



DEPARTMENT OF SPORTS SCIENCE AND
CLINICAL BIOMECHANICS



Nordic Sports Innovation Summit &
MeCaMInD ME4 Program & Dissemination report

Organised & edited by Lars Elbæk, SDU &
Carsten Couchouron, Sports Lab Copenhagen.

Contributors: Lars Elbæk, Carsten Couchouron,
Rasmus Vestergaard Andersen, Søren Lekbo, Robby
van Delden, Dees Postma, Dennis Reidsma, Maximus
Kaos, René Engelhardt Hansen and TechSavvy.

The Project is financed by a Erasmus+ EU grant.

Published: 2022.
ISBN: 978-87-94345-28-6
Copy #: 100.

Volume: MeCaMInD-reach, 2022-2
Producer and publisher: Learning & Talent in Sport
Department of Sport and Clinical Biomechanics, SDU

Cover photo & photos: pexels, shutterstock, PlayAli-
ve, Kids'n Tweens, Khalid & Zacho, and ColourBox.

Layout & editing: Lars Elbæk.

Place of printing: Grafisk Center SDU, Odense.
Year of print: 2022.

ABSTRACT

The Nordic Sports Innovation Summit and the Multiplier Event 4 of the MeCaMInD project which develop movement-based methods provide a forum to investigate elements of the current technology development of the sports industry and explore the use of movement-based design methods in future design of the sports industry.

The summit is co-financed with the Erasmus+ MeCaMInD "Method Cards for Movement-based Interaction Design" project.

Takeaways from the summit are:

- Latest research, trends and innovations in sports and health,
- Presentations of projects and ideas using cutting-edge knowledge and technology,
- Newest design methods through hands-on workshops with top European researchers supporting your next breakthrough innovation,
- Networking, knowledge and experience sharing between corporates, entrepreneurs, sports organisations, sports science & innovation researchers, and other industry trendsetters.

You will at the summit experience:

- Keynotes about the latest trends and research at the intersection of the sports, health, and wellness industries,
- Collaborative workshop sessions using the latest design and innovation methods for developing your product or product idea,
- Thematic panel sessions provide in-depth knowledge and debate translational aspects between the sports industry and research.

As a MeCaMInD reach publication, this program contains an introductory note and program schema. It will be followed by presentations of each keynote speaker, the workshops and aligned panels and participants of each workshop and contributor, to each panel, plus a few start-up presentations. The last part of the MeCaMInD-reach publication contains an article on the MeCaMInD method card model for structuring the movement-based method cards and an extended abstract reflecting on the facilitation of movement-based design methods.

Contents

- 06 **1. Thanks to our Project, Media & Network Partners**
Six European universities collaborate to make embodied design methods more accessible and now disseminate in the program and MeCaMInD report with contribution from TechSavvy.
- 09 **2. The Expanding Sports Tech Industry**
The sports tech industry is growing fast these years; thus, as research and educational institutions, we should further collaborate with the industry. A door-opener is a collaboration with Sports Lab Copenhagen.
- 12 **3. Program**
Get an overview of the activity of the second Nordic Sports Innovation Summit in which the sports industry, sports organisations, public service, and education and research meet to share insights.
- 14 **4. Keynotes**
The keynotes present exergames that make you super-powered, movement as a design resource, technology that will drive future talent development in sport and finally, an update into the future sports tech industry.
- 18 **5. Sports Industry Research Collaboration**
Let's together establish a cross-disciplinary networking future. We are building our collaboration idea on the quadruple helix model because the model is ideal for future business actions in the complex sports landscape.
- 19 **6. Thanks to all participating companies and organisations**
Without companies and organisations open to participating and contributing, we would be unable to run the Nordic Sports Innovation Summit. From our side, a big and heartfelt thank you.
- 20 **7. Workshops**
Part of starting a sports (tech) industry business is the skills and competencies to create new novel products and services. Try out being in the engine compartment of design in sport and with movement.
- 24 **8. Panels**
We will debate how sports industry products have been created and how we can generate legitimacy of products and services through the collaboration between researchers, corporates and sports organisations.
- 30 **9. Start-up presentation**
In collaboration with Tech Savvy, we have access to a couple of articles reporting some sports industry start-ups.
- 34 **10. Sports Entrepreneurship Education**
The Danish and international sports industry is growing faster than ever. At SDU we offer a teaching track for educating future employees in the sports industry.
- 36 **11. Movement-based Design Method Card Model**
We in the MeCaMInD consortium have created a model for organising different movement-based design methods. You will get the entire research paper presenting the model.
- 54 **12. Facilitating Movement -Based Design Method**
A finding in the MeCaMInD consortium has been that it is a challenge to facilitate movement-based design methods. In this research paper, we provide some suggestions for different facilitator roles.

I. Thanks to our Project, Media & Network Partners



The MeCaMind project's goal is to gather and document knowledge about movement-based design methods suitable for the development of technology as well as training practices in health and sports domains. These design methods help foreground the importance of bodily engagement in design. The project is looking for ways to encourage designers, and everyone involved in a design process, to not just engage intellectually but also to move while carrying out design activities. The project's outcomes will be a structured collection of method cards documenting practical methods of designing with the body and for and of movement and an accompanying toolbox which provides further insight into why, how, and when these methods are helpful. Movement-based design methods are

used in various sports, health, and cultural production fields for different reasons.

The MeCaMind project has gathered experts from various fields, who all have deep insights into designing for and of movement and with their moving bodies but with different theoretical and methodological approaches to their work.

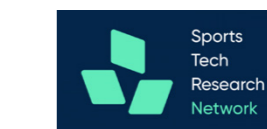
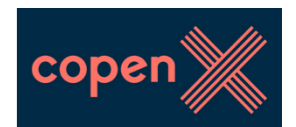
For this Erasmus+ MeCaMind Multiplier Event, the movement-based method will be presented, tested, and used in the Nordic Sports innovation Summit workshops. In as diverse fields as workplace physical activity, inclusive sport, mental health in sports, and exergames.

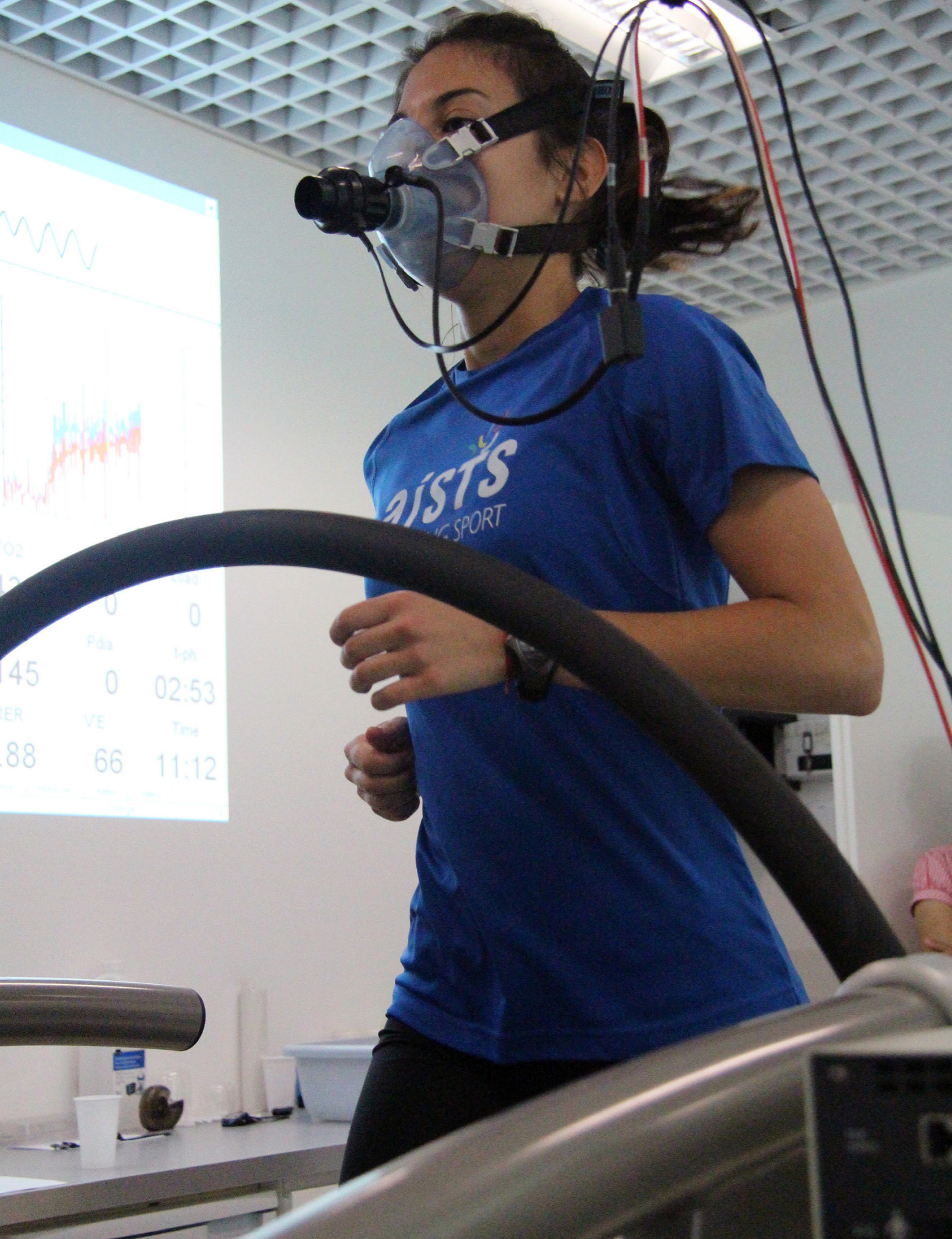


Right now, startups, innovative companies, and the people behind them are solving future challenges with innovative business models and a techsavvy mindset. Maybe you are one of them? Perhaps you want us to tell your story?

Nordic Sports Innovation Summit media partner TechSavvy Media is Denmark's leading digital startup media. They specialize in telling great stories at the intersection between technology, innovation and business and have had an increasing focus on the sports industry in the last few years. If you want us to tell your story on our platform or in one of our many industry-specific magazines, don't hesitate to reach out at sales@techsavvy.media.

Nordic Sports Innovation Summit also thanks the in the next column shown network partners who have actively promoted the event. All the partners are substantial contributors to the Danish sports industry's ecosystem and the development of sporting knowledge, services and sports products and goods.



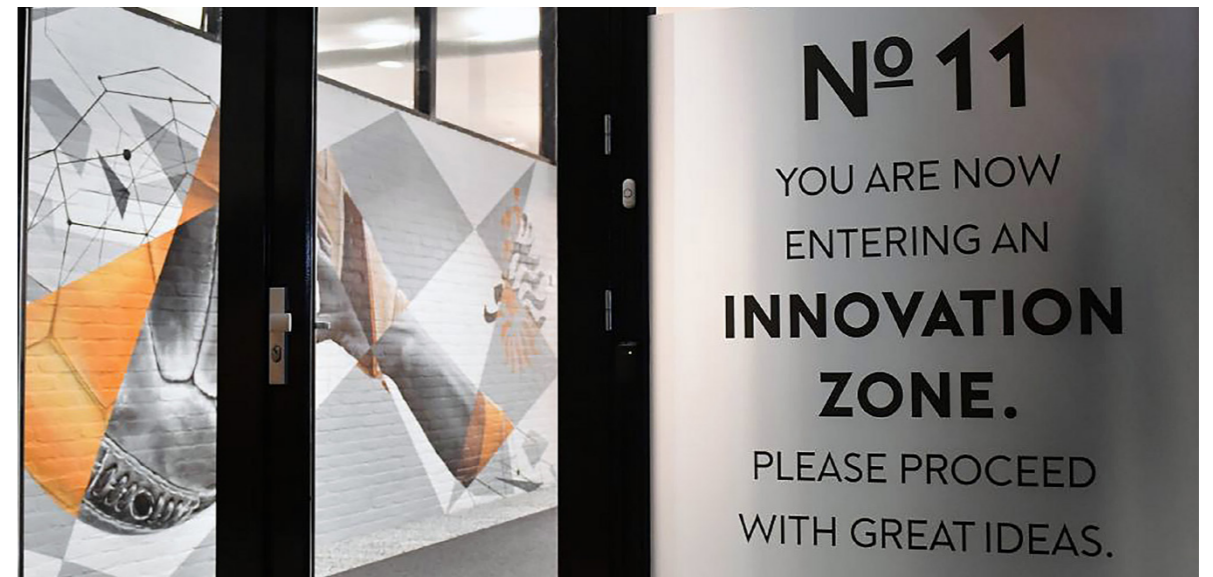


2. The Expanding Sports Tech Industry

Organising the Nordic Sports Innovation Summit, we bring together sports science academia, young and mature sports sector businesses, and sports-related organisations to focus on innovation and exploring the translational aspects of sports science and technology.

In this 2022 version of the Nordic Sports Innovation Summit, we focus on examining and discussing sustainability in the field of social sustainability. However, we also recognise the perspectives of environmental and economic sustainability for later versions of Nordic Sports Innovation Summits. We will explore the valuable collaboration between sports professionals and researchers in developing and designing products and services. This year's summit will specifically focus on social sustainability in sports through the lenses of

health, inclusion, well-being, and human performance. It will tackle topics such as the relation between workplace-related physical activity, and movement-based health with a view into exergaming, mental health and sports performance, and the inclusion of para-sports, as critical levers of human development and well-being. Through these lenses, we will exemplify the Nordic approach to a healthy lifestyle underpinned by inclusive and socially and physically active communities. As a player developing network activities Nordic Sports Innovation Summit is an initiative that establish even stronger collaboration between sports-tech companies and the other players in the sports industry ecosystem, such as sports federations, public service organisations and educational and research institutions.



The Expanding Sports Tech Industry

The international and the Nordic sports tech industry extraordinary developed and exponential growth in recent years. There is an undergrowth of start-ups in the sports industry, and several companies have, in a short time, become scale-ups, and others have become well-established companies. Sports tech companies establish their business on innovative solutions for end users such as athletes and active citizens. The technologies in this field can be hardware in the form of wearables and software in the form of apps for measurement and analysis, as well as digital platforms, tools, and guides for training, performance improvement, and recovery. The second field of business provide fans experiences to enjoy sports as entertainment. The third field of product and services is the managers of sports clubs and organisations. Executives need digital aids and solutions for administrative and managerial functions in sports organisations, managing members, events, and facilities, as well as solutions that improve media coverage. Therefore we build on SportTechX's typology, which divides the industry based on end-users as the athletes, fan, and executives.

During the past year, the Danish sports industry has been mapped by the IRIS-Group at the behest of DIF InnovationLab. These analyses show the same trends that SportsTechX states in their yearly reports on the European and global sports industry. We observe extraordinary growth ra-

tes for the last decade and exceptionally high post-COVID-19 growth rates. Sports tech in Denmark and other Nordic countries is characterised by mostly small and newly established companies that have put solutions on the market in the last few years. Of these companies, more than half were founded after 2015. Most companies work with new digital solutions within activities and performances, which will also be the main focus at the Nordic Sports Innovation Summit 2022.

Sports and technology are elements in intense interplay that are driving a trend towards more self-organised, product and service-organised sports and movement health for employees, citizens, and athletes. We think the established sports organisations may look for increasing collaboration with the market-driven providers of products and services for the general public's health and well-being. We see a touch point in the Nordic model of clubs that build on the solid fellowship philosophy combined with the flexibility of digital solutions for physical activity, health, and well-being. The organisation of sports health exercise is spread between voluntary, civil society, and public service and is increasingly organised on market premises. Thus, it is incredibly complex for start-up companies in the sports industry to navigate this cacophony of organisational realities.

We recognize that many start-ups and compani-

The Expanding Sports Tech Industry

es in the field of health, performance, and well-being struggle to create a sustainable business that manages to implement and sell products and make an impact with their technology-based service. We recognise that one of the extraordinary challenges that companies have, especially in the health and well-being sector of the sport industry, is how to make a behavioural change with a sustainable retention rate using sports industry products and services.

We believe that if the products and services of today the ones developed in the future, are to succeed they need to focus on the collaboration between companies, end-users, sports and user organisations, and research partners. The products and services will thus be founded on the newest research evidence and well-established sports and behavioural science theories as well as empathise with the emotional being of the people using the products.

Some of the considerable challenges are transfer-

ring knowledge from academia, translating specific evidence and expertise into go-to-market products and services, and making the products scalable for national and international sales. An essential element in making sustainable products and services is to team up with test and marketing partners. A divergent team like this will have good ideas, and the appropriate knowledge and in-depth testing will allow those ideas to turn into solid-founded products that are validated, legitimised, and can go to market.

We believe meeting up in panel sessions to discuss themes like this and to have a closer glance into each partner's fundamental values and objectives will pave the road for a more in-depth understanding of how to make a strong product and project concepts and have a fair market share. Primary outcome from attending this summit is establishing a shared mindset that evaluates each other's knowledge and stances for future collaboration.

Photo by: Swedish Sports Confederation



3. Program

Program

09:00 – 09:30	<i>Coffee</i>		<i>Coffee</i>	
09:30 – 09:40	O100 – Welcome by SDU (Lars Elbæk) and by Sports Lab Copenhagen (Carsten Couchouron).		Opening of Nordic Sports Innovation Summit by vice-dean at the SDU Health Faculty Uffe Holmsgaard.	
09:40 – 10:05	O100 – Keynote: Prof. Perttu Hämäläinen – Designing Superhero Experiences in Virtual and Mixed Realities exergaming.		Research on AR/VR/MR exergames that make the players feel like they have superhuman movement abilities through both digital and physical means, combining a real trampoline with in-game simulation.	
10:05 – 10:25	O100 – Keynote: Associate professor Lars Elbæk – New methods in sport and movement design.		The keynote discusses how movement and physical activity can be used as a creative resource and become an integrated element in sports and health products and service design.	
10:25 – 10:55	<i>Coffee break & Networking</i>		<i>Coffee break & Networking</i>	
10:55 – 12:25	Workshop sessions		Developing concepts and product using movement-based design methods – LE + text.	
	O99 – Workshop 1: Physical activity and health in the workplace. 50-minutes app development.	Lab for Play & Innovation – Workshop 2: Inclusion and accessibility to training. Exergames for equality.	O94 – Workshop 3: Mental health and sports. App development for young football players.	O96 – Workshop 4: Active play-lives for kids. Exergame design for STEM learning with Hopspot.
12:25 – 13:15	<i>Lunch & Networking</i>		<i>Lunch & Networking</i>	
13:15 – 13:45	O100 – Knowledge sharing from the four workshops.		O100 – Knowledge sharing from the four workshops.	
14:00 – 14:05	O100 – LET’S be active with SilentFit exercise		O100 – LET’S be active with SilentFit exercise	
14:05 – 14:25	O100 – Keynote: Peter Mattsson – Managing Director, Project Elitesports2030, the Swedish Sports Confederation.		Peter will elaborate if technology can play a role in putting elite sports at the heart of some future challenges society faces. He sees a future where sport and technology can societal work together for the greater good.	
14:25 – 15:15	<i>Pitching of product and Project plus – Networking Café & Coffee Break</i>		<i>Pitching of product and Project plus – Networking Café & Coffee Break</i>	
15:15 – 16:15	O99 – Panel 1: Future job-related physical activity plays (JR-PA) an essential role in a healthy lifestyle and is a counterweight to the workplace-related development of musculoskeletal pain. You will get to know how the Norwegian government promote workplace related physical activity. How Plaez deliver a service for JR-PA, how Dansk Firmaidrætsforbund actively facilitate JR-PA, and how Precure creates technologies for JR-PA And how TradeXpansion collaborate with researcher to make a business for JR-PA.	O95 – Panel 2: Technology-supported adaptive training and social inclusion in physical activity are crucial for impaired citizens. Get insights into solutions that require target group-specific hardware, software, and knowledge of functional levels. You will learn how TUCV uses 3D printing and how the Norwegian SmartGroup makes Smart Break for wheelchairs. You will get insights into how parasport Denmark supports athletes and knowledge from IDAN on the activity levels of impaired citizens and how the Muskelsvind-fonden helps members be physically active.	O94 – Panel 3: Human performance, mental health, and well-being – use of data in sports performance. Despite this challenging lifestyle, athletes seem to have similar or even higher mental well-being than their non-sporting peers. Nevertheless, how are elite athletes supported in sustaining a competitive mental health? You will get a view into how Team Denmark supports athletes’ mental health, how CurveX provide a product that masseur brain waves. You will get insights of the most updated research in athletes mental health and how wearables and research go together for monitoring mental health.	O96 – Panel 4: Exergame sports and fitness is the merging of exercise and gaming, aiming at interactive solutions that are fun and playful and enhance health. Most companies developing solutions and research in the field apply one or more technologies that track your reaction times, your body’s movement, and overall progress. You will experience exergame examples like BHOUT, interactive trampolining that will be presented in the keynote, and more unforeseen games coming up. You will get how Rehaboo uses game design for elderly citizens' health and well-being.
16:15 – 16:55	O100 – Keynote: The future of research and innovation in sports tech. Kristof De Mey		O100 – Panel discussion: How knowledge and end-user insights shape tomorrow’s innovation in sports.	
16:55 – 17:00	O100 – Closing note			

4. Keynote



Keynote

Prof. Perttu Hämäläinen will share his research on AR/VR/MR exergames that aim to make the players feel like they have superhuman movement abilities. This is pursued through both digital and physical means, for example, by combining a real-world trampoline with exaggerated in-game physics simulation (now also available as Valo Motion's ValoJump in trampoline parks around the globe).

Perttu Hämäläinen is an Associate Professor of Computer games at Aalto University. His mission

is to improve health through exergames and digitally augmented sports that promote physical activity. He has designed, developed, and researched new forms of hybrid digital and physical exergaming for over 20 years, since 2001. He is also the scientific advisor of Valo Motion, a spin-off start-up from his research group with award-winning Augmented and Mixed Reality climbing and trampoline games ValoClimb and ValoJump, respectively and now also ValoArena, a multiplayer MR exergaming platform.

Associate prof. Lars Elbæk will present a framework for movement-based design methods, establishing a starting point for the later workshops. The keynote discuss how movement and physical activity can be used as a creative resource and become an integrated element in sports, health products, and service design.

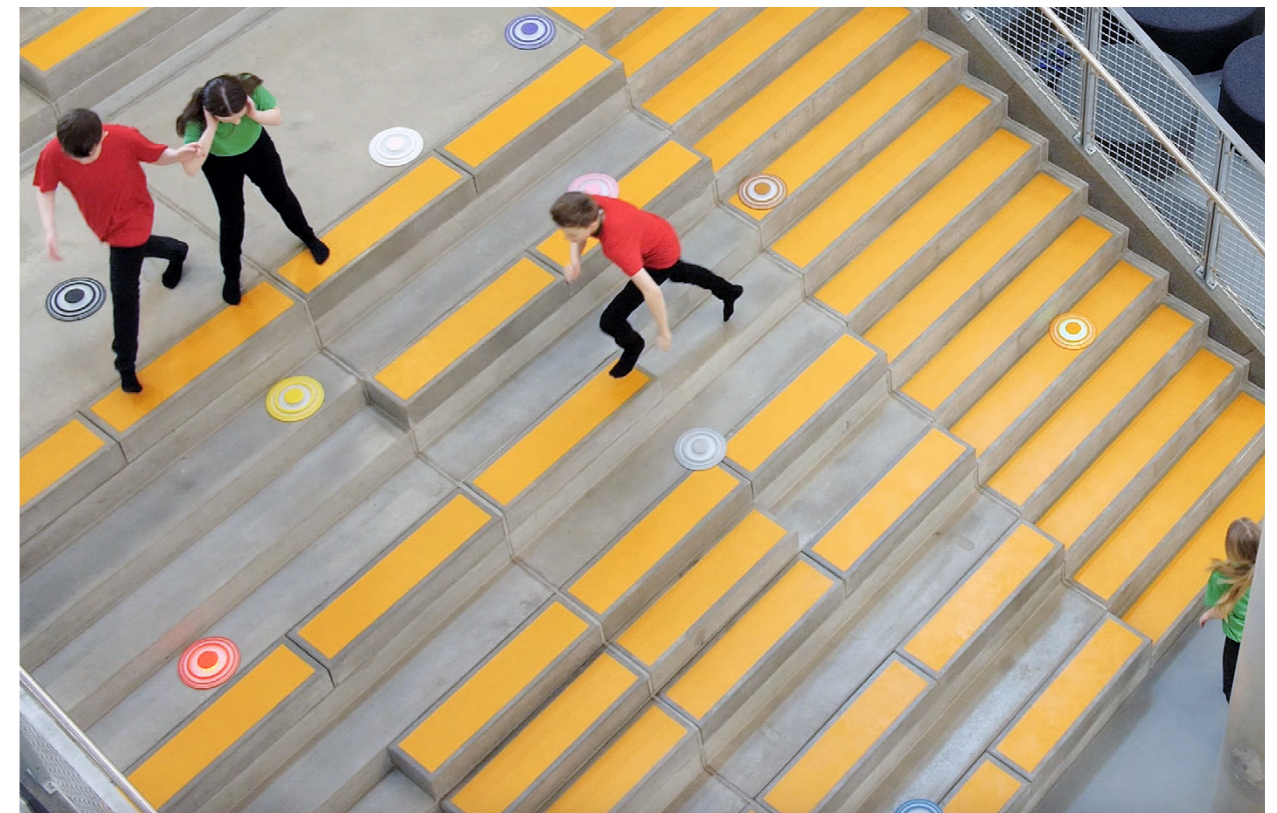
We recommend that designers use movement as part of the design activity when designing for and of movement.

With the 4M model, we propose three types

of facilitator-mediated methods: 1) Mood-setters stimulating a creative body being, 2) Movement-based design methods for creating immersion in creative bodily activities, and 3) Movement concepts as knowledge and evidence for developing and validating movement artefacts. Besides the facilitator cards, the participants have access to Modifiers that can be used in conjunction with the other methods as creative inspiration for exploring, trying, or performing new movement possibilities.



Photo by Lars Elbæk



pexels-shotpot

Keynote



Keynote & Closing Panel

Elite Sports in 2030 is the new Swedish overarching elite sports program— can and will technology play a role in putting elite sports at the heart of some of the future challenges society faces? In 2008, researchers de Boscher et al. concluded that a Global Arms race is going on in elite sports, fuelled by countries wanting to succeed at the Olympic and Paralympic Games. Government and corporate money take turns in funding this arms race. Signs of the time make it questionable whether this government and corporate

sponsoring model can be sustained in the future. On top of that, Sports washing has become a term that nobody wants to be connected to. In this challenging future, technology can connect people as never before, and perhaps elite sports can engage people in new ways, leading to increased physical activity in the population and better achievements from the top athletes. In this keynote, Peter Mattsson will expand on visions of the future where sport and technology can work together for the greater good.

In order to increase sports or physical activity levels, become more effective in preventing and treating injuries, optimize training and recovery strategies, and achieve higher performance innovations in sports might help. But which ones should we focus on the most? And how do we go from the initial idea to actual impact in the field in the best possible way? During this keynote, Kristof De Mey will be sharing key lessons learned from setting up a variety of projects dealing with technologies such as wearables, exergames, apps and software platforms which are used in different settings ranging from professional to recreational contexts in various age groups and for a multitude of purposes. Combining the latest

scientific insights with a pragmatic view, Kristof will discuss the current and desired future state of our industry regarding these topics. Kristof supports start-up incubation through research–industry collaboration in the Sports Tech Research Network and are among others, is involved in Victoris, SportUp, and Sportamundi.



Carsten Couchouron's international career in sports business and re-location to DK lead him to found Sports Lab Copenhagen, which supports innovation and entrepreneurship, provides expertise and consultancy, and develops the Nordic sports innovation ecosystem.



Olov Belander is senior adviser at the Norwegian Directorate of Health. He is involved in "Smart mosjon i arbeidslivet" that is a new digital research-based solution that allows you to design a tailored training program based on the work life- and physical condition.



Søren Kleberg has developed health and exercise apps since 2009, e.g., the self-back that makes personalized treatment of low back pain accessible – currently involved in, i.a., the EU's Expert Groups on Harmonisation of Digital Medicine Devices.



Gregory Diment is Head of Sports Psychology for Team Danmark, aiming to create the best possible conditions regarding performance and mental health for Danish elite sports and individual athletes, aiming for medals to Denmark.



Mauro Frota has been active in several martial arts, and his academic career focuses on retention in fitness. With over 20 years of experience in fitness, he created BHOUT, the "first boxing bag with a brain", as a next step.



Shutterstock



CC – Photo by – pexels-erenli

5. Sports Industry Research Collaboration

Let's together establish a cross-disciplinary networking future

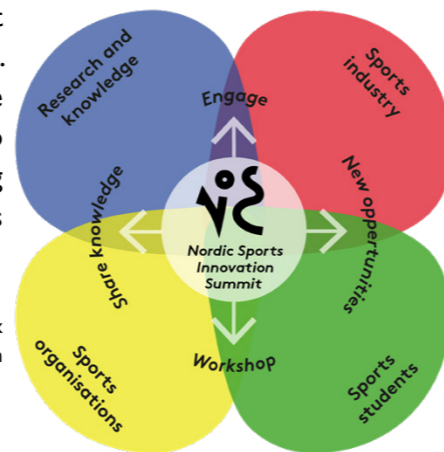
Globally sports tech research is increasing both from an engineering perspective and a sports and health research perspective. Thus, research and knowledge needed for developing sports technology include experience with sensor and hardware, software and data management and analytics. Collectively from these fields of research more evidence is created about sports technology's impact. As Kristof De Mey pointed out at the Sports Tech Research Innovation Summit in Ghent, Belgium, sports tech is overlapping and gaining insights from health and medical tech. Research disciplines supporting these approaches are physiology, biomechanics training and health behaviour, sports psychology, nutrition, sociology, organisational knowledge of sports, pedagogy and learning of movements, and coaching theory. We aim for an evidence-based legitimisation of the design approaches.

We recognise that there is often a gap between research and applying knowledge and evidence in final products that can make an impact. Contrary products also represent new knowledge, that will need validation to create evidence, often presenting a gap. By creating forums like our workshop and panel activities, it is our mission to have the potential to develop collaborative opportunities. We also believe that meeting up will help overcome the valley of death that techno-

logy transfer and the commercialisation process often represent. We think we can reduce the lack of validity, poor product safety, poor usability and bad user experience by establishing stronger collaborations. Utilising the Nordic Sports Innovation Summit, we invite you to collaborate, and we can provide innovation management. We can team up researchers that have an applied attitude, and we also open ourselves to being business minded.

We believe that if we, as a sports industry ecosystem are out to achieve the complete valorisation of our different efforts, we need to pull down research results from the shelf and turn them into products and services for the athletes and the citizens in need of a healthy life and strive for well-being. As researchers we need to be part of validating sports industry products and collaborate with the sports organisations close to athlete and citizens that enjoy being physical active. We also need to gain competencies in scaling from local initiatives to entire globalised companies to make the most real-world impact. Our mission in the coming years is to be part of growing the Nordic sports industry.

Figure 1: Quadro Helix innovation collaboration model.



6. Thanks to all participating companies and organisations



7. Workshop 1

By attending the workshops at Nordic Sports Innovation Summit you can experience being part of making transparent the generative processes of being in the interdisciplinary space of creating new products and services for the sports industry. We accomplish this by showcasing the design processes in which we apply movement-based methods. We make transparent the cross-disciplinary gains of designing together with companies, researchers, practitioners, users, engineering experts and non-specialists, and sports and health organisations. We have approached this by inviting researchers, companies, sports students, customers, and end-users to the workshops. This exemplifies how overlapping areas can work together and how the activities can mediate establishing innovative consortiums. Join the workshop with a focus on how to enhance



René Engelhardt Hansen is assistant professor at University of Southern Denmark. His main fields are project- and innovation management and design process facilitation. His research focuses on gamification and design to motivate users towards health behavioral change.



Tina Dalager is associate professor at University of Southern Denmark and her main interest in research is to develop, monitor, and implement physical exercise programs at the workplace, including the exploration of behavior related to training adherence.



Tony Dieu is co-founder and CEO of 50Minutes. Since 2017, Tony has been involved in the development of health and exercise applications with a focus on bridging the gap between academic research and digital application.

physical activity and health in the workplace. Researchers from SDU and the company “50 minutes” are developing an application that tailors and individualises physical exercise training to the individual’s work exposure and health profile. You will try out a movement-based design process on how to visualise the execution of exercises, and training progression, and learn what to include to enhance engagement and motivation of the app use. The workshop is at the heart of the Summit and is focused on translating knowledge into service products to aim for a healthier work-life for the general workforce. We will get knowledge input from researchers, 50 minutter, and the Danish Company Sports organisation with years of experience making workplaces more physically active.



While a student at SDU, Naja K. Lindberg started Silent FIT, a headphone-based system allowing training anywhere, without disturbing the environment, or being disturbed, now a growing startup.

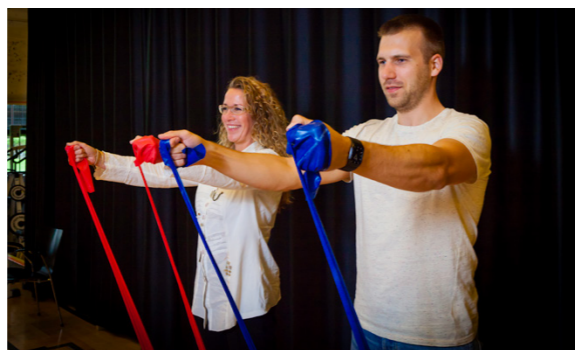


Photo by SDU

Workshop 2

This workshop aims to discover how movement-based design methods can be leveraged to enable people with disabilities, impairments, and activity limitations to participate in sports and other movement-based games on equal terms as their non-disabled peers. Physical activity, such as playing sports, is conducive to well-being, health, and the prevention of many diseases. Individuals

with disabilities and impairments are at high risk of dropping out of treatment and at increased risk for social isolation. This workshop aims to tackle these issues by rethinking the design and play of sports and movement-based VR/MR (XR) games to foster a rich, inclusive, and social environment



CC – photo by Pexels



Rasmus Vestergaard Andersen is a research assistant at the University of Southern Denmark and teaches to innovate with movement-based design solutions in the domain of sport, game, play and learning.



Maximus (Max) D. Kaos is an assistant professor of Human-Computer Interaction, Play, Movement, and Learning at the University of Southern Denmark. His primary research lies in technology and games for health behavior change.



Sports consultant at Parasport Denmark since January 2022 with a focus on knowledge that being knowledge gathering, sharing and production of valuable solutions to the parasports members of the organisation.



Lisa Schlage is a teacher at Egmont Højskolen (high school), where her work focuses on creating an atmosphere and environment at school that promotes inclusion. This includes making adjustments so that students with and without disabilities can participate. Lisa brings along a number of student from the Egmont Folk High School.

Workshop 3

Enter the design engine room in this workshop, developing mental health products and services for the sports industry. In the workshop, we find a practical solution to support and improve players' mental health in Helsingør Boldklub. Research has shown that mental health is not only an individual matter but is highly influenced by the context and environment of which people are a part. During this workshop, researchers Team Danmark (an elite sports institution) and the company Cosmo Child will use a movement-based design approach to enhance young football players' mental health supported

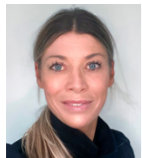
by app services. That helps the players to manage the pressure from many that influences their life and football carrier. Specifically, we will work on finding solutions to how youth football players use and manage social media in advance of good mental health. The aim is to make an application that supports an environment where players can flourish

and thrive as a young academy football player under these new conditions.

You will, in this workshop, get a grand opportunity to get into the engine room in the design of social services for a better and mentally more healthy sport.



Søren Lekbo is research assistant in the research unit Learning and Talent in Sport. He uses bodily experience in facilitating design processes to create insights for engaging and exciting movements solutions.



Majbritt Lyckhage is founder and partner of Brandlife Sport and Cosmo Child, an app for parents who want to strengthen their child's well-being. She is developing We Balance that is a platform strengthening youth football players mental health.



Kenneth Just Petersen is Body SDS-educated mental coach at Helsingør FC using both group and individual therapy. He has been a youth football coach for 20 years and the last eight years with a DBU B licence.



Daniel Jørgensen has played football in super-league divisions 1 and 2 in DK. Today, he works as a football and mental coach with youth football in FC Helsingør.



COLOURBOX

Workshop 4

In this workshop, we will enter the engine room of developing exergames for the sports industry. In the workshop, we find a practical solution to make people pupils exercise more in a fun and engaging way. You will be part of and experience how we apply the movement-based design method in exergame design. We will combine the design with our for-the-day proposal for the novel design of games based on the IMPACT exergaming framework; Immersive, Physical, Active, Cognitive, and Training. The goal is to maximise health benefits, increase motivation, optimise executive functions, transfer effects, customise

to the user's abilities, and promote self-efficacy by overcoming psychological barriers.

You will do this by applying the Hopspot programming unit merged with a STEAM-X approach to designing learning exergames in which pupils learn computational thinking.

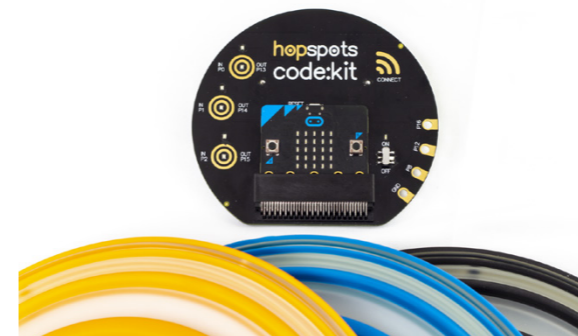
We offer a workshop that couples these elements by using embodied creativity methods that promote the creation of movement-play learning games through STEM teaching.



Dennis Reidsma is Associate Professor at the University of Twente. He has developed a research line on interactive playgrounds for play, care, and learning through user experiments with several proof-of-concept prototypes.



Aviaja Borup Lynggaard is the inventor and CEO of Hopspots and holds a Ph.d. in interaction design. Her focus is on developing new products for children that enhances movement, digital creativity, playfulness and learning.



Kinkate from pixabay

8. Panel 1

Future job-related physical activity plays an essential role in a healthy lifestyle and is a counterweight to the workplace-related development of musculoskeletal pain. Join the debate on how researchers, organizations and companies can best work together on initiatives to counteract the high prevalence of musculoskeletal pain. What technologies are needed to identify risk factors, and how can we use technology to incorporate more health-enhancing physical acti-



Photo by SDU

vity in the workplace? What are the interfaces between research and practice – can we reach a consensus?



Olov Belander is senior adviser at the Norwegian Directorate of Health. He is involved in "Smart mosjon i arbeidslivet" that is a new digital research-based solution that allows you to design a tailored training program based on the work life- and physical condition.



Tina Dalager is associate professor at University of Southern Denmark and her main interest in research is to develop, monitor, and implement physical exercise programs at the workplace, including the exploration of behavior related to training adherence.



Merete Spangsborg Nielsen is Director of "colleague fitness" at the Danish Association for Corporate Sport. She is passionate creating opportunities for dynamic partnerships that make it easier for people to cultivate unity and meet in active physical communities.



Matias Welsien is Chief Experience Officer & co-founder of startup Pleaz. He uses his knowledge of sports science and entrepreneurship to develop new products that help people thrive at the workplace.



Søren Würtz is a physiotherapist with 20 years' experience within health and safety, specializing in work related injury prevention. Today he is Co-founder and CEO in PRECURE.



Panel 2

The inclusive sport and adapted physical activity panel will connect "sports science academia, sports businesses, and related organizations". Specifically, you will get insights into reasonable solutions in parasport. The solutions have required target group-specific hardware and software with an understanding of different types of movements, sports theory and functional levels.

You will get examples of equipment-heavy sports; thus, parasport is an arena with the opportunity to create and rethink equipment. Therefore, TUCV will present the future of 3D printing, and the Norwegian SmartGroup will show Smart Break for wheelchairs. Individually adapted solu-



Lasse Werner Madsen is founder and CEO of Levitate, helping people who either experienced leg amputation or were born with it to be active by producing high-quality running blades at an affordable cost.



Maja Pilgaard, PhD in sports science, has 15 years of experience in sports policy research with an extended portfolio of projects about sports participation. She is Chief Analyst at the Danish Sports Analysis Institute.



Søren Jul Kristensen is Sport Director in Parasport Denmark. He has worked with parasport for more than 30 years, primarily with non-elite sport. He is also National Director for Special Olympics.

tions are an area of new technologies that open up to improve comfort and strengthen the safety of sports and physical activity for people with disabilities and special needs.

Maja Pilgaard will give us a view into the just-published report on citizens in Denmark with disabilities. In addition to a general focus on people with functional impairments, the report focuses on citizens with cerebral palsy and visually impairments and citizens with mental vulnerability. You will get to know that 40% of the Danish population is living life with functional impairment. We will discuss how we can create sports and movement solutions for this extensive and diverse group of Danish citizens.



Morten H. Østli is CEO and co-founder of Norway based SmartGroup which produces a patented wireless brake technology enabling disabled to enjoy cycling and other activities.



Peter Wiborg Astrup is Center Director at the Test and Development Centre for Welfare Technology, which focuses on bringing companies close to municipalities and hospitals to co-create new and innovative products.



Peter Kock Hansen has several years of experience working with activity and technology at ParaSport Denmark. He is currently Head of Activity and Members at the Danish Foundation of Neuromuscular diseases.

Panel 3

Photo by Alamy



Mental health is a buzzword, and there has lately been a significant focus on it publicly and in research. Elite athletes' mental health is challenged in many ways as they must deal with high stress and training load, pressure to perform and public scrutiny. Despite this challenging lifestyle, athletes seem to have similar or even higher mental well-being than their non-sporting peers. Andreas Küttel researcher and famous ski jumper will talk about what can we learn from athletes and

their strategies, and how are their environments shaped to focus on performance and mental well-being? And how technology can help monitor the mental health of individuals and environments will be discussed at the conference.



Henrik Horst is CEO of CurveX, which has developed a device and software that helps you become more aware of your brain, the cognitive stages you go through on a daily basis, and achieve mental well-being in the long term.



Henrik Brandt is the former director of the sports reporting institute and current director of the Sports Platform Denmark. He is an independent journalist and runs the Consultancy House of Sports.



Gregory Diment is Head of Sports Psychology for Team Danmark, aiming to create the best possible conditions regarding performance and mental health for Danish elite sports and individual athletes, aiming for medals to Denmark.



Andreas Küttel is an assistant professor at SDU and a former professional ski jumper and Olympian from Switzerland. His research interest are athletes' mental health and (dual) careers.



Dhruv Seshadri has a PhD in Bio- and Biomedical Engineering from Case Western Reserve University and is focusing on developing and translating medical technologies to optimize and improve health and performance.



Panel 4

Exergame sports and fitness is the merging of exercise and gaming, aiming at interactive solutions that are fun and playful and enhance health. Most companies developing solutions and research in the field apply one or more technologies that track your reaction times, your body's movement, and overall progress. The market has seen exergames such as active wall games, dance & step games, gaming bikes, strength & cardio games, like the BHOUT that is part of the panel discussion, interactive climbing that you may get a glance of in the keynote, and more unforeseen games coming up, e.g. standalone-console games in the future.

In this panel session on exergames, we will discuss trends we believe are pointing towards exergames with a scientific basis, plus exergames offering novel experiences and novel forms of training and gamification of exercises and "Exercisification" of games.

The future exergame success will depend on more effective ways of improving motivation, the addition of social dimension and flexibility regarding competitive vs collaborative gameplay to retain users, and the play and fun factor will reduce the repetitive nature.



Jakob Breddam is project manager at DGI Impact, which aims to empower entrepreneurs to make Denmark the most active sports nation through grassroots and sports associations.



Robby van Delden is a researcher at the University of Twente (NEL). His research focuses on interactive whole-body interaction and persuasion during play. He looks at various contexts from stimulating movement to transforming social interactions.



Mauro Frota has been active in several Martial Arts since childhood. His academic career focused on retention in fitness. With over 20 years of experience in fitness, he created BHOUT, the "first boxing bag with a brain", as a logical next step.



Peter Gr en is founder and CEO of Finland-based Rehaboo!, making exergames for rehabilitation of hospital patients, for workplace exercising at office or home, and for physical- and cognitive activation of elderly people.



Photo by BHOUT



Photo by Lars Elb ek

9. Start-up presentation

Technology reduces sports injuries – and not just for elite athletes

Danish startup ZOLES uses new technology to make customised sports insoles, which prevent sports injuries whatever the user's age, level or sporting activity

This article is published in collaboration with ZOLES and TechSavvy.

A 3D-scan precisely measures your feet. Some nifty algorithms process the scanned data. The system then automatically designs the insoles so that they are a perfect fit for your sporting activity, e.g. badminton or cycling. Finally, the insoles are 3D printed, perfect for your needs and feet. Excellent insoles are not only comfortable when running or walking, they actually prevent injuries. By using state-of-the-art technologies, Danish start-up ZOLES takes insoles to a whole new level and at a price most of us can afford.

“Some of our customers have experienced injuries already, and we help to ensure it doesn't happen again. But ideally, we want people to avoid becoming injured in the first place – staying active is difficult if you get sore knees every time you do sport. In collaboration with universities and doctors, we have learned that a great many injuries in the legs and joints could be avoided if people just wore the correct insoles,” said Cecilie Lisberg, co-founder and CEO at ZOLES.

Developed with help from elite athletes – for the benefit of everyone

Customised insoles is not a new practice in the sporting world. But until now it has been cobbler-style, manual cut-and-glue work using standard insoles to begin with. ZOLES has revolutionised the method, by using 3D printed insoles that have the perfect shape for individual feet down to the last millimetre.

“We are the only people developing insoles who use technology from start to finish. We have the most advanced biomechanical AI (editor's note: artificial intelligence) to do this across different sporting activities, so the insoles provide the support that is required for the specific sport,” explained Lisberg.

The insoles are not only made for the individual person, but also for the individual sporting activity. The company has collaborated with a

Start-up presentation



number of prominent athletes in order to train the algorithms correctly – badminton insoles are developed in collaboration with the YONEX Peter Gade Academy, handball insoles with Daniel Svensson and AJAX København handball club, and football insoles with a number of Danish top-level league (Superliga) football clubs.

“We have used elite athletes to develop insoles for the benefit of everyone else doing sports. We do it this way for two reasons: for branding purposes and for testing insoles in the environments that really matter. Because if the insoles are great for elite footballers, then they are also great for Joe Bloggs down the road who plays in his local

club every Tuesday and Thursday,” said Lisberg.

More focus on insoles

Customised insoles are still a relatively specialised product, but the ZOLES co-founder expects that in just a few short years we will see a shift where more and more people discover what a good insole can do for them when doing sports.

“All of us are getting older and older. We want to stay active for as long as possible and we can do this if we take care of our bodies. So it makes sense that we already use aids in our 20s if we want to do sport when we're 70,” said Lisberg.

Start-up presentation

Start-up presentation



Photo by Silent FIT

Silent Fit – what is it?

During COVID-19, there was a reason to exercise outdoors. People wanted to exercise together but at a distance. A need arose to practice fitness or team training outdoors without disturbing others.

By Lars Elbæk

Silent FIT started at SDU in the course Sports and Design. Naja emerged with the idea that it could be interesting to train precisely where you want without disturbing others with the insistent music from loudspeakers in the fitness training class. Plus, as a participant in Group Fitness, could you have the liberty to control the volume yourself?

Having that as a starting point, Naja and her group at the University of Southern Denmark created a concept for the next generation of sound in

Group Fitness training. The idea was later dubbed Silent FIT, which lifts the experience to the next level and solves a wide range of indoor and outdoor fitness challenges.

With Silent FIT, participants are given headphones that sit firmly on their heads, and the instructor wears a microphone so that the participants receive clear instruc-



tions directly in their ears. The participants get an intense and gripping musical experience with pure tones, and deep bass delivered simultaneously with crystal-clear instructions.

The group fitness provider can have several indoor and outdoor activities for the customer who invests in the concept. Thereby, Silent FIT optimises the use of facilities and ensures training to full music – anywhere. A stable signal is established via radio technology where no extra handshakes are required for pairing devices, and an unlimited number of devices can be connected.

A quick search on Google shows that Silent fit also creates the basis for new companies and concepts such as Train4life, SeierFitness and many more. The product thus helps spread the joy of movement and well-being in the Danish population. Today, Silent FIT collaborates with DGI, DIF, Danish School Sports and Danish Company Sports and has Club La Santa as a customer.

A Trustpilot user states, "I had no idea what to expect from Silent FIT, but I am blown away by what it does. And it amazes me that no one has come up with it because it's brilliant. The system makes it possible to train outdoors year-round at all times of the day. The fact that you decide the sound level yourself makes the trai-

ning feel even more on your terms, and that is probably the most significant difference from the sound we know. At the same time, you have the teacher very close to you without the person having to scream hoarse or strain their voice. It makes - for me - the training much more pleasant. Something that has surprised me is the sense of community that arises, even though everyone is, in principle, in their own 'bubble'."

Today combining her passion for fitness, community and great sound, Naja emphasises the importance of helping students gain the skills to realise an idea into a business. "I know it all started back when I studied and was challenged to invent a solution to a problem in an area of interest, and even though it was "just" a school project back then, I am certain that Silent FIT exists and optimise the way we use sound for Group Fitness, because of that."



Photo by Silent FIT

10. Sports Entrepreneurship Education

A sector that is changing rapidly: Today sports professionals must also manage technology and entrepreneurship

A sports education can lead to a lot more than a job as a PE-teacher or sports association consultant. The industry is undergoing rapid change, which can lead to new competencies – and the University of Southern Denmark (SDU) has found the recipe for meeting demand.

This article has been written in collaboration with SDU and TechSavvy.

If you love sports, then a university degree in sports is the ideal education for you. And with the sports industry undergoing rapid development in recent years, completely new career paths are opening up. It is a development that is based on technology and entrepreneurship and SDU already began to offer its “Sports, innovation and Entrepreneurship” sports degree nine years ago.

Lars Elbæk is a lecturer at the Department of Sports Science and Clinical Biomechanics at SDU. “I really want to help to educate the future labour market in sports, and the market is changing while the industry is growing, becoming more private sector and business driven,” explained Elbæk.

Students still receive the traditional education in sports, but at the same time they learn to put it in the context of the new and growing part of the sports market which is screaming out for qualified professionals.

“We have to educate the students to have another mindset that is other than learning to become high school sports teachers or consultants for organisations. It’s about establishing a mindset in the students that is experimental and proactive, where you learn quickly through feedback from customers and use the resour-



Sports Entrepreneurship Education

ces you have available,” said Elbæk.

A bridge to the sports industry

Sports education’s closest partners have always been sports organisations and associations. But a private sector industry is growing rapidly, and the sector is about to change, to think more in terms of marketing and technology.

To get closer to the changes, the universities have started to work closely with the private sector – much as they do in engineering and business education programmes and elsewhere. For example, right now a project between SDU, Aalborg University, the University of Copenhagen and Sports Lab Copenhagen is underway, financed by “Fonden for Entreprenørskab” (commercial foundation supporting young people), aiming to build bridges to the private sector:

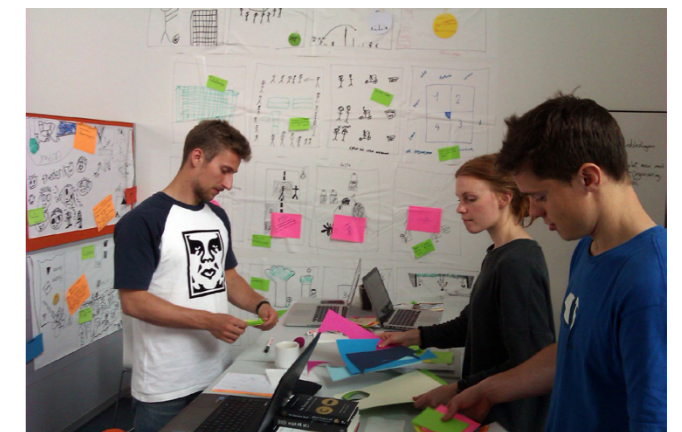
“Our position is that the sports industry is a unique context and must be included in the sports-cultural self-perception. This means we have to make more specific bridging models, so that students gain a more specific industry understanding – regardless of whether they intend to establish a startup or work in the industry,” said Elbæk.

It means in practice that students get some other types of courses during their education programme, and that the programme is organised in the university’s startup environment and

lastly, it is linked to the external sports industry’s ecosystem.

“They must learn to focus on the customer or end user. It is not the most natural thing in our environment, where traditionally the coach knows best. But when it succeeds, it makes a huge difference, and it is helping to form the framework for the establishment of entrepreneurial ambitions among students,” said Elbæk.

Facts: Sport, Innovation and Entrepreneurship The Sports, Innovation and Entrepreneurship course has existed for nine years. Students are taught traditional sports, such as dancing, transformation of energy and ball sports – but they also learn about the UN’s Sustainable Development Goals, digital design and marketing. The course has led to 40 company projects, of which three are functioning today. Together they have received investment of over DKK 5.5 million.



11. Movement-based Design Method Card Model

Mind the gap – the 4M bridge between 4E-cognition and movement-based design

Author version: Elbæk, L., Lekbo, S., Hansen, R. E., Kaos, M., & Andersen, R. V. (2022, September). *Mind the gap: The 4M Bridge Between 4E-Cognition and Movement-Based Design*. In *European Conference on Games Based Learning (Vol. 16, No. 1, pp. 208-215)*.

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

Introduction

Our vision is to make movement-based design approaches and practical movement-based design activities accessible to a broader audience of designers and movement professionals who are not movement experts. But even as sports experts in our design practise, we find it challenging to translate an embodied and movement-based design approach into design practice. Recognising this challenge, we see a need for creating a bridge between practice and theory in movement-based design. Based on the bridging concept (Dalsgaard & Dindler, 2014), this concept paper presents a movement-based design framework to bridge the abstract idea of embodied cognition and concrete movement-based design practices.

When designing "for" and "of" movement, designers are recommended to use movement as part of the design activity and build awareness of the fleeting and immediate movement experience (Schleicher et al., 2010; Márquez Segura, 2018; Elbæk & Friis, 2017). With this, we recognise the human body as more than a physical object in the world. It is a feeling and perceptualising body that

creates meaning in interaction with objects, the context, and other humans. As Malinin (2019) argues, creativity must be understood as a dynamic relationship between bodily movement, environment, and cognition. Based on the philosophy of embodied cognition, we, along with other scholars, argue for an understanding of how we can unleash creativity in design processes.

In design practice, however, designing sustainable solutions for and of movement poses a challenge for designers regardless of the target domain (such as technology-driven games, sports performance, physical activity, and fun and enjoyment in physical play etc.). As Segura et al. (2016) state, it can be challenging to design immersive bodily experiences due to the lack of spatial and social context in design activities. It, therefore, requires the designer to facilitate the right mindset by designing the optimal process through choosing and interconnecting methods to explore embodied movement as a medium of creativity. Therefore, the successful application of movement-based design relies primarily on the individual designer's knowledge and practical movement skills (Svanæs & Barkhus 2020). It requires effort from the designer in planning, facilitating and analysing

Design Method Card Model

movement insights. Therefore, the designer must possess both confidence and skills to facilitate and engage in movement-based design (Andersen et al., 2020).

We believe that there is a gap of no movement-based design frameworks available to advance theory-grounded movement-based design practice and with movement as the crankshaft of the design process. In the domain of exertion game design, Müller et al., 2011 have created an exertion game design framework with the moving and active body as one of four elements.

However, we believe there is a need for a movement-based design framework with the moving body as the approach's core.

Thus, we want to democratise movement design and unleash movement creativity for engineers, designers, and students and enhance sports and movement professionals' awareness of their core design competencies. The 4M-framework we present bridges abstract theory and design practice through a holistic view of movement-based design, which can be applied across contexts and target domains. We believe in our mission th-



COLOURBOX

Design Method Card Model

rough this embodied design approach to support the creation of more sustainable and engaging movement-based design solutions.

Applying a “bridging concept” between embodied philosophy and movement methods

Practical design research happens in the research themes and activities between philosophical, theoretical, methodological, design activity (methods), and the making of designed solutions (Koskinen et al., 2011). A bridging concept bridges the themes and activities, and is a mean for limiting thoughts, supporting a discussion, and planning supported by the intermediate knowledge one has.

Created by Dalsgaard and Dindler (2014), the bridging concept forms an intermediary link in its ability to bridge the gap between an abstract overarching theory and concrete practice. A bridging concept consists of three defining constituents: a theoretical foundation, a set of design articulations, and a range of exemplars that demonstrate the scope and potential of their application. Following Stappers & Vissers (2014) terminology we create a bridge between the abstract level of the philosopher and the concrete level of the designer via our framework.

The framework supports future facilitators and designers who wish to understand the means and mechanisms of creating an immersive process for movement-based designs. Even though it is an inherently unstable and intermediate form of knowledge (Dalsgaard & Dindler, 2014), the

framework is meant to support the design process and not hinder it.

Approaching Movement Creativity through Radical Embodied Cognitive Science

Designing creatively for and of movement is highly immersed in the personal being of the designer and interwoven into the external world. Thus, applying a philosophical concept that uses a holistic understanding of cognition is preferable. Radical Embodied Cognitive Science (RECS) frames cognition to embrace the brain, body, and the world in a dynamic system (Malinin, 2019). It goes beyond seeing the brain/mind as a computer located in the head disconnected from the environment and sees cognition as a constitution united between mind, body, and the world. A way to understand RECS is by the 4E concept, which involves the body and the body's situatedness in the environment (Newen, Bruin & Gallagher 2018). Each concept within 4E is each intertwined with one another, making the cognition process complex and always embodied, embedded, enactive, and extended.

Embodied cognition refers to the premise that perception and cognition are embodied and impact whole-body interactions with the world. Mental phenomena such as perception, memory, reasoning, language, emotion, and consciousness are constituted and depend on the entire body. In the concept of RECS, embedded cognition is understood as rooted within a specific context and oriented toward action (Newen, Bruin &

Design Method Card Model

Gallagher 2018). Thinking in action is related to how the environment allows focusing on the relationship between our improvisational or adaptive actions and the situation.

Enactive cognition relies on motor activities (action) and sensory perception, and there is no significant difference between acting and perceiving. Enactive cognition is interactive with the biological and nonbiological environment and requires a continual negotiation between the individual and

the collective community.

In extended cognition, thinking is understood beyond the body and the mind. Here, physical things in our environments are seen as part of the cognitive system, and we must understand our beings-in-the-world as a connection and a constitution between our body and the world. Putting this understanding of cognition as a complex process involving the 4E's, "embodied creativity includes creative expressions and processes



Design Method Card Model

that emphasize or are generated by the physical body. This view of creativity highlights physical responses within creative practice and is attentive to the influences of space, environment, materials, and the individual's relationships to other bodies" (Griffith, 2021). We view this understanding of cognition as stressing that the state of being in the world should be considered when designing for, with, and of movement in sport, movement, and play. We must consider how to practice design for movement in a social and cultural world, where our bodily engagement with the environment is part of cognition and creativity.

The genesis of the 4M framework

We used constructive design research methodology (CDR) (Koskinen et al., 2011) as an overarching approach to structure in designing the framework. In CDR, the creation of a design is founded on both abstract theory and practical and research-based knowledge, and the creation of physical or social artefacts is the key to knowledge production. In our process, we constructed and re-constructed a provisional framework, aiming at encapsulating our understanding of the overall movement-based design process. Our design process was advanced by several workshops, building prototypes of methods cards, building prototypes of the framework, testing movement-based practices, conducting desktop research, and discussing theoretical and practical aspects. We summarise this process three years

process in two distinctive phases we call Storming and Symphony. The storming phase consists of an explorative approach for iteratively creating movement-based methods cards and the framework. In the symphony phase, we tested movement methods and the framework and consequences of our decisions.

Presentation of the 4M framework

Based on the design process, we have developed the 4M framework as a model for understanding approaches when designing for, of, and with movement in sport, technology, game, and play. The 4M framework consists of four elements of movement-based design activities: Movement modifiers, Mood setters, Movement methods, and Movement concepts (figure 1). The 4M model illustrates a box placed on top of Modifiers that you can use along with the three other types of movement methods. The box' red foundation (bottom) is the Mood-setting. The green movement methods on the left side of the box embrace design methods with a Movement-first approach. The right blue side of the box represents Movement-concepts of knowledge.

The framework is inspired by Karoff (2013) understanding of play as a triad interplay between play media (nouns), play practices (verbs) and play moods (bodily state of being). The framework takes a constitutional stand in movement-based design (Andersen et al, 2020) acknowledging the

Design Method Card Model

movement-first approach (Segura 2016) and movement as a medium for different aspects of design activities (Loke & Robertson, 2013), adding specific movement and sport theory and evidence. The framework enhances an understanding of how to create and enrich a movement-based creative design environment. In developing a movement-based design framework we strive for making movement-based methods navigable and actionable in the fields of interaction design, game and learning design as well as in sport & physical activity design. With 4M, we strive for having a medium to gain confidence in using movement in design practice. The target users of the framework are stu-

dents and design professionals across disciplines such as engineering, design and PE, sports, and movement-health.

The four constituents are independent of each other. Consequently, any chosen movement method does not rely on a corresponding mood (setting) or a relevant movement concept. By adding the different constituents, we suggest that a movement-based design practice has different layers and perspectives, and that designers or facilitators must understand and plan design processes recognising these layers and perspectives.

In the next sec-

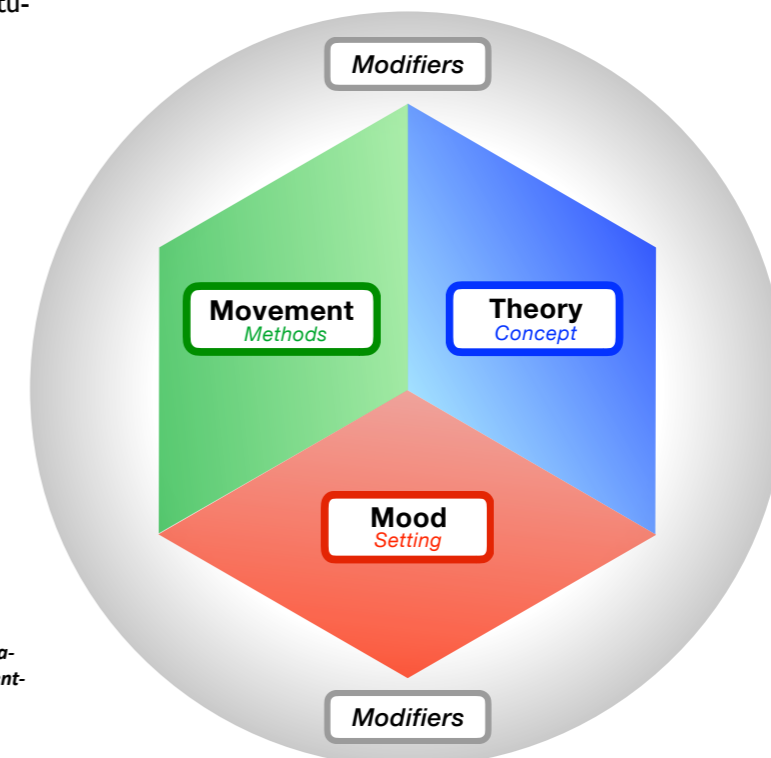


Figure 1: – the 4M framework for movement-based design

Design Method Card Model

tion, we provide a description and examples of the four constituents to give an image of the separate elements and how they guide the movement-based process.

Mood setters

Having movement at the centre of interaction design and as the medium of design, it is our experience that being in the 'right' state of body being is essential for choosing a movement first approach in the design activities and thus practising warm-up like activities. The Oxford Dictionary of Sports Science & Medicine defines a warm-up as typically comprising "mild exercise to raise tissue temperature and stretching" and "to prepare the athlete psychologically".

We propose and classify a variety of warm-up games as Mood Setting. The activities prepare participants physically, socially, mentally, and for movement design purposes, also include embodied creativity training. It embraces activities such as icebreakers, warm-up exercises, team building, and physical technology-supported games (Márquez Segura et al., 2021). We use a typology for making the Mood-setting method identifiable regarding function in the design processes. The typology contains Exertion, Playfulness, Body Awareness, and Creativity. Altogether, the Mood Setting activities are warm-up like energisers with a creative potential. For the participants they typically take place before the primary de-

sign activities and can be applied to energise the design process. Further the movement methods will be searchable by the duration of set-up time and proposed activity time, proposed number of people participating (social configuration), and material (props) needed.

Movement Methods

Design methods are generally known as a designed way of working in a design process. Well-known design methods are brainstorming and sketching with the general idea of using primarily cognitive processes. The framework constituent of Movement methods contains design methods, which use movement as a medium to explore, stimulate and activate designers and their creativity in a design process (Andersen et al., 2020). The use of movement as a part of the design process stems from practices such as dance, sport, rehabilitation, and theatre (Höök et al., 2017). It has sparked the emergence of embodied sketching (Segura et al., 2016) and movement-based interaction design disciplines (Loke & Robertson, 2013). We acknowledged the body and movement as a way for designers to engage in design challenges to pursue insights (Andersen et al., 2020).

The Movement-based methods have a specific context-bound design goal. Dividing the methods through how they use movement as a medium to achieve the design goal, we informed by Andersen et al. (2020), further develop the categori-



Design Method Card Model

Design Method Card Model

sation of the methods into Exertion, Playfulness, Body Awareness, and Role-Playing. Further the movement methods will be searchable by the duration of set-up time and proposed activity time, proposed number of people participating (social configuration), and material (props) needed.

Movement concepts

Informing the design, we propose using multi- and cross-disciplinary research-based evidence and theory as a knowledge foundation when designing for and of movement, sports, and interaction technology. Peters, Loke and Ahmadpour (2020, p. 417) define a concept (cards) as “Some tools present chunks of expert knowledge in a manageable manipulable form”. Based on different disciplines in scientific areas, we have developed Movement Concepts in the areas of Philosophy of Sports and Movement, Psychology of Humans, Humans in Society, Motor Learning and Biomechanics, Physical Training and Physiology, Sports, Games and Play, and Sports and Movement Technologies. The Movement Concepts includes manageable descriptions of theories, knowledge, and evidence, plus generative questions, and reflective questions to support informative decisions making in the design process.

Movement Modifiers

Movement modifiers include cards and physical artefacts that support, modify, tweak, or disrupt design practices. Informed by Peters, Loke and

Ahmadpours’ (2020) review, method cards formed as props, fuel divergent thinking as a scaffolding of the design process. The artefacts stimulate physical exploration and creativity when participants use them in design and real-life settings. Engaging and moving with the artefact can be generative for the design activities. Modifiers can also be words or pictures related to a sport, movement, or sports theme, and they are placeholders representing components within a system. Modifiers can tweak movement like, e.g., via cards of movement qualities, types of core movements, movement metaphors, different sports disciplines, play and play elements. Movement can be modified using technologies and game genres and types. Modifying people using personas and constraints. Modifying motives through experiencing movement through different lenses & logics, stances & values, and perspectives of movements.

Bridging the framework to practice

We will exemplify the framework from two perspectives: 1) “design of movement” in the Creative Acrobatic Body course for sports science students and 2) “design for movement” with the HangXRT bodystorming case. For the 4M model in use, we first describe the case then, the concept of the 4M model is related to practice use.

Case presentation: The Creative Acrobatic Body

The Creative Acrobatic Body is a 3 ECTS ba-

achelor course for Sport Science Students at our local university's innovation track. The students' course task is to create a bodily acrobatic performance informed by or invented from movement cultures of their own choice, e.g., parkour, new circus, creative gymnastics etc. The student's assignment is to produce an informative inspiration video showing parts of the performance and core elements of the process of creating said performance. The course provides students with the knowledge and practical experiences in different acrobatic movement practises. We introduce how embodied creative and playful learning processes unfold within innovation. The course is structured as 1) formalised lectures and 2) practical workshops. Before any practical workshops, the students participate in a lecture-based on the coming practical workshop (e.g., the culture of parkour, gymnastics, parkour, or new circus).

Applying the 4M framework in the workshops, we recognise icebreakers, warm-up, and team-building activities to enhance the participants' mood-setting towards playfulness, trust, and creativity. A Mood-setting activity used was “Follow the leader”. In the workshop, we introduced and practised movement creativity based on the structure of the 4M framework by;

- 1) using Modifiers, physical prompts (artefacts), movement qualities images, and play formats on word-cards as embodied creativity disrupters
- 2) improvising movement as a Movement method to explore acrobatic movement possibilities
- 3) using the context and theme knowledge from the formal lectures to reach the design goal as a representation of Movement concepts
- 4) using music to facilitate creativity and, as such, representing a Modifier (Segura et al., 2016).



Design Method Card Model

Design Method Card Model

The last workshop element was video documentation of a mini-performance for further feedback and reflection on the process of working with embodied creativity.

In their self-guided work, the student applied movement methods such as props and gym equipment experimentation as an emergent movement method represented in the 4M framework. The workshops and the students' self-guided project work illustrate how both facilitators and students apply the 4M framework and the movement methods, respectively, in their teaching and learning. It includes designing and practising their performance and sharing visual (video) knowledge to inform other potential users' embodied creativity and "design of movement".

Our next case shows the 4M framework's potential focus on designing for movement.

HangXRT bodystorming through the 4M framework

Segura, Vidal and Rostami (2016) created the workshop HangXRT to design computing technology games that encourage vigorous physical activity and physical fatigue. The workshop's background lies in the knowledge of how physical fatigue resembles what happens with real-world sports, and such a game provides physical and cognitive advantages.

Segura, Vidal and Rostami (2016) succeed in allowing participants to engage in embodied ways

of designing supported by an atmosphere of physical and social play. The general idea of the workshop was to utilise the principle of show, don't tell and let the environment become a design resource. The generative workshop approach involved an on-the-spot complex design space of people, technologies, artefacts, and physical elements in a bodystorming session to envision and act through physical activities. The core artefact was the TRX suspension trainer, a piece of equipment attached to the ceiling. Participants hung and moved with, within and around the TRX. Other playful artefacts were provided as inspiration for the participants, and the facilitator instructed them to take turns in their experimental actions with the TRX and the artefacts.

Understanding HangXRT through the 4M framework, we see Segura, Vidal and Rostami (2016) utilise movement methods by placing the TRX at the centre of the room and making the participant experiment with movement through the TRX and the principle of show don't tell.

The participants were encouraged to involve other artefacts to change the perception of the movement and the concept. The group is observed bringing in balls, skateboards, and mats for tweaking the bodystorming process (Segura, Vidal & Rostami, 2016). In doing so, aiming toward physical exploration instead of classic cognitive problem-solving and the artefacts are seen as modifiers supporting this physical explo-

ration. While at the same time recognising the mood-setting part of the 4M framework by addressing the artefacts as playful artefacts.

The Movement-concepts of the 4M framework stem from the participants involved in the process. The participants were experts in physical activity, exertion games and motivation; the theory was the foundation of the design (Segura, Vidal and Rostami, 2016).

The design of the technological solutions for

TRX starts with a movement first approach. We show the potential of using the 4M framework to analyse design activities and structure future developmental processes alike.

Designing with movement – implication, reflections, and recommendations

We for now proceed with our reflections on the bridging of the 4M framework with the 4E theory and we will discuss implications, reflections, and recommendations.



Design Method Card Model

Design Method Card Model

Alongside the sports and movement focused technology trends new design approaches have emerged, focusing on full-body interactions by actively working with the lived body's capacity to sense, feel, and create. We have to a lesser extent been able to bridge an embodied understanding of cognition and movement-based design approach into practical design activities. We created the 4M framework to bridge the theory of 4E and with this enhance the practical use of

4E creativity (Malinin, 2019). As Malinin (2019) states, based on the 4E, "creativity does not begin with an idea in the head that is subsequently realized; it emerges through interactions with others and artefacts of the material environment". The 4M framework makes a bridge for non-movement experts and experts to understand and structure movement focused design processes that take into consideration the elements of 4E – embodied, embedded, enactive and

extended cognition in both divergent processes and convergent processes of a design process. As 4E operates with an extended form of cognition involving bodily, material/technological, socio-cultural, and temporal dimensions (Malinin, 2019) the 4M has a Mood setting to promote a forthcoming social-cultural environment.

The embodied dimension of 4E points to the embodied being and thus the mood of your body being will affect the creative potential. As the phenomena of perception, memory, reasoning, language emotion and consciousness are constituted and depend on the entire body. The Mood-setters as warm-up games are drawing on these cognitive phenomena from a movement-based and playful approach striving for loosening up for internal creative potential as well as reaching out for and connecting to fellow participants taking part in the design activities. The Mood-setting activities have affective, social, trust formation, perceptual, cognitive, and physiological outcomes. As such warm-ups as embodied games show potential toward unlock innovation, creativity, and intelligence (Segura et al., 2021). The Mood-setting we interpret as having an embodied metaphorical creativity training dimension. Thus, drawing on how movement may enact embodied metaphors. It also draws on that walking and particularly free walking improves divergent thinking (Malinin, 2019).

The Movement methods involve bodily actions, and the modifiers give access to a wide variety of material and technological artefacts. Thus, for Segura (2016), the embodied ideation is realized in the participants' lived physical and social life world. The holistic approach that Segura is describing in most aspects builds on the potential use of 4M and primarily on perception-in-action as defined for the enactive perspective of the 4E model and makes a movement first approach by Segura (2016) actionable. The 4M framework we believe used in an open and situational adaptive way will be part of forming design as creativity-in-the-wild (Malinin, 2019).

In developing the framework, our focus was on design for movement and design of movement as described in the two cases. Although we recognise the framework is more than of and for movement in design with movement. We are convinced the framework can also be used in numerous design settings, e.g., bus stops, supermarkets etc.

Conceptualising movement as a medium that stimulates, forms or catalyses insights within the design process, we reject a focus on how much movement. Instead, we advocate for how movement promotes energy and catalyses insights, we argue for design activities not directly related to design for and of movement. For this, the 4M framework could be relevant for designers and non-experts of movement to use movement-ba-



Design Method Card Model

Design Method Card Model

sed and embodied design approaches.

Concluding remarks

Authentic movement-based design requires sympathy with the movement, and the context, establishing a forthcoming interaction between the participants, fostering a creative body being and thus enhancing positive, creative moods among the participants in the co-design processes. The 4M framework is based on the prerequisite that the environment is an umbrella term to describe both human-specific environment (habitat) and actor-specific environment, the outside world. It is evident that bodies, artefacts, and environments shape creative processes (Malinin, 2019). First, it involves an experimental examination of embodied metaphors associated with creative thinking reified through mood-setting in the 4M framework. Second, it involves a systemic approach that implicates the whole creative process of problem finding and forming, generating, testing, and elaborating on ideas to develop a product or service (Malinin, 2019). This approach in the 4M framework is reified in the Movement-methods and through Movement-concepts. Thus, Modifiers are available for tweaking both the Mood-setting and the Movement-methods and the Movement-concepts.

We recognise that testing and evaluation of the 4M framework and its grounding in the 4E radical embodied cognitive science still will have to be established to document the actual value of the

framework

Activity Design is an analytical lens towards conceptualising such designerly practices that, fully or partially, aim to design what people do. There exist numerous examples of activities that we enter into, sometimes just once and sometimes more regularly, that have been (or are continuously in the process of being) deliberately designed.

- Paying your ticket in the front of the bus.
- The ride of an amusement park.
- A panel debate.
- A traffic light.
- An online game.
- A physical training class.
- A theatre performance.
- A larp (live roleplaying game).

Activity design can be seen as a generalisation of service design [61], but without the latter's emphasis on servicing a customer. It builds upon practice theory [118], theories of social schemata [50], and practice-based design [147], but rather than arguing that design should adapt to practices, it emphasises how activity design can be done to circumvent established patterns and norms, and to establish entirely new activities or change existing practices. It is also influenced by theories of Situated Action, in its emphasis on in-the-moment action and how it is shaped by contingencies of the situation [146], and Distributed Cognition in its focus on how different objects

support understanding and action [60]. Within HCI, it stands in contrast to a more traditional technology-centric design stance. While both ultimately target the experience of users' engagement, traditional HCI center on the design of the technology/object/artefact itself.

Game Design is very influential in this approach. In general, games are a great example of activity-centered design. As [131] put it: "[...] Game designers don't just create content for players, they create activities for players, patterns of actions enacted by players in the course of game play." Just as Game design, activity design is second order design [170], and emphasises the rich plethora of materials available for its design [95]. An example of an activity-centric approach to embodied design is Márquez Segura's work on

embodied core mechanics [91], which suggests a work process for designing embodied activity through focusing on key actions at the core of that activity, the embodied core mechanics, and identifying and developing material and immaterial elements that support those actions. The latter includes technology, but also non-digital artefacts as well as spatial and social elements shaping action, such as the physical layout of the room, or rules of interaction. These are considered resources for design.

ACKNOWLEDGMENTS

This research was supported by the EU Erasmus+ project Method Cards for Movement-based Interaction Design (MeCaMInD), grant number 2020-1-DK01-KA203-075164.

References



Photo by PIXNIO

Design Method Card Model

- Andersen, R., Lekbo, S., Hansen, R., Elbæk, L. (2020) Movement-based Design Methods - a Typology for Designers. In European Conference on Games Based Learning. Academic Conferences International Limited.
- Dalsgaard, P., & Dindler, C. (2014, April). Between theory and practice: bridging concepts in HCI research. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems (pp. 1635-1644).
- Elbæk, L., & Friis, J. J. (2017, October). Perspectives on a Learning-Model for Innovating Game-Based Movement in Sports and Health. In European Conference on Games Based Learning (pp. 155-164). Academic Conferences International Limited
- Griffith, A. (2021). Embodied creativity in the fine and performing arts, *Journal of Creativity*, Volume 31, 2021, 100010, (<https://www.sciencedirect.com/science/article/pii/S2713374521000108>)
- Höök, K., Hummels, C., Isbister, K., Marti, P., Márquez Segura, E., Jonsson, M., ... & Lim, Y. K. (2017, May). Soma-based design theory. In Proceedings of the (2017) CHI conference Extended abstracts on human factors in computing systems (pp. 550-557).
- Karoff, H. S. (2013). Play practices and play moods. *International journal of play*, 2(2), 76-86.
- Koskinen, I., Zimmerman, J., Binder, T., Redström, J., & Wensveen, S. (2011). Design Research through Practice – From the Lab, Field, and Showroom. Morgan Kaufmann.
- Loke, L., & Robertson, T. (2013). Moving and making strange: An embodied approach to movement-based interaction design. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 20(1), 1-25.
- Malinin, L. H. (2019). How radical is embodied creativity? Implications of 4E approaches for creativity research and teaching. *Frontiers in psychology*, 2372.
- Márquez Segura, E., Fey, J., Dagan, E., Jhaveri, S. N., Pettitt, J., Flores, M., & Isbister, K. (2018, April). Designing future social wearables with live action role play (larp) designers. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (pp. 1-14).
- Márquez Segura, E., Turmo Vidal, L., Waern, A., Duval, J., Parrilla Bel, L., & Altarriba Bertran, F. (2021, May). Physical Warm-up Games: Exploring the Potential of Play and Technology Design. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1-14).
- Mueller, F. F., Edge, D., Vetere, F., Gibbs, M. R., Agamanolis, S., Bongers, B., & Sheridan, J. G. (2011, May). Designing sports: a framework for exertion games. In Proceedings of the sigchi conference on human factors in computing systems (pp. 2651-2660)
- Newen, A. Bruin, L., Gallagher S. (2018). *The Oxford Handbook of 4E cognition*. Oxford: Oxford University Press.
- Peters, D., Loke, L., & Ahmadpour, N. (2021). Toolkits, cards and games—a review of analogue tools for collaborative ideation. *CoDesign*, 17(4), 410-434.
- Segura, E. and Vidal, L., Rostami A. & Waern A. (2016). Embodied Sketching. *Proc. CHI 2016*.
- Segura, E. M., Vidal, L. T., & Rostami, A. (2016). BODYSTORMING FOR MOVEMENT-BASED INTERACTION DESIGN. *Human Technology*, 12(2).
- Schleicher, D., Jones, P., & Kachur O. (2010). Bodystorming As Embodied Designing. *Interactions* 17, (6).
- Stappers, P., and Visser, F. (2014) Meta-levels in design research: Resolving some confusions, in Lim, Y., Niedderer, K., Redström, J., Stolterman, E. and Valtonen, A. (eds.), *Design's Big Debates - DRS International Conference 2014*, 16-19 June, Umeå, Sweden. <https://dl.designresearchsociety.org/drs-conference-papers/drs2014/researchpapers/63>
- Svanæs, D., & Barkhuus, L. (2020, April). The designer's body as resource in design: Exploring combinations of point-of-view and tense. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (pp. 1-13)



Photo by VALOJUMP

12. Facilitating Movement-Based Design Method

Facilitating Movement-Based Design Method

Considerations for (Teaching) Facilitator Roles for Movement-Based Design

Ref.: Dennis Reidsma, Robby W. van Delden, Joris P. Weijdom, René Engelhardt Hansen, Søren Lekbo, Rasmus V. Andersen, Lærke Schjødt Rasmussen, and Lars Elbæk. 2022. Considerations for (Teaching) Facilitator Roles for Movement-Based Design. In *Extended Abstracts of the Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '22 EA)*, November 2–5, 2022, Bremen, Germany. ACM, New York, NY, USA, 10 pages. <https://doi.org/10.1145/3505270.3558315>.

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

INTRODUCTION

Research in the CHI PLAY community includes a very active strand on movement centric and embodied playful applications, such as exergaming [8], active immersive VR applications [35], sports and sportful applications [9, 23], rehabilitation [24], dance and circus [15], and many others; movement is seen as a vital material for games and play (cf. [6]). Designing and building this type of application requires new design concepts, guidelines, and lenses [18, 22, 27]. For example, Mueller and Young [18] describe how sports-HCI can benefit from designing for facets such as humility, the sublime, or for sacrifice. In addition, though, this type of design work requires different design activities. In design for movement (to facilitate movement) and design of movement (movement improvisation), designers are recommended to design with or through movement (the body as a creative resource), that is, use movement as a medium or instrument in the design activity and build awareness of the silent, fleeting and immediate movement experience [5, 14, 26]. Current activities for movement-based

design (MBD) include body storming, embodied sketching, experience prototyping, and others [e.g., 3, 13, 19, 33]. The role of body movement as a source of creativity has been explored [14, 26, 34], pointing at methods and outcomes as well as the importance of facilitating the right mindset and way of acting through activities and environmental stimuli. In particular, play can open up creative potential “silently hidden” in the body; Börghall [2] describes that the courage to play and be playful is the entrance to being creative. To make the growing collection of methods and approaches accessible to a broader audience, the Erasmus+ project “Method Cards for Movement-based In-



teraction Design” (MeCaMInD I) aims to gather them into a comprehensive and accessible method card toolbox. This project, therefore, involves making inventories of existing methods, categorizing and grouping methods based on crucial distinctive features [1], and micro-packaging them into accessible method cards and support for navigating the collection. Furthermore, a primary aim is to explore the teaching with / of these methods in various curricula ranging from sports and movement to the engineering domain – to deliver a new generation of designers who can tap into the playful, play-oriented, embodied, movement-based perspectives to design.

Aims and Contribution

This paper addresses one specific challenge in the context of MeCa- MInD: in our experience, movement-centric design activities place particular demands on the facilitator who guides the activities towards fruitful outcomes, in addition to and distinct from facilitation approaches for the typically somewhat more cognitive, sticky-note- whiteboard-and-tangible-prototype types of design methods. Plus, we see a challenge regarding how to teach facilitation – because the industry not only needs designers who can participate in these methods, but also experts who can take the lead in these activities: beyond mastery of the met-



Facilitating Movement -Based Design Method

hod into the facilitation and guidance of others in this design work. In this paper we therefore aim to explore the facilitator roles and their facets for movement-based design. We embed our discussions in literature and the context of our own experiences, leading to initial steps for a framework describing facilitation for MBD specifically, recommendations for facilitation of movement-based design activities, and teaching.

Background

According to Mosely et al. [17], the primary role of a (design) fa- cilitator is to make space for dialogue and assist group members in collaborating, so they can approach the design themes and chal- lenges in new ways and generate new ideas. According to Hunter et al. [10], the facilitation of groups originates from co-operative movements that aim to ensure group members can fully partici- pate in decisions making if they demand so. They align this with a democratic model rather than a co-operative model. The demo- cratic model requires co-operation and participation in majority decision-making, and the democratic model state it as the best way to make decisions. The authors elaborate on the continuum of decision making, with autocracy (single person decision making) on one side, democracy in the middle, and they set 'co-operacy' (new word) on the other. The authors state that democracy and autocracy are both practical and have advantages. Although the authors argue towards co-operacy,

they believe it is used negligible because of cul- ture and less societal trained skills. In their view, the facilitator role is comparable to a leader or chair of a committee for which they have been elected, and a facilitator is skilled in guiding a group in co-operative processes, including sha- red decision-making to fulfill its purpose in the best manner — focusing on managing design activities, unlike managing the content. Hunter et al. [10] de- scribe the shift from dependence (autocracy) through independence (democracy) to interdependence (co-operacy).

Facilitation as a practice is a fundamental meth- odological chal- lenge in Participatory Design (PD) and Human Computer Interac- tion (HCI) discourse. Dahl and Sharma [4] argue that participatory design facilitators significantly impact participatory activities and outcomes and propo- se six facets of the facilitator's role: 1) Trust build- er, 2) enabler, 3) inquirer, 4) direction setter, 5) value provider, and 6) users' advocate. Each role was associated with specific re- sponsibilities and strategies. In addition, facilitation requires 'core design competencies' [16], particularly design process knowledge and understanding. Mosely et al. [16] identify facilitation as the process and act of drawing on and applying design processes and approaches to enable dialogue and ideas to emerge within partici- patory design contexts in developing novel solutions to complex problems.

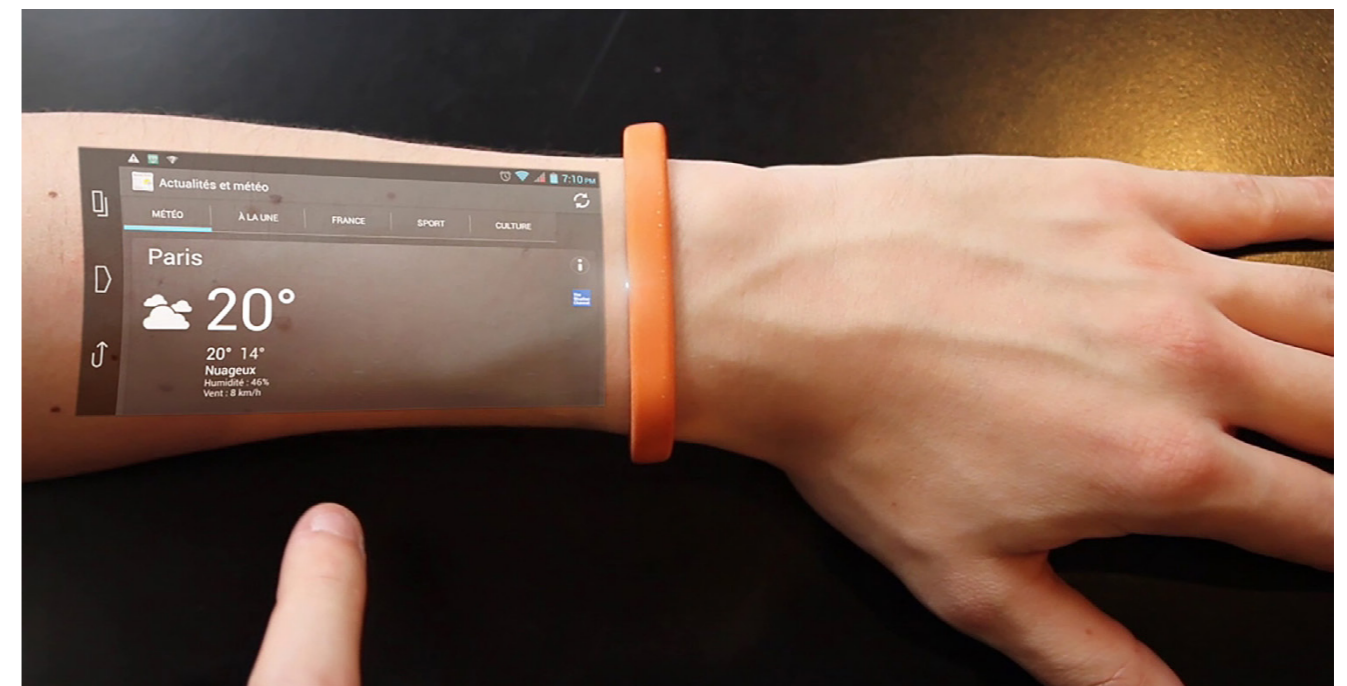
In this, the facilitator's approach and characteri-

Facilitating Movement -Based Design Method

stics play a cru- cial role in shaping a project's dynamics [16, 29]. Starostka et al. [29] showed that Design Thinking facilitation is practiced in var- ious ways, recognizing a conti- nuum between a Methods-focused approach on one end and co-facilitation on the other. They de- scribe this in four facets: 1) understanding Design Thinking from a tool perspective vs. a mindset perspective 2) focusing on solutions vs. problems 3) having a planned vs. emergent process 4) indivi- dual vs. shared leadership. They highlight that each parameter is a continuum and that the fa- cilitator's approach can change, either voluntarily (e.g., adjusting to the group's development) or involun- tarily (e.g., by group pressure or implicit habits and preferences of the facilitator). Specifically for movement-based design methods, additional con- siderations come in. Svanæs and Barkhuus [30] propose theoretic- al perspectives

such as Gibson's ecological theory of perception, Dewey's aesthetics, somatics, and introspection, as a takeoff point for the facilitator's instructi- on and guiding movement-based meth- ods. They further propose that the facilitator be aware of and make explicit the theoretical and philosophi- cal stances of facilitating the movement-based design activities.

An essential role of a facilitator in MBD is to create a safe and welcoming space where the design activities can take place. People may feel exposed and embarrassed performing move- ment activities. As such, the initiation of icebrea- kers and team building are essential elements of a well-performed facilitator role. Such activities often strengthen the playful mindset and crea- tive body being. Thus, a playful approach will be part of unfolding movement-based creative re- sources of the participating bodies. According to



Facilitating Movement -Based Design Method

Facilitating Movement -Based Design Method

O'Shaughnessy and Ward [20], Lee et al. [12], and Svanæs and Barkhuus [30], training activities for participants such as improvisation and somesthetic reflection may create a better starting point for participation in the design activities and thereby a more favorable outcome of the design activities.

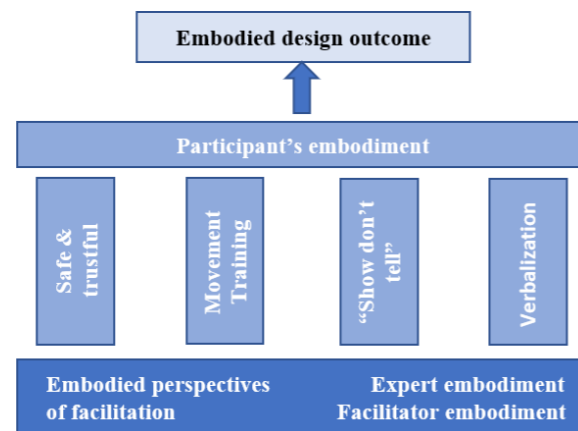
This is not only a matter of getting rid of possible awkwardness and sense of unsafety (due to the unknown), it is literally about developing skills to be more sensitive to what the body tells and how to communicate this to oneself and others. That may be particularly important if the participants have little or no movement experience. Thus, an additional primary role of a facilitator of MBD methods is to motivate and engage participants in play and movement and encourage the individual to incorporate their own bodily experiences, feelings, and senses as a source of knowledge, inspiration, and testing of concepts and prototypes (see e.g., [13, 21]).

“Show don't tell!” is an approach proposed by Márquez Segura et al. [19]. On the other side, Lee et al. [12] describe how it is also essential to document and share the embodied and subjective experiences that arise from doing MBD activities; they describe somesthetic reflection using verbalization as a method. This “doing” and “reflecting” are modes that the facilitator and participants need to take and change over time. Höök et al. [11] describe how the tacit knowledge from our bodily experiences can be very

challenging to verbalize.

In summary, we see the participants' embodiment contributing to movement-based design, resting on four pillars of facilitation of a safe and welcoming design space among participants, embodied training of carefully selected techniques and methods, “show don't tell” embodied ideas, and verbalization of embodied experiences (see Figure 1).

Figure 1: How a facilitator can support participants in MBD



activities according to summarized literature

The importance of the facilitator is thus clearly seen, but how should this work specifically? Quoting Lauren Tan, “in the field of design, the role of the designer as facilitator is commonly acknowledged; but the limitations of the design literature are that they do not elaborate on this role, nor explore its practices.” [31, p180]. This, is the focus of the current paper – to explore how

these general insights translate to more concrete advice on the facilitation of MBD activities.

APPROACH

To develop our insights regarding the facilitation of MBD activities, we first applied for an ethics review to conduct research in our teaching sessions on which our analysis is based (request #RP2022-50). We then started trialing MBD methods in several design sessions including empathizing, generating, and testing phases, with various target groups. Briefly summarized, these included the following sessions: three consecutive sessions with students Interaction Technology (n ≈ 20 on average), three parallel design sessions with industry people and design professionals (n ≈ 5 per session), a workshop to teach creative acrobatic performance (55 students and one teacher), a conference workshop (7 local participants and 8 online participants), and a playground workshop with 16 students, three industry designers, and two teachers. The sessions covered various application domains including sports, playground play, and health applications, and led us to experience in practice some of the barriers to the logistics and execution of sessions as well as barriers to getting participants to immerse themselves and engage with the process. While doing so, and while informally discussing amongst the authors our experiences and reflecting on them, we identified several dimensions/facets to our own experiences as teacher/facilitator in



COLOURBOX

Facilitating Movement -Based Design Method

the various sessions, considering topics such as perspectives (ranging from facilitate-as-co-participant to facilitate-as-outsider) and stage engagement (stepping-in-and-out)

In this paper, we present our first thoughts regarding facilitation for MBD. For this Work-in-Progress paper we did not yet follow a formalized methodology in analyzing our experiences, but we loosely organized our thoughts and reflections along dimensions of what gets facilitated, how one can do facilitation in different ways, and who is the facilitator regarding different roles and skills. Finally, we reflect on the teaching of the facilitator role to MB designers, which we see as a crucial point to address in future work, and on which tools can support the facilitation.

RESULTS AND DISCUSSION

In this section we highlight experiences and observations from our design sessions. Our reflections are grouped in subsections that together sketch out a (highly preliminary) structure in which facilitation of MBD can be understood; for some topics we draw upon additional existing literature to clarify distinctions that we made.

What is facilitated?

Similar to much related work, we found that our role sometimes focused on structure facilitation (ensuring that the group takes the right steps in the proper order and time). In addition, there

was some facilitation of content, helping people identify interesting ideas that emerged and highlighting “unheard ideas” from group members to build upon.

The facilitation of mood and energy for the best possible commitment and engagement was also seen as necessary. Even though our participants were not un-experienced in creative design, moving and acting out in the “performance space” was scarier than being creative with sticky notes and whiteboards. Facilitation in maintaining a playful attitude (distinct from energy) is also crucial [2], and even more so as our groups were designing for embodied/movement-based play experiences. Having a playful attitude is hard to do on command, so we tried to sneak this in by role-playing (giving the right example ourselves to take the group along) and adding task constraints and props to the activity.

We also saw group-building facilitation. As acting out (in often new environments with new peop-



Facilitating Movement -Based Design Method

le) is scarier, the group dynamics also become more critical. This calls for making the right groups, engaging with the people that need to be involved, and keeping an eye on those students that benefit from being watched while avoiding focusing on those that would find this detrimental. For example, we often attempted to have in every design group at least someone with a relevant background in movement (sports trainers, dance amateurs, actors etc.). Finally, something that we experienced as quite different from non-movement-based methods that we guided in the past, we saw a need for facilitation of stage-engagement (helping people with stepping-in-and-out). We observed things such as people standing in a circle, where taking a step back led to “disengagement from the movement”; people starting the session hiding at the edges of the room, watching what was going to happen in the center; and people seeing not all places in the room as potentially being “on stage”. People often seemed not aware that they would literally step out of the activity in some places and moments; we attempted to help them wield this stage presence deliberately.

How does the facilitator approach their role?

Shared facilitation vs controlled facilitation.

Sometimes, as facilitator we would take strict control of the steps that the groups carried out; at other moments, we provided a general out-

line and light guidance only. This depended on the personal preference of the particular facilitator(s) in each session, of what the group responded well to at any particular moment, and the experience that the facilitator had in “winging it” i.e. switching naturally between these approaches.

Fully controlled facilitation – The facilitator controls the process; participants focus on the current task/activity. We saw this especially in warm-up phases and with groups struggling to get into the experience: “now do this, now do that”. This approach supports building a safe and friendly movement environment, but probably takes away some flexibility and spontaneity.

Shared participation – The facilitator lets participants explicitly suggest methods or respond more implicitly to what happens between the participants. We saw this especially with the smoother going sessions. This approach requires that participants feel comfortable, and runs the risk of a particular person becoming too dominant.

Fully shared facilitation – Facilitation as the “sum of intentions from the participants,” fluctuating between participants in no specific pattern. In our practice, when left on their own, some groups would appear to lack a facilitator role whereas in other groups, the members would take turns steering the direction of the movement activities. This approach seems to require a more experienced group with a clear shared

Facilitating Movement -Based Design Method

view of their goal, path, and timeline.

Technology based facilitation – Providing facilitation only through technological means and instructions. For instance, we sometimes used a canvas approach in which points of preparation and attention were given, and more strict indications of process stages were defined, after which groups were left to follow those rules and structure. This approach seems to help make sessions more efficient, but seems generally not adaptive enough and not sensitive enough to what happens in specific groups.

Levels and perspectives of participation in the design activity.

Another thing we varied in our facilitator role related to our perspective on the activity carried out by the group and the level of involvement that we took upon us, roughly summarized as a spectrum ranging from “inside, playing” to “outside, observing and controlling”. Our discussion of this facet is inspired by Loke and Robertson [13] (recognizing the perspectives of the ‘mover, observer, and machine’), and the description of Svanæs and Barkhuus [30] of three perspectives based on Fdili Alaoui et al. [7].

“1. First-person perspectives are focused on self-observation and exploration of one’s own experience in developing and testing technologies.” [30] In this perspective, as facilitators we sometimes briefly joined the design activity in a more immersed manner. We focused on our own

senses and experiences, left the responsibility for content and progress more shared between participants. This might be seen as “undercover facilitation”, being a role model to get others to move along. Similar to how in sports a trainer can role-model facilitator, sometimes “jumping in and doing it” is needed.

“2. Second-person perspectives include participant observation through kinesthetic empathy.” [30] This perspective focuses on the senses and experiences of others. Not by standing apart and observing them from the outside, but by perceiving the actions and responses

of another person in the activity, in a way resonating with it, and then observing and reflecting on one’s own bodily and embodied responses to what happens. Thus, this perspective yields insights from one’s own unique experience, rather than from summarizing observations of what the other person may have experienced. As a participant, this is a source of unique insights regarding the topic of the design activity. As a facilitator, this perspective seems a powerful tool to monitor the performance of the group, and to see whether it seems useful or necessary to join the group more actively in the first or more systematically observing in the third perspective.

“3. Third-person perspectives posit observation as objectively gathering data from the world that removes the bias of the self.” [30] For participants, this perspective may be relevant for recording and documenting the outcomes



Facilitating Movement -Based Design Method

of the design activity, or for taking the machine perspective described by Loke and Robertson [13]. As facilitators, we were more focused on the process and the goal in this perspective. We observed to see which groups were struggling or not following the process adequately, we did time keeping, chose which groups needed extra attention, etcetera.

We think that for participants, these three perspectives offer different embodied 'points of view' on the collective MBD activity, as can also be illustrated through further literature [7, 28, 30, 32]. The perspectives are not fixed but rather dynamic positions the participant can take and vary during the session. While the facilitator is responsible for the overall process, needing to always keep a 3rd person perspective on the whole group, we argue that purposefully changing perspectives during the MBD session is also necessary to fulfill this role. For example when the facilitator notices that participants struggle to start an improvisational movement exercise they might need to step in as 1st person participant to 'show by doing' [19]. Furthermore, sometimes the facilitator might need to switch to a 2nd person role to get a better understanding of the embodied group experience through kinesthetic empathy [25, 30]. While the participants need to learn when to take which perspective within the MBD session, the facilitator needs even more to master shifting between these perspectives while continuously maintaining a 3rd person perspective

on the group process. Finally, it is very hard to both act and reflect at the same time, yet a great facilitator skill is to know which mode is necessary and when. Since this skill will also benefit the participants in their activity, the facilitator needs to be able to teach them to others, as well as be able to know when to shift to 2nd and 3rd person perspectives themselves to verify and add to what is verbalized by the participants.

Who is the facilitator in their various roles?

Given the facets discussed above we can articulate a few typical roles the facilitator can draw upon, moving back and forth between various role-related perspectives and activities.

The instructor and games master – Sets up the "games" (activities/methods) in advance, explains them at the start, structures the execution of the activity, but (3rd person) ultimately lets the participants do the playing.

The coach and mediator – Guides the direction of the activity, partial active involvement. The aim is to optimize the performance and to achieve results, but takes a more active and immersed role than the games master in steering the group to the correct execution of the activity.

The role model – As a kind of "undercover facilitator", the role model is conscious of their role in the group and actively plays it out to help others participate in the group activity.

The initiator and animator – Controls the purpose of the activity, starting from full active in-

Facilitating Movement -Based Design Method

volvement. Focuses on the energy in the process and how it can be affected/manipulated in pursuit of the goal. Participant immersion is a key indicator. Plays a lot with 1st and 2nd person perspective to help groups along, exploring emergent movements.

This role can be better understood by looking at how Børghall

[2] describes this animator role in more depth, how it creates pre-requisites for new paths of movement, encourages and supports the movement inquiry, opens a space for wonder, supports the participants in exploring the principles of the movement idea, gives room for exploration, and lets the art of improvisation be a driving force [2]. In Latin, "anima" is defined as "breath of life". The animator is grounded in using the principles for animating movement instead of instructing specific movement techniques. For Børghall [2] to succeed as an animator, one needs to have the courage to play and be playful, as the entrance to being creative. They argue for finding the naive desire to play and for the animator to use themselves to change perspective, stimulate the desire to play, energize the process, and create intensity. Finally, as an animator, in contrast to the instructor, one will have to show courage to lose control of the process and move from being self-conscious to being in a state of devotion and self-forgetfulness [2].

What skill set would an MBD facilitator have?

Comparing these roles and approaches, the question arises: what skill set does a facilitator need? Firstly, we feel that they should have mastered managing and

shifting between the levels of participation and the perspectives described before and know the structure of the methods to be carried out. To be effective, a facilitator should also know how to fit in and to be authentic. Another facet that strikes us is that the facilitator may be already good at going back and forth between "stepping in and fully engaging, participating, losing themselves in the activity", "standing a bit apart, observing and reflecting on what's going on and nudging / steering the group in better directions" and "stepping out and controlling / directing from the outside". Here we typically expect that it helps to look at what makes for a strong group leader in sports, dance, youth work, and similar – the good facilitators in our experience already bring quite a bit of that to the table. Experience with stage performance also seems to help, especially with stepping in and out.

The need for training for MBD facilitators

Clearly, facilitation does not come naturally without any practice. In our sessions, some teachers/facilitators were better than others in managing aspects of the role. For the industry to pick up on using these MBD methods requires a transferable form of facilitation expertise. Although not all of our students need this, we expect that some should at least learn to lead sessions, rather than only participate in them. This involves methods as well as mastering aspects of didactics, pedagogy, and group work. From our experience, facilitation tasks and skills may be specific to the movement-based design methods being used, and there is a gap from existing general knowledge on

Facilitating Movement -Based Design Method

facilitation of play, movement, and creativity, to more actionable advice on how to specifically do this in a specific setting for a specific activity. Anecdotally, we got the sense that good facilitators, among other things, have learned this in a teacher-apprentice-like setting, in a guided learning-by-doing experience; how to organize that remains for future work.

A critical facet in this concerns the perspective taking. Participants can take different embodied perspectives, or points of view [cf. 7, 28, 30, 32], to the collective MBD activity. However, parti-

cipants must learn how to execute consciously, observe, and verbalize these embodied perspectives through practice [cf. 12, 20, 33]. Additionally, they need to learn when to switch to what perspective in order to obtain new information or validate insights that emerge from the group session. The facilitator has to master these skills to teach them to others and be able to switch between these perspectives within the session to stay connected to the group's lived experience while maintaining a 3rd person overview of the overall process. We noticed that this type of



PlayAlive

Facilitating Movement -Based Design Method

multi-perspective facilitation is quite a demanding and challenging task to do. Working in duo facilitator was a productive way to lighten this workload and enable an observational dialogue whereby facilitators purposefully take different perspectives while working with a group. This helped us form a research perspective to share and validate observations and discuss insights from a shared embodied experiential perspective.

CONCLUSION

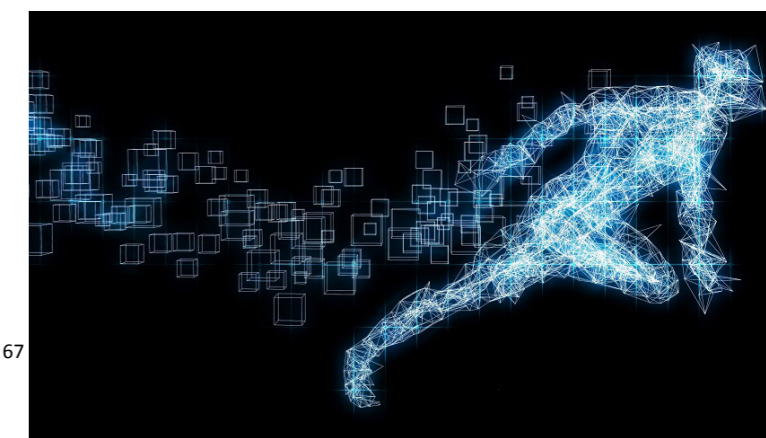
Based on lessons learned in this work, we see a need for a more formally structured conceptual framework for different perspectives on the facilitation of MBD, in addition to and separate from what is known on facilitation of design work in general. Furthermore, we see a need to extend our teaching approaches to include teaching for 'the next level of mastery' of design methods – even though not every single student needs that level of mastery. Future work is needed to address such frameworks and teaching methods in a concrete and actionable way, tailored to the specifics of certain methods. This will therefore also be a particular focus of our own followup work in research and teaching.

ACKNOWLEDGMENTS

This research was supported by the EU Erasmus+ project Method Cards for Movement-based Interaction Design (MeCaMInD), grant number 2020-1-DK01-KA203-075164. We like to thank the other project partners for fruitful discussions, and Nancy Sihmar for her master thesis work in the context of this project providing us with a canvas approach and new points for discussion. We also thank Edwin Dertien for his interest in this project and for sharing insights and intermediate results of his research.

REFERENCES

- [1] Rasmus Vestergaard Andersen, Søren Lekbo, René Engelhardt Hansen, and Lars Elbæk. 2020. Movement-Based Design Methods: A Typology for Designers. In Proceedings of the 14th European Conference on Games Based Learning (University of Southern Denmark, Odense, Denmark). Academic Conferences and Publishing International (ACPI), 637–645. <https://doi.org/10.34190/gbl.20.082>
- [2] Johan Börghall. 2019. At bryde isen. Eget forlag.
- [3] Marion Buchenau and Jane Fulton Suri. 2000. Experience Prototyping. In Proceedings of the 3rd Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques (New York City, New York, USA) (DIS '00). Association for Computing Machinery, New York, NY, USA, 424–433. <https://doi.org/10.1145/347642.347802>
- [4] Yngve Dahl and Kshitij Sharma. 2022. Six Facets of Facilitation: Participatory Design Facilitators' Perspectives on Their Role and Its Realization. In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (New Orleans, LA, USA) (CHI '22). Association for Computing Machinery, New York, NY, USA, Article 484, 14 pages. <https://doi.org/10.1145/3491102.3502013>
- [5] Lars Elbæk and Jørgen Jakob Friis. 2017. Perspectives on a Learning-Model for Innovating Game-Based Movement in Sports and Health. In European Conference on Games Based Learning. Academic Conferences International Limited, 155–164.



Facilitating Movement -Based Design Method

- [6] Cumhur Erkut and Sofia Dahl. 2018. Incorporating Virtual Reality in an Embodied Interaction Course. In Proceedings of the 5th International Conference on Movement and Computing (Genoa, Italy) (MOCO '18). Association for Computing Machinery, New York, NY, USA, Article 45, 6 pages. <https://doi.org/10.1145/3212721.3212884>
- [7] Sarah Fdili Alaoui, Thecla Schiphorst, Shannon Cuykendall, Kristin Carlson, Karen Studd, and Karen Bradley. 2015. Strategies for Embodied Design: The Value and Challenges of Observing Movement. In Proceedings of the 2015 ACM SIGCHI Conference on Creativity and Cognition (Glasgow, United Kingdom) (C&C '15). Association for Computing Machinery, New York, NY, USA, 121–130. <https://doi.org/10.1145/2757226.2757238>
- [8] Roland Graf, Pallavi Benawri, Amy E. Whitesall, Dashiell Carichner, Zixuan Li, Michael Nebeling, and Hun Seok Kim. 2019. IGYM: An Interactive Floor Projection System for Inclusive Exergame Environments. In Proceedings of the Annual Symposium on Computer-Human Interaction in Play (Barcelona, Spain) (CHI PLAY '19). Association for Computing Machinery, New York, NY, USA, 31–43. <https://doi.org/10.1145/3311350.3347161>
- [9] Perttu Hämäläinen, Joe Marshall, Raine Kajastila, Richard Byrne, and Floyd Mueller. 2015. Utilizing gravity in movement-based games and play. In Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play (CHIPLAY'15). 67–77.
- [10] Dale Hunter, Anne Bailey, and Bill Taylor. 2017. The Facilitation of Groups. Routledge.
- [11] Kristina Höök, Baptiste Caramiaux, Cumhur Erkut, Jodi Forlizzi, Nassrin Hajinejad, Michael Haller, Caroline C. M. Hummels, Katherine Isbister, Martin Jonsson, George Khut, Lian Loke, Danielle Lottridge, Patrizia Marti, Edward Melcer, Florian Floyd Müller, Marianne Graves Petersen, Thecla Schiphorst, Elena Márquez Segura, Anna Ståhl, Dag Svanæs, Jakob Tholander, and Helena Tobiasson. 2018. Embracing First-Person Perspectives in Soma-Based Design. *Informatics* 5, 1 (2018), 26 pages. <https://doi.org/10.3390/informatics5010008>
- [12] Wonjun Lee, Youn-kyung Lim, and Richard Shusterman. 2014. Practicing Somaesthetics: Exploring Its Impact on Interactive Product Design Ideation. In Proceedings of the 2014 Conference on Designing Interactive Systems (Vancouver, BC, Canada) (DIS '14). Association for Computing Machinery, New York, NY, USA, 1055–1064. <https://doi.org/10.1145/2598510.2598561>
- [13] Lian Loke and Toni Robertson. 2013. Moving and making strange: An embodied approach to movement-based interaction design. *ACM Transactions on Computer-Human Interaction (TOCHI)* 20, 1 (2013), 1–25.
- [14] Elena Márquez Segura, James Fey, Ella Dagan, Samvid Niravbhai Jhaveri, Jared Pettitt, Miguel Flores, and Katherine Isbister. 2018. Designing Future Social Wearables with Live Action Role Play (Larp) Designers. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (Montreal QC, Canada) (CHI '18). Association for Computing Machinery, New York, NY, USA, 1–14. <https://doi.org/10.1145/3173574.3174036>
- [15] Elena Márquez Segura, Annika Waern, Luis Parrilla Bel, and Laia Turmo Vidal. 2019. Super Trouper: The Playful Potential of Interactive Circus Training. In Extended Abstracts of the Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts (Barcelona, Spain) (CHI PLAY '19 Extended Abstracts). Association for Computing Machinery, New York, NY, USA, 511–518. <https://doi.org/10.1145/3341215.3356282>

Facilitating Movement -Based Design Method

- [16] Genevieve Mosely, Lina Markauskaite, and Cara Wrigley. 2021. Design facilitation: A critical review of conceptualisations and constructs. *Thinking Skills and Creativity* 42 (2021), 100962. <https://doi.org/10.1016/j.tsc.2021.100962>
- [17] Genevieve Mosely, Natalie Wright, and Cara Wrigley. 2018. Facilitating design thinking: A comparison of design expertise. *Thinking Skills and Creativity* 27 (2018), 177–189. <https://doi.org/10.1016/j.tsc.2018.02.004>
- [18] Floyd Mueller and Damon Young. 2018. 10 Lenses to Design Sports-HCI. *Foundations and Trends® in Human-Computer Interaction* 12, 3 (2018), 172–237. <https://doi.org/10.1561/11000000076>
- [19] Elena Márquez Segura, Laia Turmo Vidal, and Asreen Rostami. 2016. Bodystorming for Movement-Based Interaction Design. *Human Technology* 12 (11 2016), 193–251. <https://doi.org/10.17011/hturn.201611174655>
- [20] Hilary O'Shaughnessy and Nicholas Ward. 2014. The Use of Physical Theatre Improvisation in Game Design. In Proceedings of the 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational (Helsinki, Finland) (NordCHI '14). Association for Computing Machinery, New York, NY, USA, 588–597. <https://doi.org/10.1145/2639189.2639258>
- [21] Solip Park, Perttu Hämäläinen, Annakaisa Kultima, Laia Turmo Vidal, Elena Márquez Segura, and Dennis Reidsma. 2022. Move to Design: Tactics and challenges of playful movement-based interaction designers' experiences during the Covid-19 pandemic. In FDG'22: Proceedings of the 17th International Conference on the Foundations of Digital Games (Athens, Greece). Association for Computing Machinery, New York, NY, USA, 14 pages. <https://doi.org/10.1145/3555858.3555925>
- [22] Dees Postma, Robby W. van Delden, Jeroen H. Koekoek, Wytse W. Walinga, Ivo van Hilvoorde, Bert Jan F. van Beijnum, Fahim A. Salim, and Dennis Reidsma. 2022. A Design Space of Sports Interaction Technology. *Foundations and Trends® in Human-Computer Interaction* 15, 3-4 (2022), 249–433. <https://doi.org/10.1561/11000000076>
- [23] Dees B.W. Postma, Robby W. van Delden, Wytse Walinga, Jeroen Koekoek, Bert Jan F. van Beijnum, Fahim A. Salim, Ivo M. van Hilvoorde, and Dennis Reidsma. 2019. Towards Smart Sports Exercises: First Designs. In Extended Abstracts of the Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts (Barcelona, Spain) (CHI PLAY '19 Extended Abstracts). Association for Computing Machinery, New York, NY, USA, 619–630. <https://doi.org/10.1145/3341215.3356306>
- [24] Cynthia Putnam, Amanda Lin, Vansanth Subramanian, Dorian C. Anderson, Erica Christian, Bharathi Swaminathan, Sai Yalla, William Cotter, Danielle Ciccone, and Jinghui Cheng. 2017. Effects of Commercial Exergames on Motivation in Brian Injury Therapy. In Extended Abstracts Publication of the Annual Symposium on Computer-Human Interaction in Play (Amsterdam, The Netherlands) (CHI PLAY '17 Extended Abstracts). Association for Computing Machinery, New York, NY, USA, 47–59. <https://doi.org/10.1145/3130859.3131431>
- [25] Dee Reynolds and Matthew Reason. 2012. Kinesthetic empathy in creative and cultural practices. Intellect Books.
- [26] Dennis Schleicher, Peter Jones, and Oksana Kachur. 2010. Bodystorming as Embodied Designing. *Interactions* 17, 6 (nov 2010), 47–51. <https://doi.org/10.1145/1865245.1865256>
- [27] Jeff Sinclair, Philip Hingston, and Martin Masek. 2007. Considerations for the Design of Exergames. In Pro-

Facilitating Movement -Based Design Method

ceedings of the 5th International Conference on Computer Graphics and Interactive Techniques in Australia and Southeast Asia (Perth, Australia) (GRAPHITE '07). Association for Computing Machinery, New York, NY, USA, 289–295. <https://doi.org/10.1145/1321261.1321313>

[28] Wina Smeenk, Koen Van Turnhout, and Oscar Tomico. 2016. A Systematic Analysis of Mixed Perspectives in Empathic Design: Not One Perspective Encompasses All. *International Journal of Design* 10 (08 2016), 31–48.

[29] Justyna Starostka, Majbritt Evald, Ann Clarke, and Per Hansen. 2021. Taxonomy of design thinking facilitation. *Creativity and Innovation Management* 30 (07 2021). <https://doi.org/10.1111/caim.12451>

[30] Dag Svanæs and Louise Barkhuus. 2020. The Designer's Body as Resource in Design: Exploring Combinations of Point-of-View and Tense. Association for Computing Machinery, New York, NY, USA, 1–13.

[31] Lauren Tan. 2012. Understanding the Different Roles of the Designer in Design for Social Good: A Study of Design Methodology in the DOTT 07 (Designs of the Time 2007) Projects. Ph. D. Dissertation. University of Northumbria.

[32] O. Tomico, V. O. Winthagen, and M. M. G. van Heist. 2012. Designing for, with or within: 1st, 2nd and 3rd Person Points of View on Designing for Systems. In *Proceedings of the 7th Nordic Conference on Human-Computer Interaction: Making Sense Through Design (Copenhagen, Denmark) (NordCHI '12)*. Association for Computing Machinery, New York, NY, USA, 180–188. <https://doi.org/10.1145/2399016.2399045>

[33] Vasiliki Tsaknaki, Madeline Balaam, Anna Ståhl, Pe-

dro Sanches, Charles Windlin, Pavel Karpashevich, and Kristina Höök. 2019. Teaching Soma Design. In *DIS '19: Proceedings of the 2019 on Designing Interactive Systems Conference*. 1237–1249. <https://doi.org/10.1145/3322276.3322327>[34][34] Laia Turmo Vidal and Elena Márquez Segura. 2018. Documenting the Elusive and Ephemeral in Embodied Design Ideation Activities. *Multimodal Technologies and Interaction* 2, 3 (2018), 40 pages. <https://doi.org/10.3390/mti2030035>

[35] Soojeong Yoo, Marcus Carter, and Judy Kay. 2018. VR-move: Design Framework for Balancing Enjoyment, Movement and Exertion in VR Games. In *Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts (Melbourne, VIC, Australia) (CHI PLAY '18 Extended Abstracts)*. Association for Computing Machinery, New York, NY, USA, 295–307. <https://doi.org/10.1145/3270316.3272054>





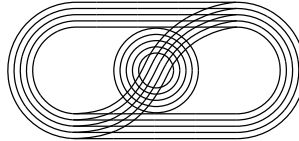
MeCaMInD

Creativity in Motion

Program and MeCaMInD dissemination report edit by: Lars Elbæk

The Method Cards for Movement-based Interaction Design (MeCaMInD) project explores how we can make a navigable and actionable method card toolbox in human-computer interaction, sport & movement.

MeCaMInD also focuses on disseminating, as in the Nordic Sports Innovation Summit, the insights of the toolbox to students and design professionals across disciplines, as well as providing a greater understanding of how to create and enhance a movement-based creative design environment.



DEPARTMENT OF SPORTS SCIENCE AND
CLINICAL BIOMECHANICS

Erasmus+

ISBN: 978-87-94345-28-6

