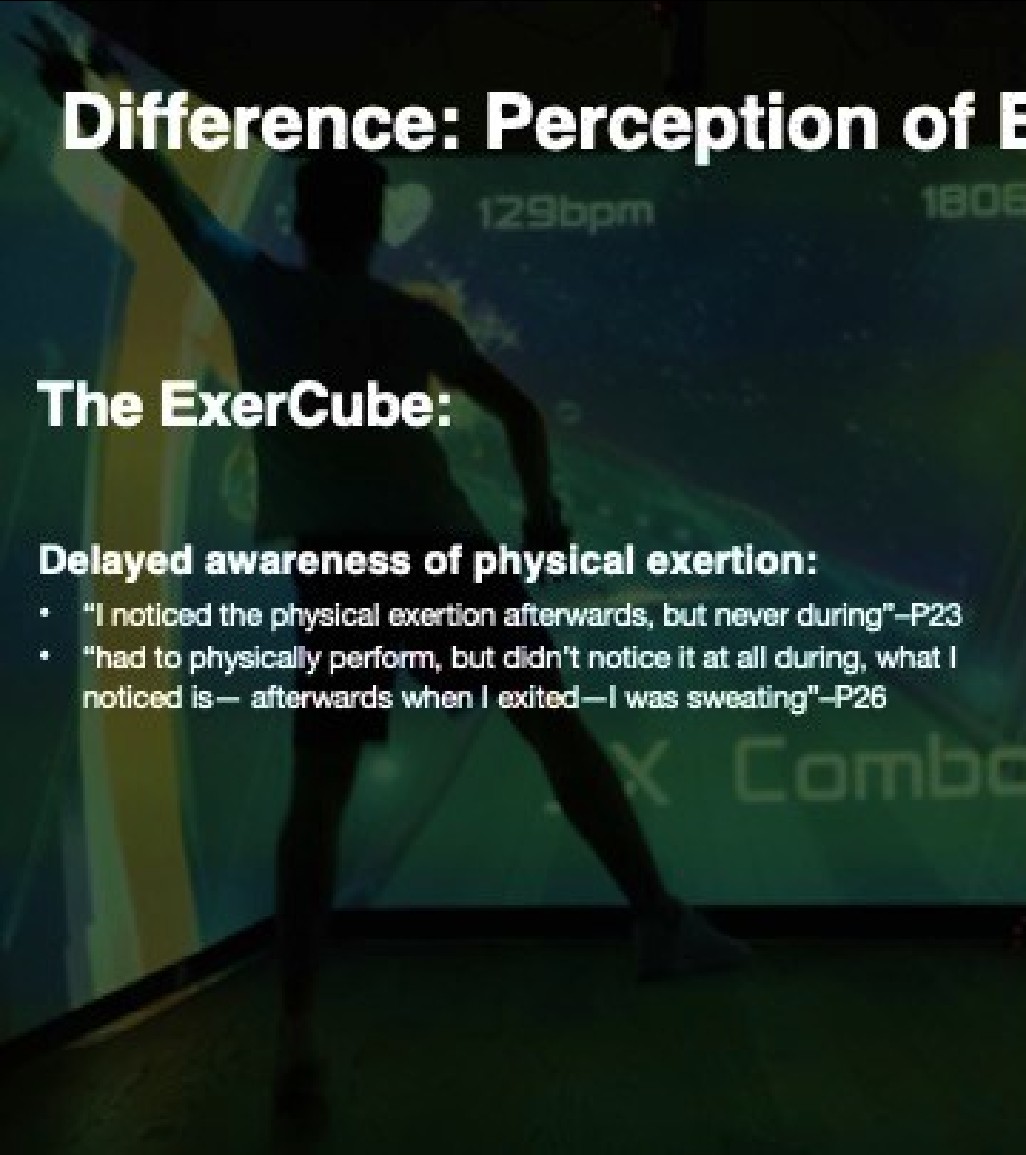
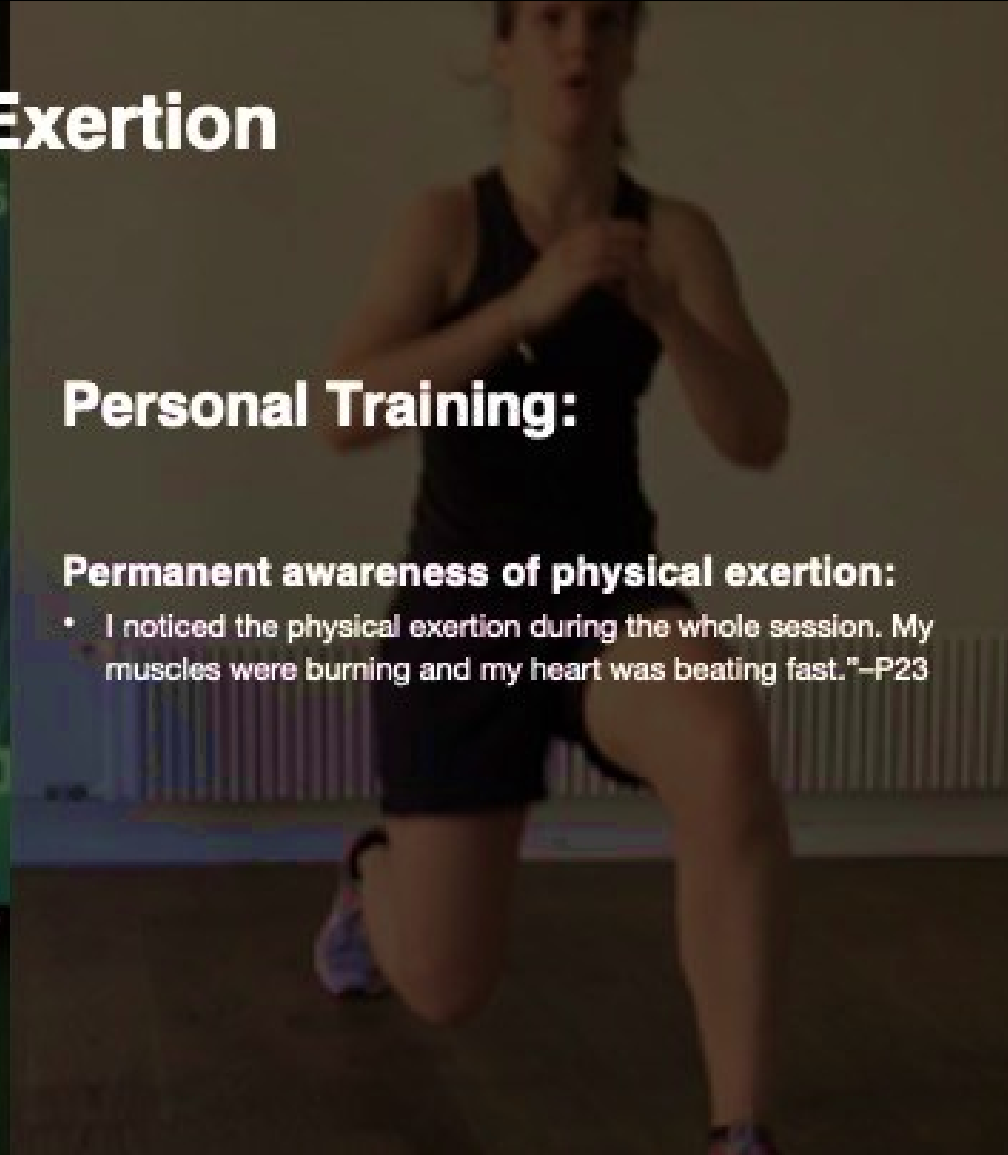

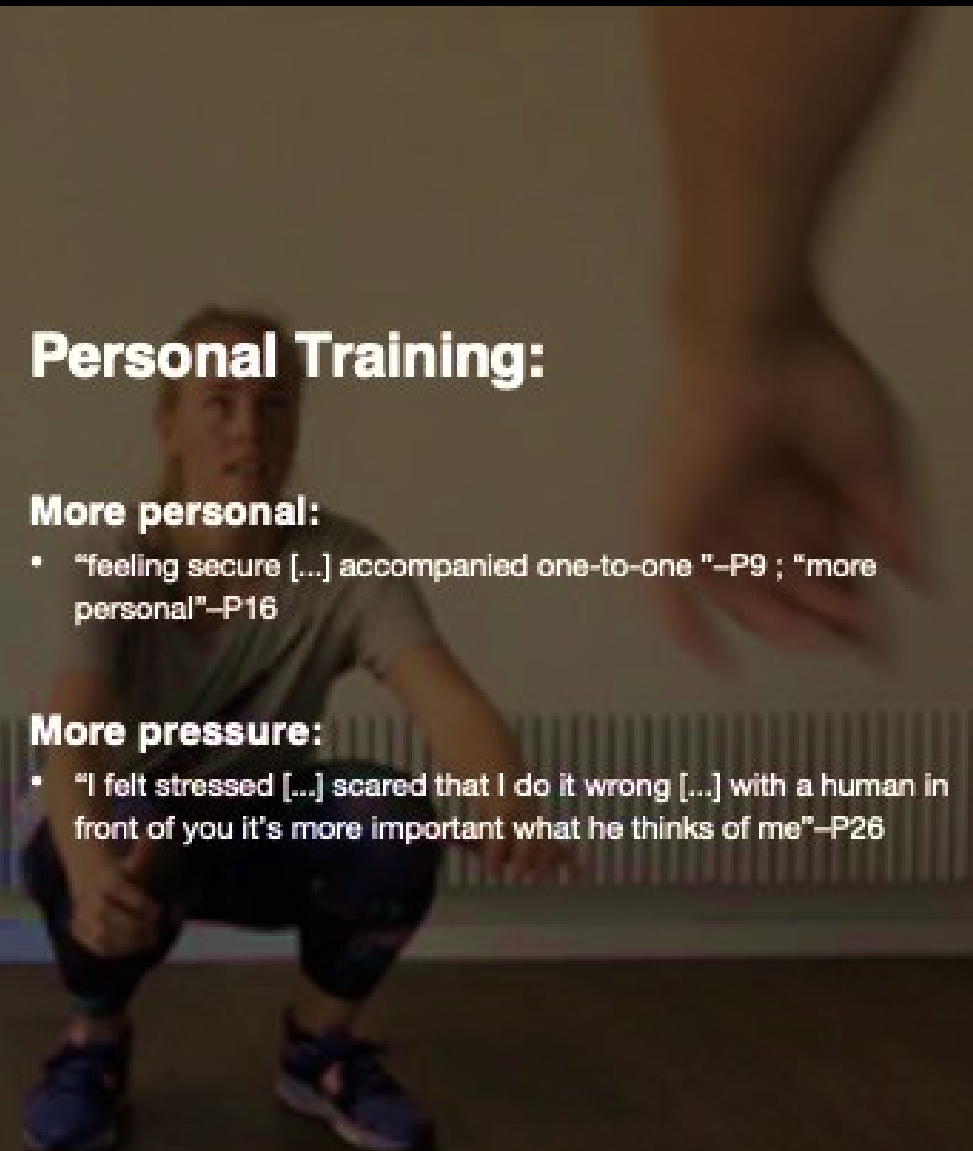


EVALUATIONEN & ITERATIONEN

ExerCube vs. Personal Trainer



ExerCube vs. Personal Trainer – Subjektives Erleben

 <p>Difference: Mental Focus</p> <p>The ExerCube:</p> <p>Focus on game:</p> <ul style="list-style-type: none">• "you're not explicitly conscious with your body [...] you're more driven by the game" –P9• "[my focus] was definitely on collecting points" –P16 <p>Focus on cognitive challenge:</p> <ul style="list-style-type: none">• "it keeps challenging you [...] always have to think" –P31	 <p>Personal Training:</p> <p>Focus on body & trainer:</p> <ul style="list-style-type: none">• "was able to focus more on the body" –P20• "more focused on the movement pattern" –P4	 <p>Difference: Perception of Exertion</p> <p>The ExerCube:</p> <p>Delayed awareness of physical exertion:</p> <ul style="list-style-type: none">• "I noticed the physical exertion afterwards, but never during" –P23• "had to physically perform, but didn't notice it at all during, what I noticed is— afterwards when I exited—I was sweating" –P26	 <p>Personal Training:</p> <p>Permanent awareness of physical exertion:</p> <ul style="list-style-type: none">• I noticed the physical exertion during the whole session. My muscles were burning and my heart was beating fast." –P23
<p>PT:</p> <ul style="list-style-type: none">• Spielerfokus auf eigenem Körper• Höhere körperliche Anstrengung• «Sozialer Druck»	 <p>Difference: Social Factors</p> <p>The ExerCube:</p> <p>No fear of mistakes:</p> <ul style="list-style-type: none">• "less issues having failures in a game" –P17	 <p>Personal Training:</p> <p>More personal:</p> <ul style="list-style-type: none">• "feeling secure [...] accompanied one-to-one" –P9 ; "more personal" –P16 <p>More pressure:</p> <ul style="list-style-type: none">• "I felt stressed [...] scared that I do it wrong [...] with a human in front of you it's more important what he thinks of me" –P26	<p>ExerCube:</p> <ul style="list-style-type: none">• Geringere körperliche Anstrengung• Höhere kognitive Anstrengung• «Sich frei fühlen»

(Martin-Niedecken et al. 2019)

Vergleich Effektivität

	ExerCube	Traditional fHIIT	z	p	r
Average HR [bpm]	155.0 [141.5; 161.3]	159.5 [150.3; 167.0]	-2.878	.003*	0.46
Average HR (% of calculated HR _{max})	78.7 [72.6; 82.2]	81.1 [77.9; 85.8]	-2.837	.005*	0.45
Maximal HR [bpm]	182.5 [172.0; 191.0]	180.5 [176.0; 190.8]	-0.262	.806	0.04
Maximal HR (% of calculated HR _{max})	93.0 [88.7; 97.4]	91.6 [93.6; 97.3]	-0.302	.388	0.05
	ExerCube	Traditional fHIIT	z	p	r
Borg _{physical}	7.0 [6.0;8.0]	9.0 [8.0;9.0]	-3.020	.001*	0.48
Borg _{cognitive}	6.5 [5.0; 8.0]	5.0 [4.0; 6.0]	-1.603	.113	0.25

*=p<.05=significant

ExerCube:

- etwas geringere körperliche Anstrengung, ABER die durchschnittl. Herzfrequenz erreichte die funktionelle HIIT-Schwelle
- subjektiv höhere kognitive Belastung (Dual-Domain-Training)

(Martin-Niedecken et al. 2020)

Vergleich Attraktivität

Questionnaires		ExerCube	Traditional fHIIT	z	p	r
SIMS	intrinsic motivation	6.5 [5.8; 6.8]	5.1 [4.5; 5.5]	-3.566	<.001*	0.56
	identified regulation	6.3 [5.5; 6.7]	6.0 [5.6; 6.7]	-0.029	>.999	0.01
	external regulation	1.3 [1.0; 2.4]	1.6 [1.3; 2.7]	-0.940	.367	0.15
	amotivation	1.0 [1.0; 1.6]	1.3 [1.0; 1.9]	-0.939	.388	0.15
FSS	overall	6.0 [5.6; 6.4]	5.4 [4.9; 5.8]	-3.663	<.001*	0.58
	fluency of performance	6.3 [5.5; 6.5]	5.7 [5.2; 6.4]	-1.708	.088	0.27
	absorption by activity	6.0 [5.5; 6.5]	4.9 [4.5; 5.8]	-3.436	.001*	0.54
	perceived importance	1.7 [1.0; 2.2]	1.0 [1.0; 1.8]	-2.519	.012*	0.40
PACES		6.3 [6.0; 6.6]	5.0 [4.7; 5.5]	-3.884	<.001*	0.61

*=p<.05=significant

- **ExerCube:** sig. bessere Ergebnisse für Flow, Freude und Motivation

(Martin-Niedecken et al. 2020)

Body Storming – Multiplayer Makeover



- Unterschiedlich ausbalancierte Erfahrungen von sozialem Eintauchen, Spass sowie körperlicher und kognitiver Anstrengung
- Identifikation vielversprechender neuer Spielerformationen

(Martin-Niedecken et al., 2019)

EXERCUBE BODYSTORMING

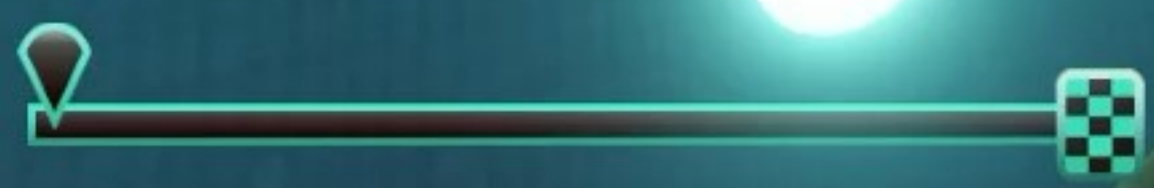


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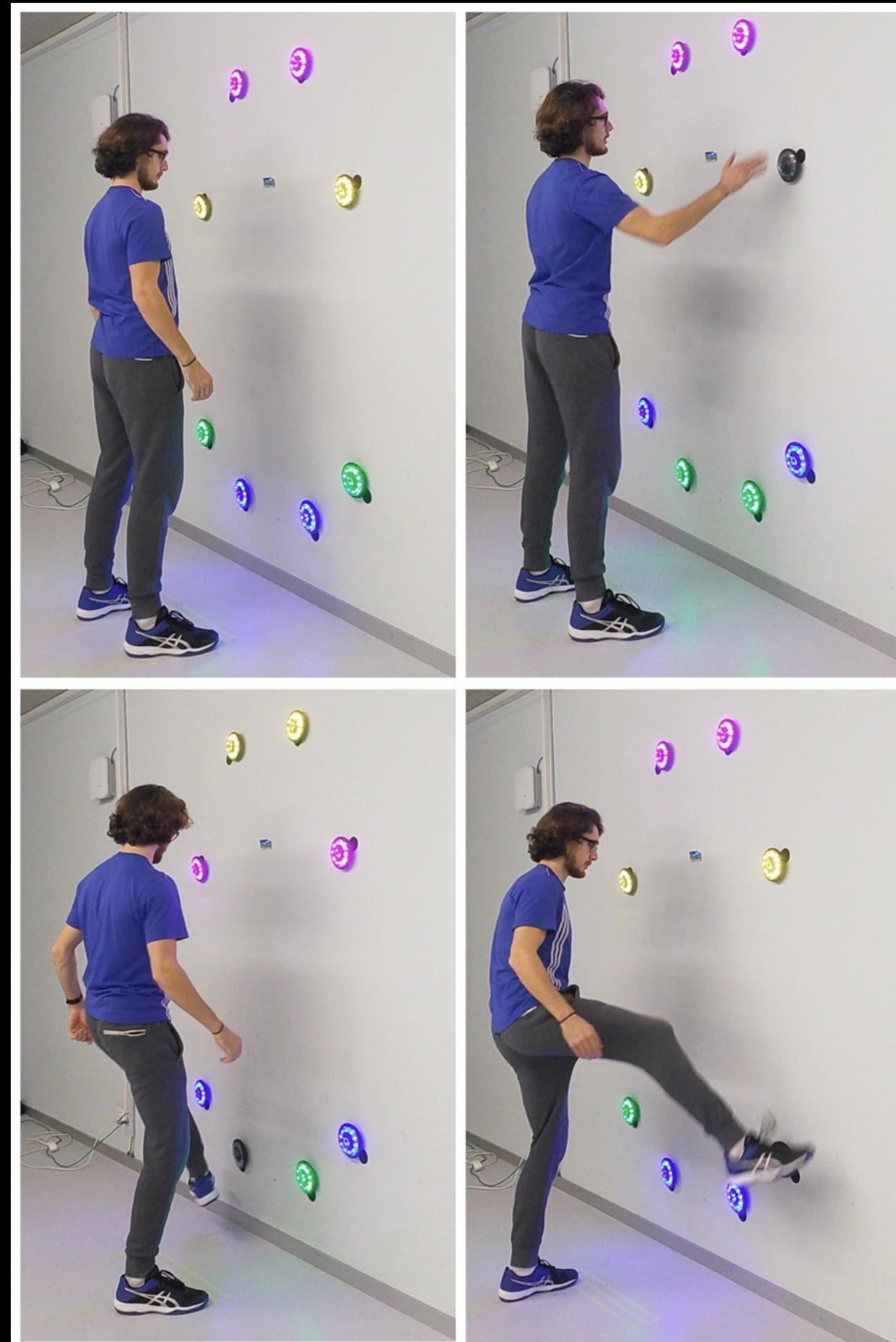
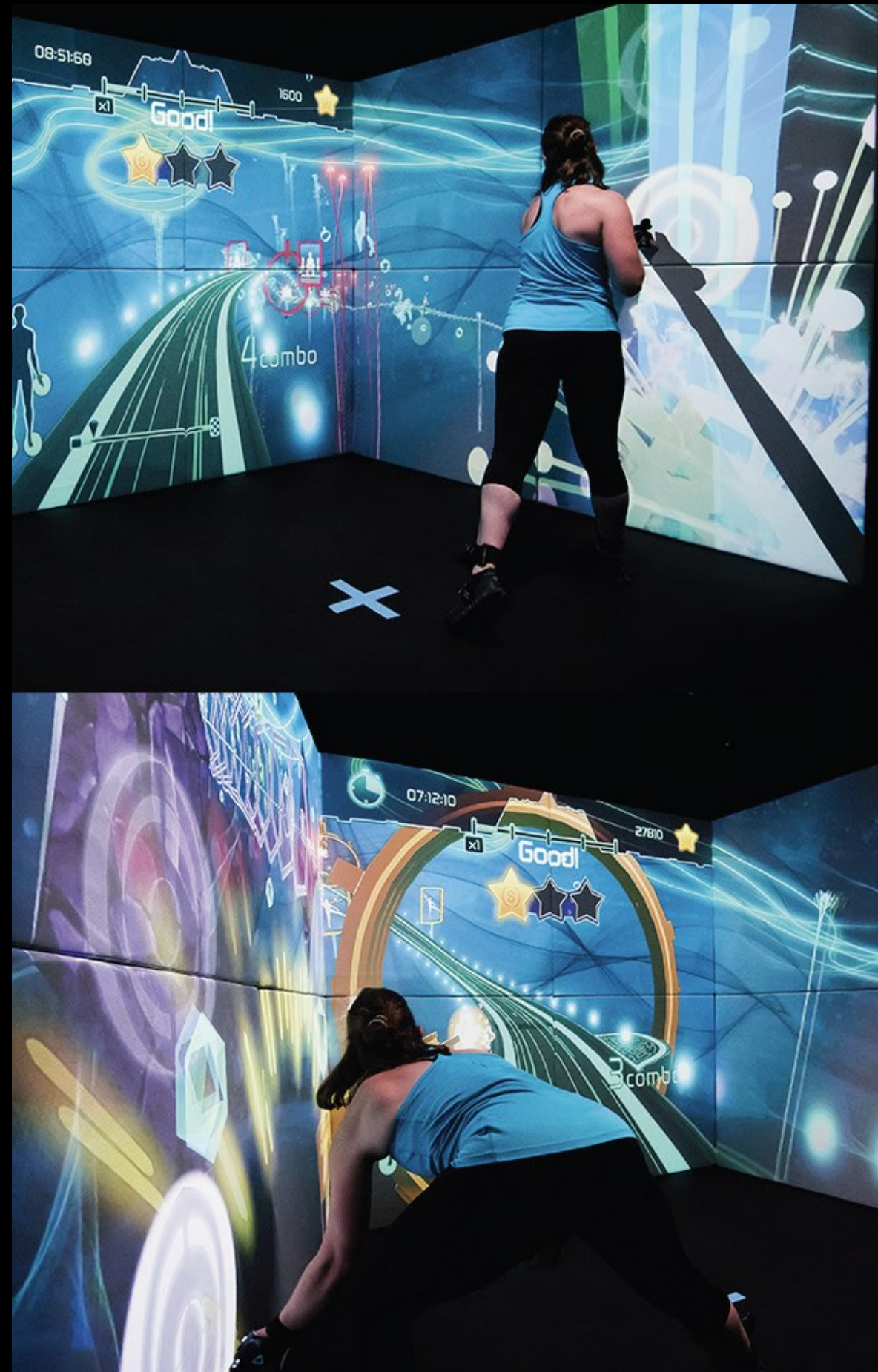


120bpm



EVALUATION

ExerCube-Training für Nachwuchathlet:innen

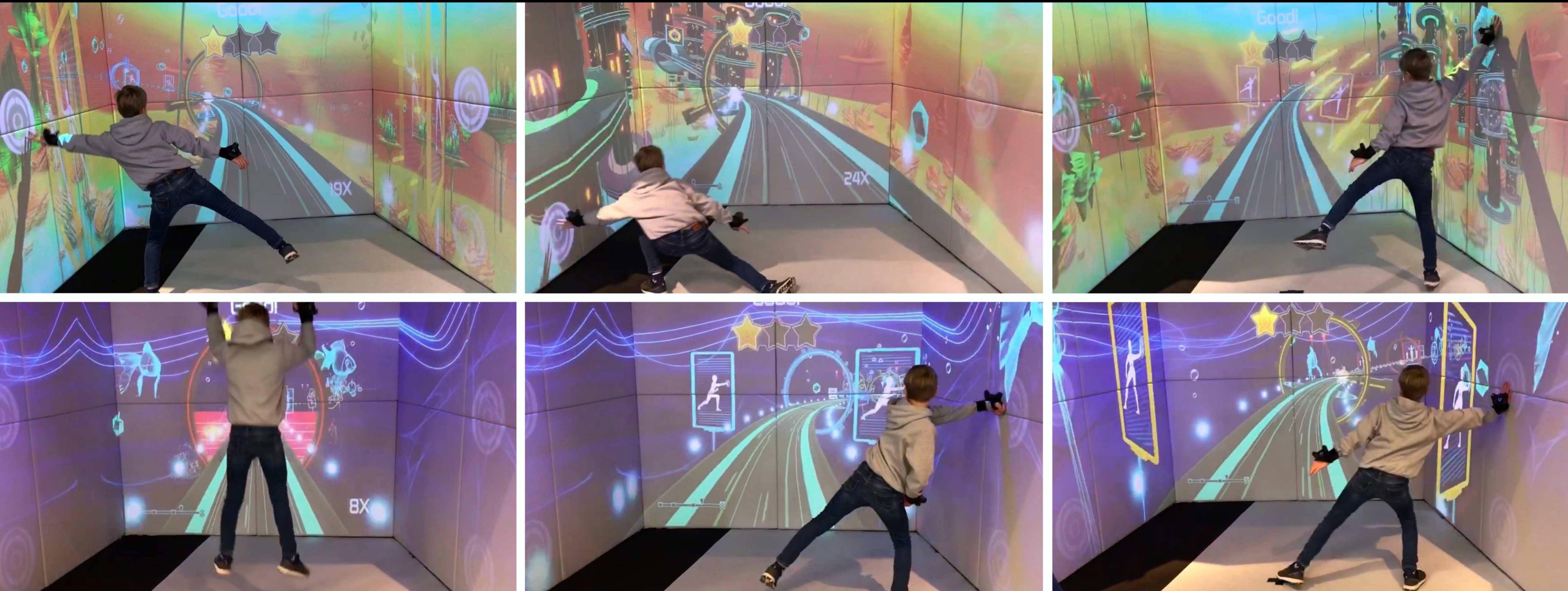


Ziel: Gewinnung von Erkenntnissen über die Trainingseffekte des ExerCube auf **kognitive (und motorische) Funktionen**

Results – Non-Randomized Controlled Trial

- 24 Nachwuchsathlet:innen im Spielsport (15 ± 0.7 Jahre; 46% Mädchen)
- 10 Wochen Interventionszeit → auf 8 Wochen verkürzt wegen pandemiebedingten Restriktionen:
 - Interventionsgruppe: 2x 25min ExerCube Training pro Woche + sportartspezifisches Training
 - Kontrollgruppe: nur sportartspezifisches Training
- Sig. positive Effekte auf **kognitive (motorische) Fähigkeiten** (schnellere Reaktion), besonders auf **Konzentration** ($U=-2.483$, $p=0.013$, $r=0.51$), **kognitive Flexibilität** ($F=12.176$, $p<0.001$, $d=1.488$) und **geteilte Aufmerksamkeit** ($F=9.776$, $p=0.002$, $d=1.404$).

ExerCube @School



Ziel: Untersuchung der Effekte einer schulbasierten Exergame-Intervention auf **anthropometrische Parameter** und **körperliche Fitness**.

Ergebnisse – Randomized Controlled Trial

- 58 Schüler:innen (10.4 ± 0.8 Jahre; 48% Mädchen)
→ nur 34 Schüler in finale Analyse eingeschlossen aufgrund pandemiebedingter Restriktionen
- 3 Monate Interventionslaufzeit:
 - Interventionsgruppe: 2x 20min ExerCube Training pro Woche+ Schulsport
 - Kontrollgruppe: nur Schulsport


Outcome	IG (n = 18)		CG (n = 16)		p-Values	η ²
	Pre	Post	Pre	Post		
BMI (kg·m ⁻²)	21.7 ± 4.0	21.6 ± 4.2	19.3 ± 4.1	19.7 ± 4.1	n.s.	0.063
WHtR	0.47 ± 0.05	0.46 ± 0.05	0.44 ± 0.07	0.45 ± 0.07	n.s.	0.114
CMJ (cm)	18.6 ± 5.4	21.1 ± 5.2 ***	20.5 ± 5.2	18.6 ± 3.6 **	<0.001	0.403
ST (s)	4.12 ± 0.45	4.08 ± 0.47	4.06 ± 0.35	4.18 ± 0.32	0.020	0.157
SRT (m)	450.0 ± 228.0	537.8 ± 210.5 *	498.7 ± 208.3	469.3 ± 162.3	0.046	0.122

Abbreviations: Pre—before intervention; post—after intervention; BMI—body mass index; WHtR—waist-to-height ratio; CMJ—countermovement jump; ST—sprint test; SRT—shuttle run test; η² –partial eta squared. * *p* < 0.05, ** *p* < 0.01, and *** *p* < 0.001 represent changes from before to after intervention for the IG and CG. *p*-values represent interaction effects.


CMJ = Counter movement jumps
SRT = Shuttle run test
ST = Sprint test
→ für alle sig. Verbesserung der Interventionsgruppe

WHtR = Waist to hight ratio
BMI = Body mass index

Ausgewählte Folgestudien







Journal of
Clinical Medicine




Article

Integrating Regular Exergaming Sessions in the ExerCube into a School Setting Increases Physical Fitness in Elementary School Children: A Randomized Controlled Trial

Sascha Ketelhut ^{1,*}, Lisa Röglin ², Anna Lisa Martin-Niedecken ³, Claudio R. Nigg ¹ and Kerstin Ketelhut ⁴



ORIGINAL RESEARCH
published: 27 January 2022
doi: 10.3389/fcvm.2022.788409




Gaming Instead of Training? Exergaming Induces High-Intensity Exercise Stimulus and Reduces Cardiovascular Reactivity to Cold Pressor Test

Sascha Ketelhut ^{1*}, Reinhard G. Ketelhut ², Eva Kircher ³, Lisa Röglin ⁴, Kuno Hottenrott ¹, Anna Lisa Martin-Niedecken ⁴ and Kerstin Ketelhut ⁵

GAMES FOR HEALTH JOURNAL: Research, Development, and Clinical Applications
Volume 11, Number 1, 2022
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DOI: 10.1089/g4h.2021.0196

Original Article



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Acute Effects of Heart Rate-Controlled Exergaming on Vascular Function in Young Adults

Eva Kircher, MA,¹ Sascha Ketelhut, PhD,^{2,4} Kerstin Ketelhut, PhD,³ Lisa Röglin, MA,^{2,4} Anna Lisa Martin-Niedecken, PhD,^{2,4,5} Kuno Hottenrott, PhD,² and Reinhard G. Ketelhut, PhD, MD^{1,5}

 BMC Part of Springer Nature

Journal of NeuroEngineering and Rehabilitation

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Research | Open Access | Published: 16 August 2022

ExerG: adapting an exergame training solution to the needs of older adults using focus group and expert interviews


Nathalie Ringenberg ¹, Sarah Milder, Marcia Hapis, Sarah Hermann, Katharina Kuszewski, Anna Lisa Martin-Niedecken, Katja Rogers, Alexandra Schättin, Frank Behrendt, Sonja Böckler, Stefan Schmidlin, Roman Jurt, Stephan Niedecken, Christian Brenneis, Leo H. Bonati, Corina Schuster-Arnt & Barbara Seebacher

Journal of NeuroEngineering and Rehabilitation 19, Article number: 89 (2022) | Cite this article

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


International Journal of
Environmental Research and Public Health



Article

A Game-Based Approach to Lower Blood Pressure? Comparing Acute Hemodynamic Responses to Endurance Exercise and Exergaming: A Randomized Crossover Trial

Eva Kircher ¹, Sascha Ketelhut ^{2,*}, Kerstin Ketelhut ³, Lisa Röglin ², Kuno Hottenrott ², Anna Lisa Martin-Niedecken ⁴ and Reinhard G. Ketelhut ^{1,5}

Training & Testing



The New Way to Exercise? Evaluating an Innovative Heart-rate-controlled Exergame

Authors
Sascha Ketelhut ¹, Lisa Röglin¹, Eva Kircher², Anna Lisa Martin-Niedecken³, Reinhard Ketelhut^{2, 4}, Kuno Hottenrott¹, Kerstin Ketelhut⁵

Exploring the Design Space of Immersive Social Fitness Games The ImSoFit Games Model

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Original Article

Adaptive High-Intensity Exergaming: The More Enjoyable Alternative to Conventional Training Approaches Despite Working Harder

Lisa Röglin, MA,¹ Sascha Ketelhut, PhD,¹ Kerstin Ketelhut, PhD,² Eva Kircher, MA,³ Reinhard G. Ketelhut, PhD, MD,^{3,4} Anna Lisa Martin-Niedecken, PhD,⁵ Kuno Hottenrott, PhD,¹ and Oliver Stoll, PhD¹



ORIGINAL RESEARCH
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Comparing the Impact of Heart Rate-Based In-Game Adaptations in an Exergame-Based Functional High-Intensity Interval Training on Training Intensity and Experience in Healthy Young Adults

Anna Lisa Martin-Niedecken^{1*}, Tiziana Schwarz² and Alexandra Schättin^{2*}

Open Access Article

Evaluating Changes in Perceived Enjoyment throughout a 12-Week School-Based Exergaming Intervention

by  Lisa Röglin ^{1,*}  Oliver Stoll ¹  Kerstin Ketelhut ²,  Anna Lisa Martin-Niedecken ³  and  Sascha Ketelhut ^{4,*} 

¹ Institute of Sport Science, Martin-Luther-University Halle-Wittenberg, 06108 Halle (Saale), Germany
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Psychology of Sport and Exercise
Volume 66, May 2023, 102404



Acute exercise and children's cognitive functioning: What is the optimal dose of cognitive challenge? ☆

Sofia Anzeneder ^a , Cécilia Zehnder ^a, Anna Lisa Martin-Niedecken ^b, Mirko Schmidt ^a, Valentin Benzing ^a

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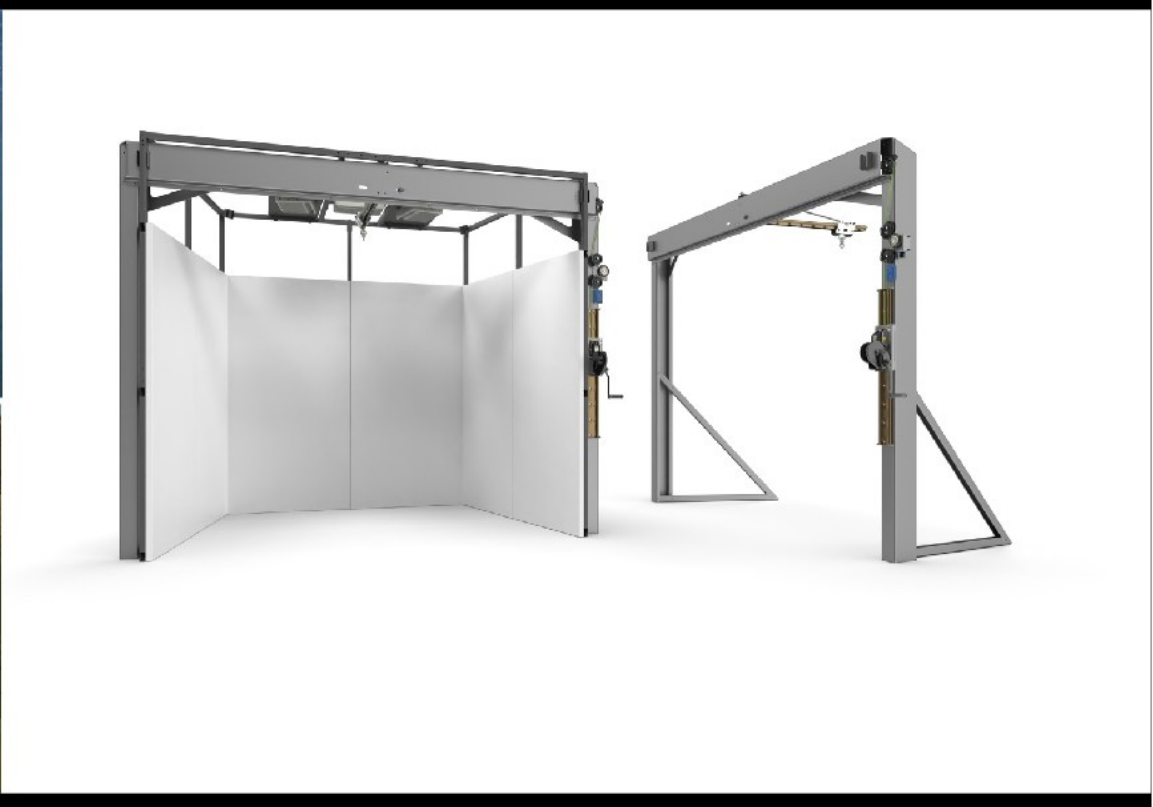
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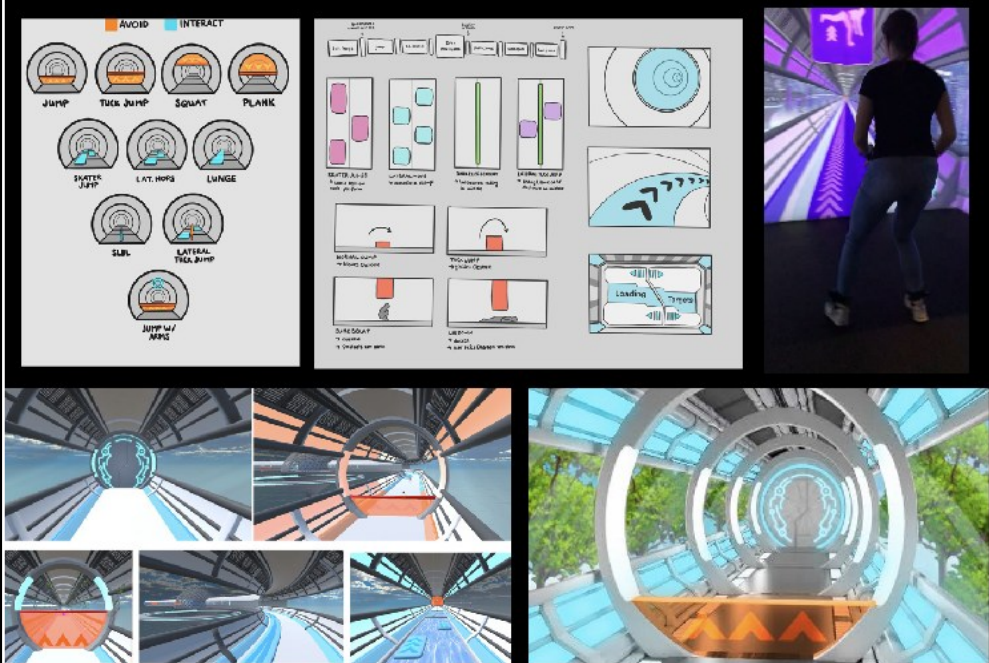
ERWEITERUNG

F&E Folgeprojekte

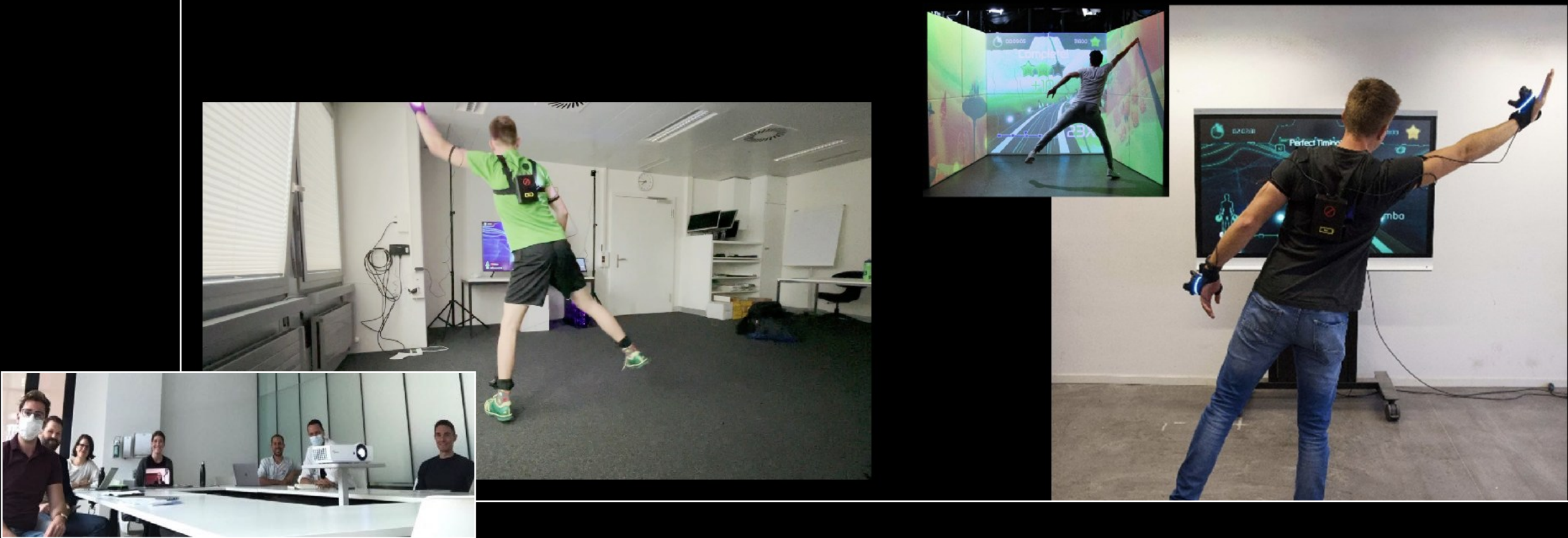
ExerG: Exergame-based Geriatric Therapy



ExerUp: «Control to Chaos» in Sports Rehabilitation



ExerCube @Home: On-Body Game Elements



ExerUp: Exergame-basierte Sportrehabilitation



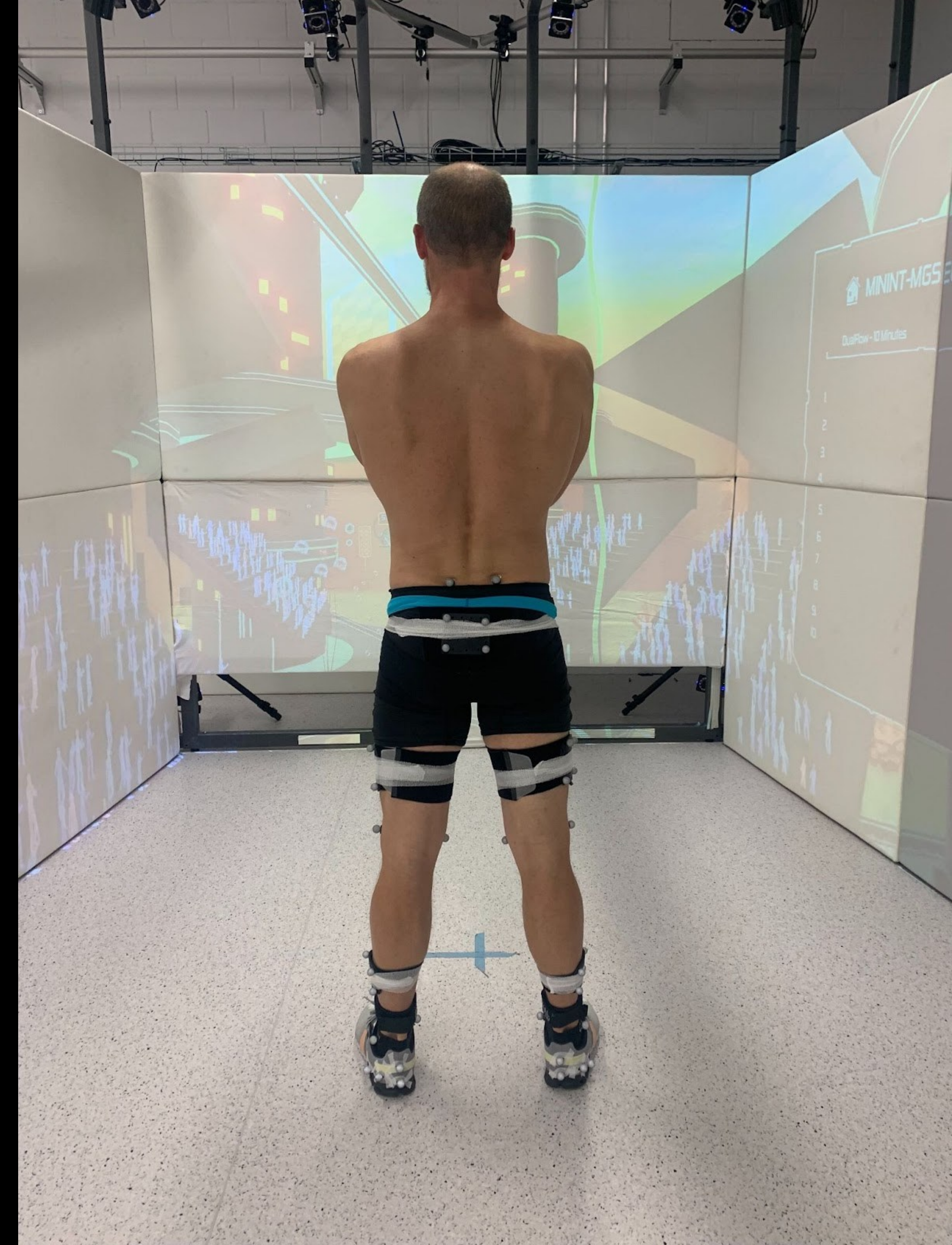
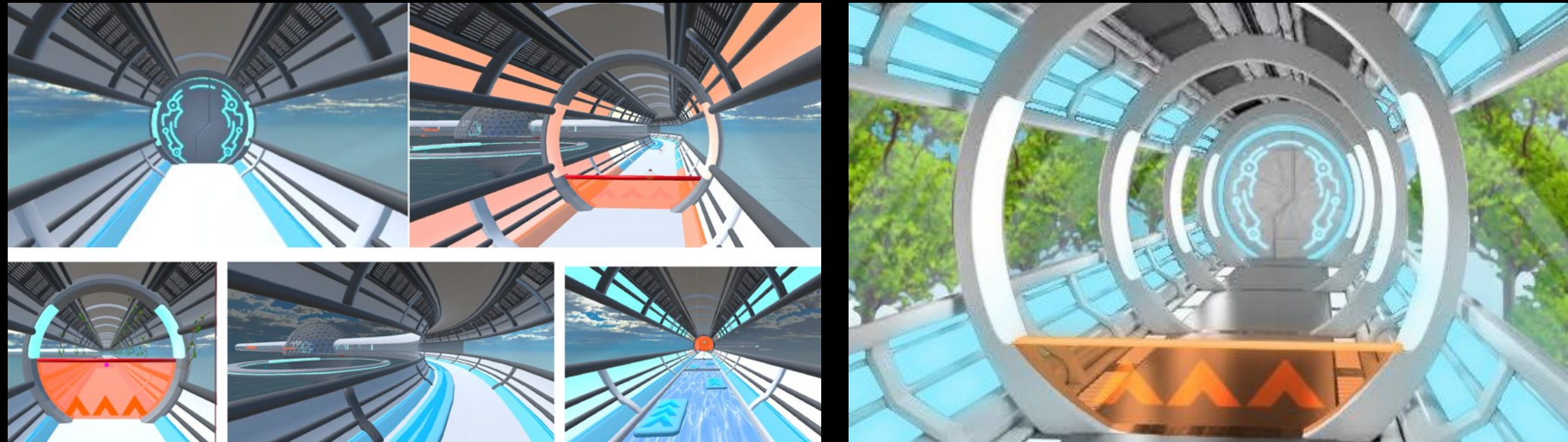
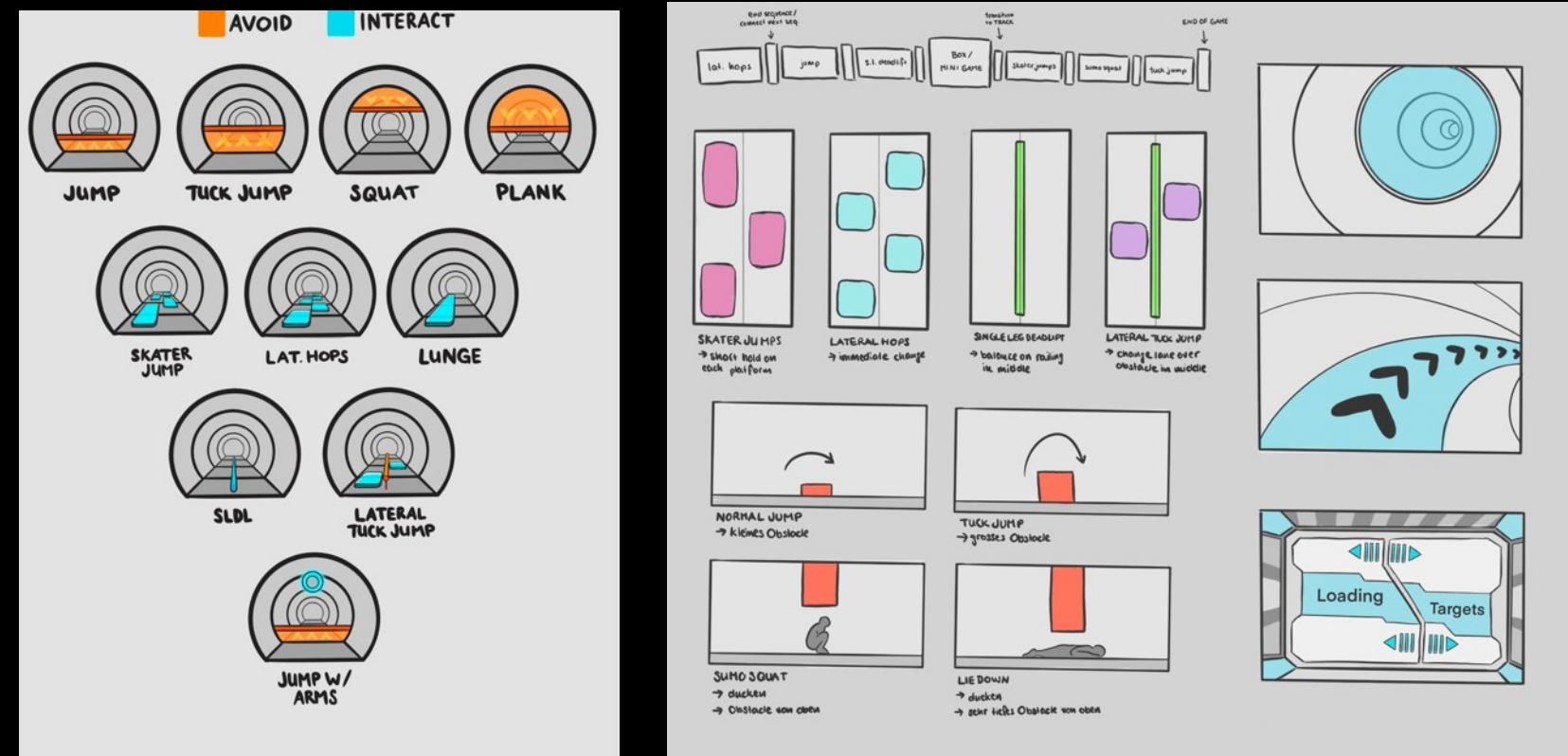
DIZH Project



ExerUp: Exergame-basierte Sportrehabilitation



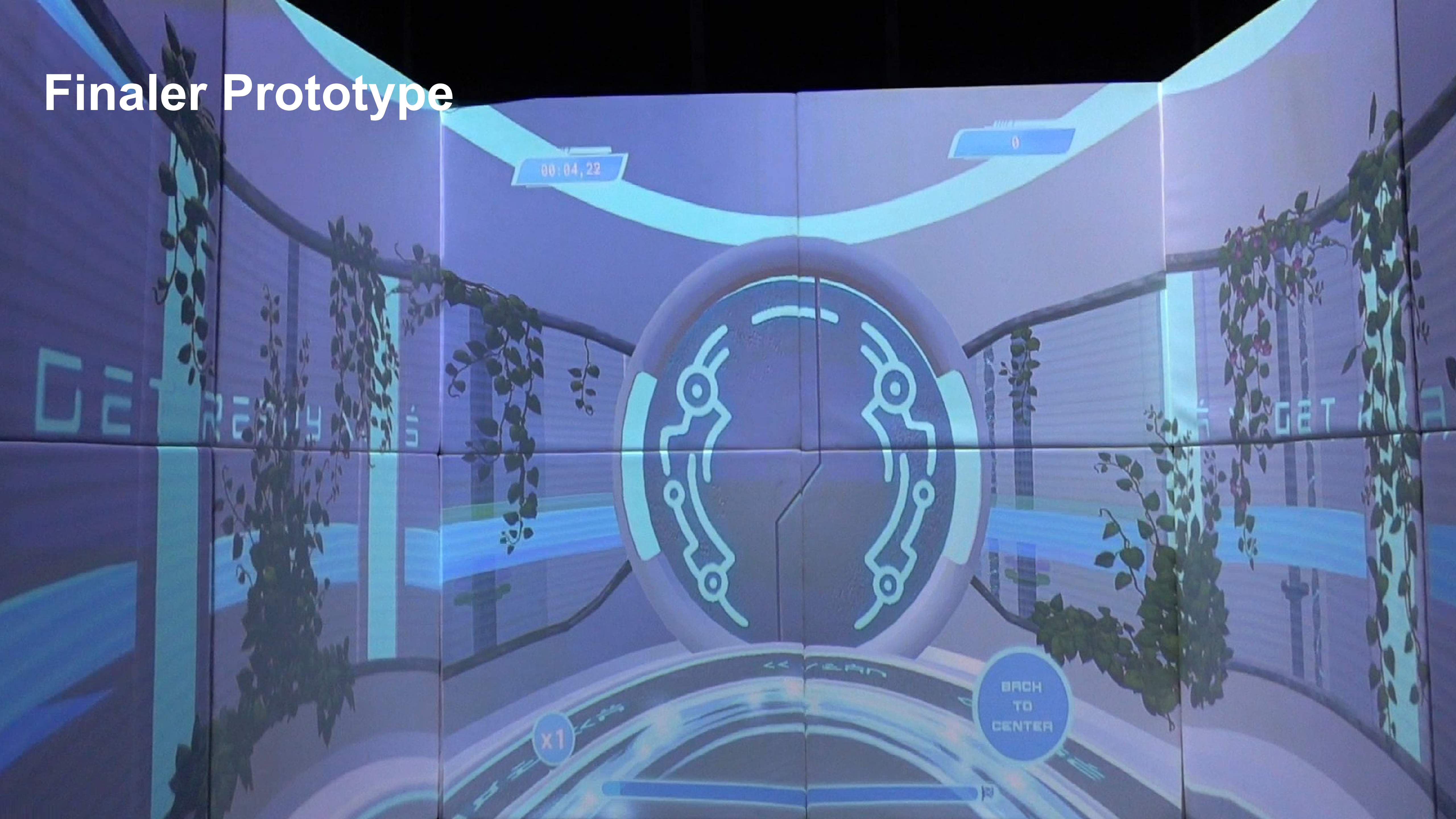
«Control to Chaos»



Fokus:

- Phase 3 der Rehabilitation nach Kreuzbandriss
- **Return to sports** (control to chaos)

Finaler Prototype

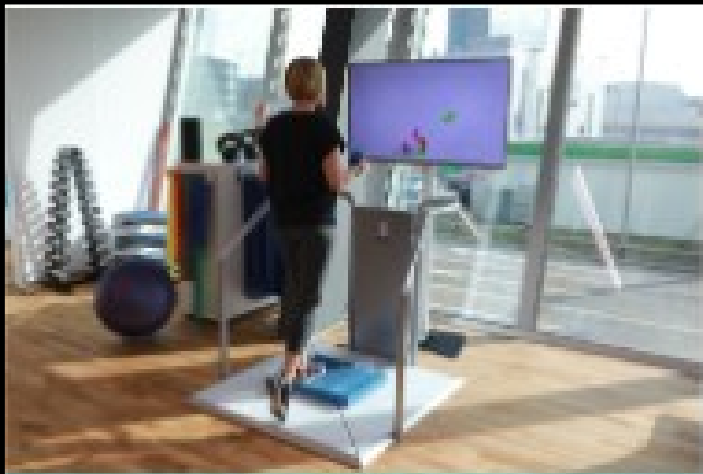


Finales Produkt



ExerUp Portal

EXERUP! PORTAL



Dividat Senso



ExerCube



Icaros Cloud



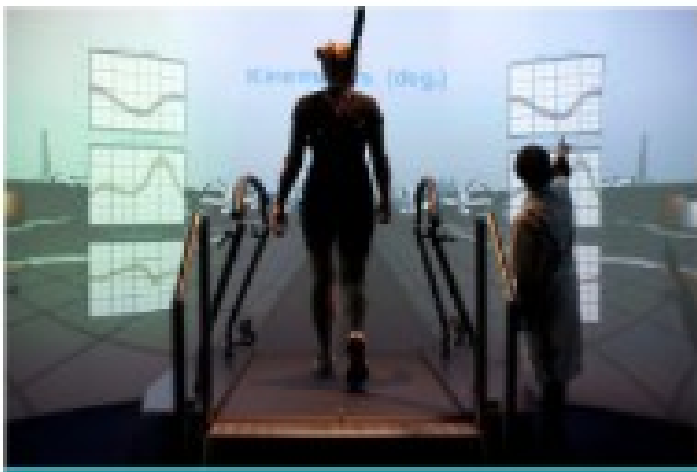
ddrobotec®



Armeo Spring



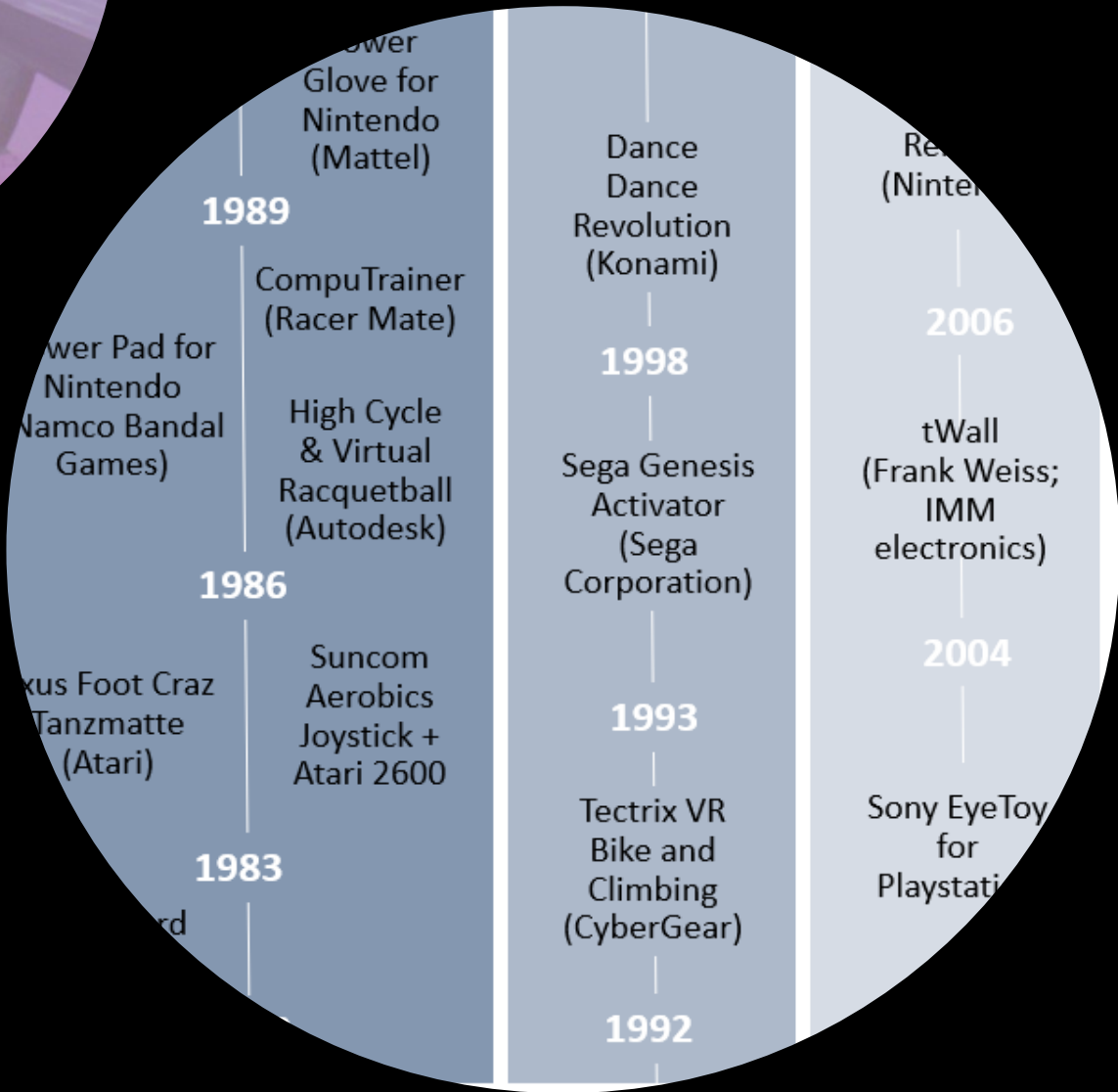
Lokomat



CAREN

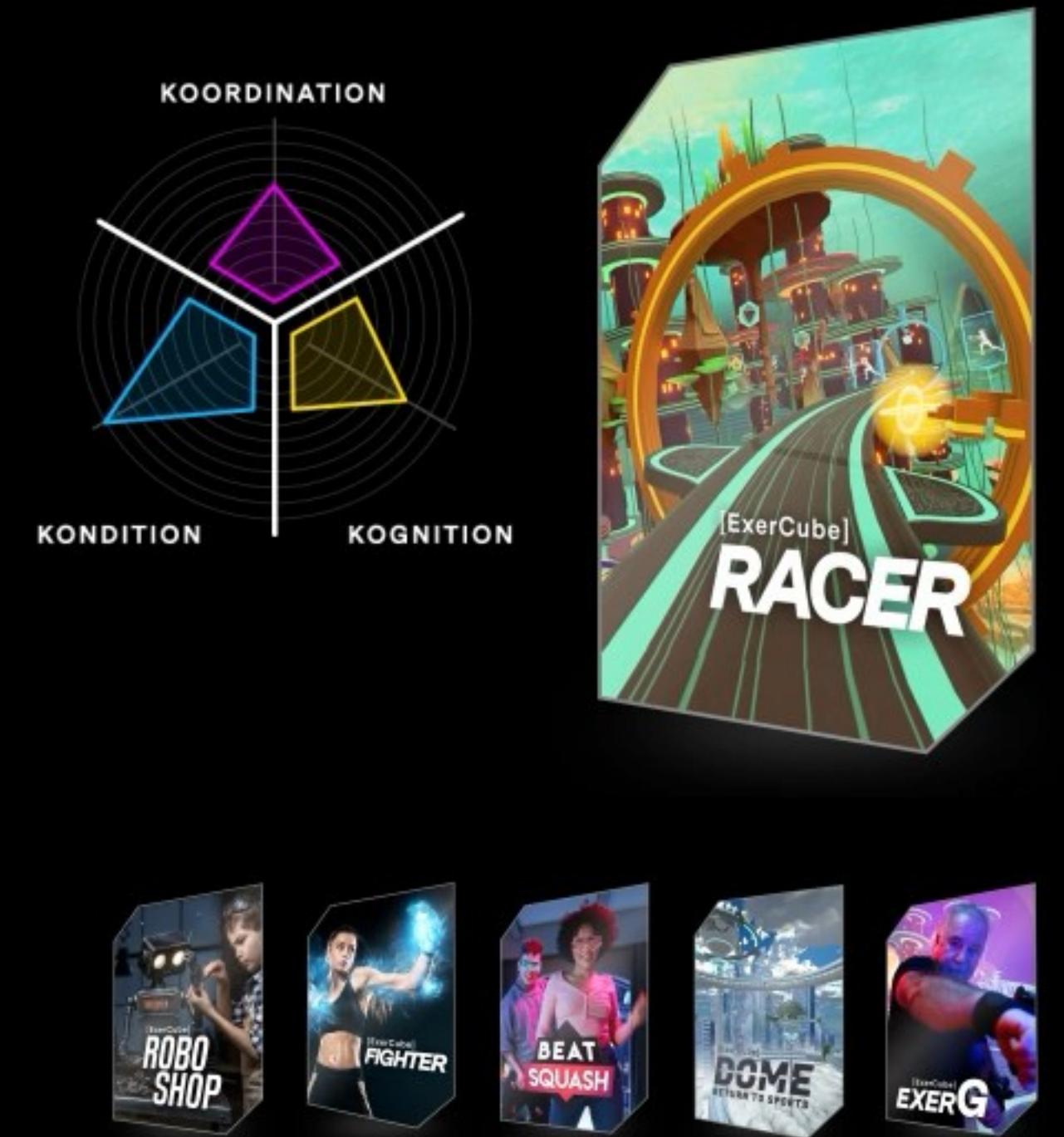


C-Mill

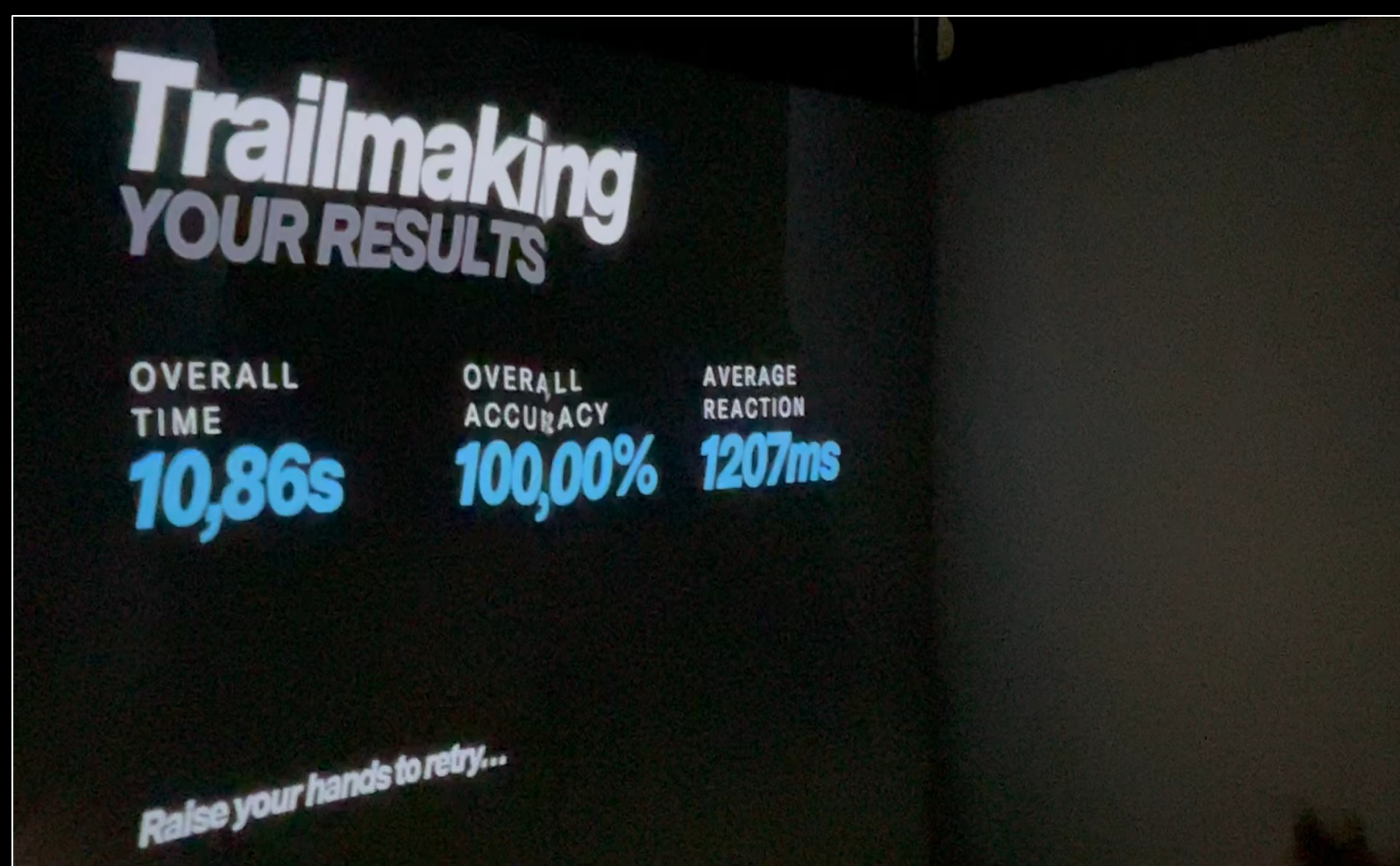


***FROM THE LAB
TO THE FIELD***

Exergame-Ökosystem



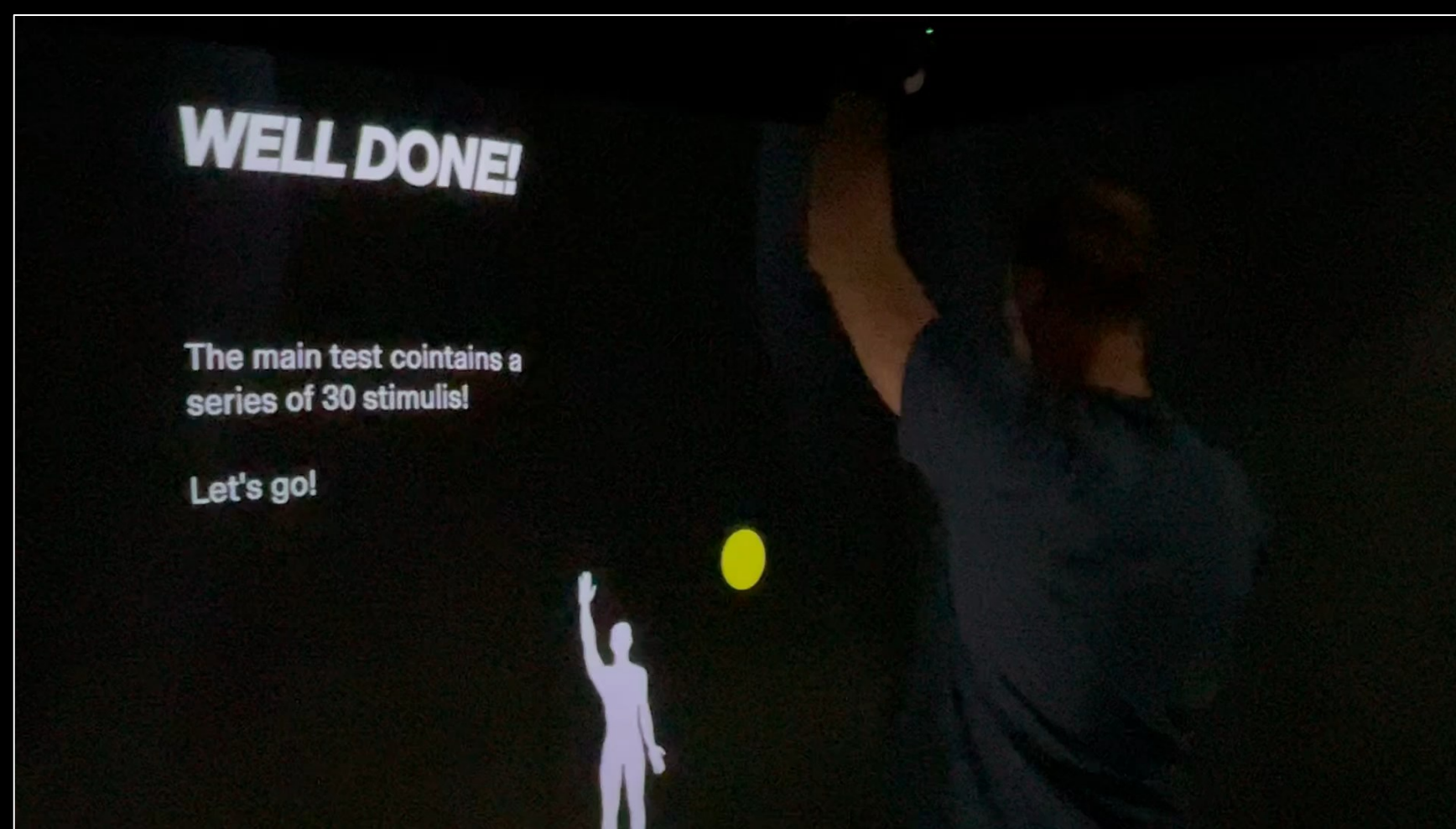
Motor-kognitive Assessments



Trail Making



Simple Reaction



N Back

12-Wochen Trainingsplan

David Habluetzel








Erfolgsgeschichte: Hospital zum Heiligen Geist in Hamburg



Exergames: Analog + Low Tech



Exergames: Analog + Low Tech

Exergame	Wie es funktioniert
 Würfel-Workout	Die Spieler würfeln mit einem großen Würfel, um die Anzahl oder Art der Wiederholungen zu bestimmen (z. B. 6 = sechs Hampelmänner). Fördert zufallsbasiertes Bewegen mit minimalem Aufwand.
 Bewegungs-Memory	Eine Abwandlung des klassischen Memory-Spiels: jedes passende Paar enthält eine körperliche Aufgabe. Um das Paar zu gewinnen, müssen die Spieler die Aktion ausführen (z. B. „Froschsprünge“).
 Musik-Stopp-Spiel	Die Teilnehmer tanzen oder bewegen sich frei zur Musik. Wenn die Musik stoppt, ruft ein Spielleiter eine körperliche Aufgabe aus (z. B. Kniebeugen, Dehnübungen). Ideal für Gruppendynamik und Aufmerksamkeit.
 Aktives Kartenspiel	Ein normales Kartendeck wird verwendet, wobei jede Farbe für eine andere Übung steht (Herz = Hampelmänner, etc.). Der Kartenwert bestimmt die Anzahl der Wiederholungen.
 Tierisches Bewegungsrennen	Die Spieler laufen oder bewegen sich durch den Raum in tierischen Bewegungsformen (Krabbengang, Bärengang). Spassig, energiereich und anpassbar für Kinder oder Erwachsene.

KONKLUSION



(iStockphoto)



(sphery)

INNOVATION



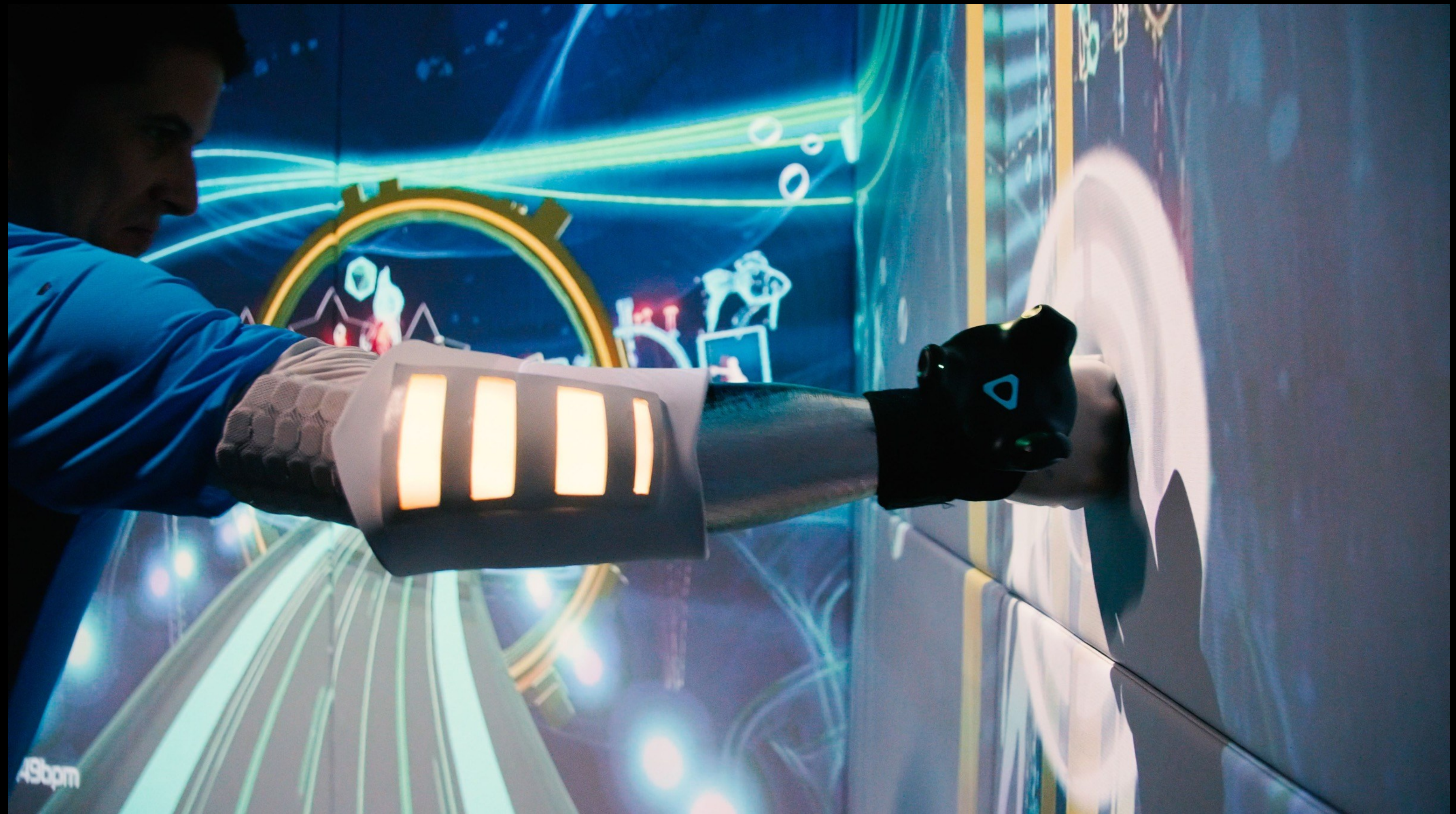
MOTIVATION



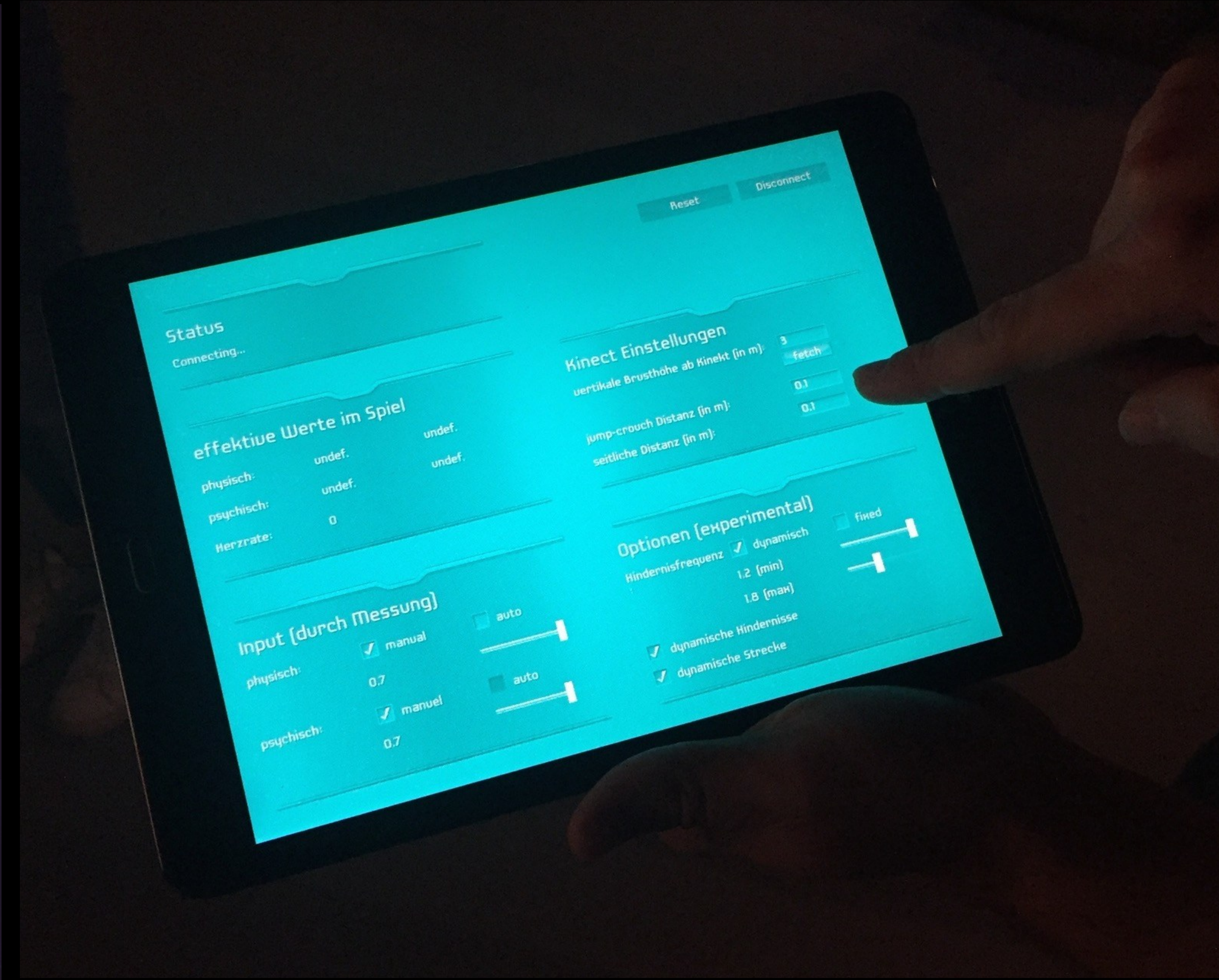
INKLUSION



EMPOWERMENT



INDIVIDUALISIERBARKEIT



TRAININGSBENEFITS



EMOTIONEN





HERZLICHEN DANK!

Prof. Dr. Anna Lisa Martin-Niedecken

Leiterin, Institut für Designforschung & Digital Health Design Living Lab
Departement Design
Zürcher Hochschule der Künste (ZHdK)

CEO & Gründerin, Sphery AG