

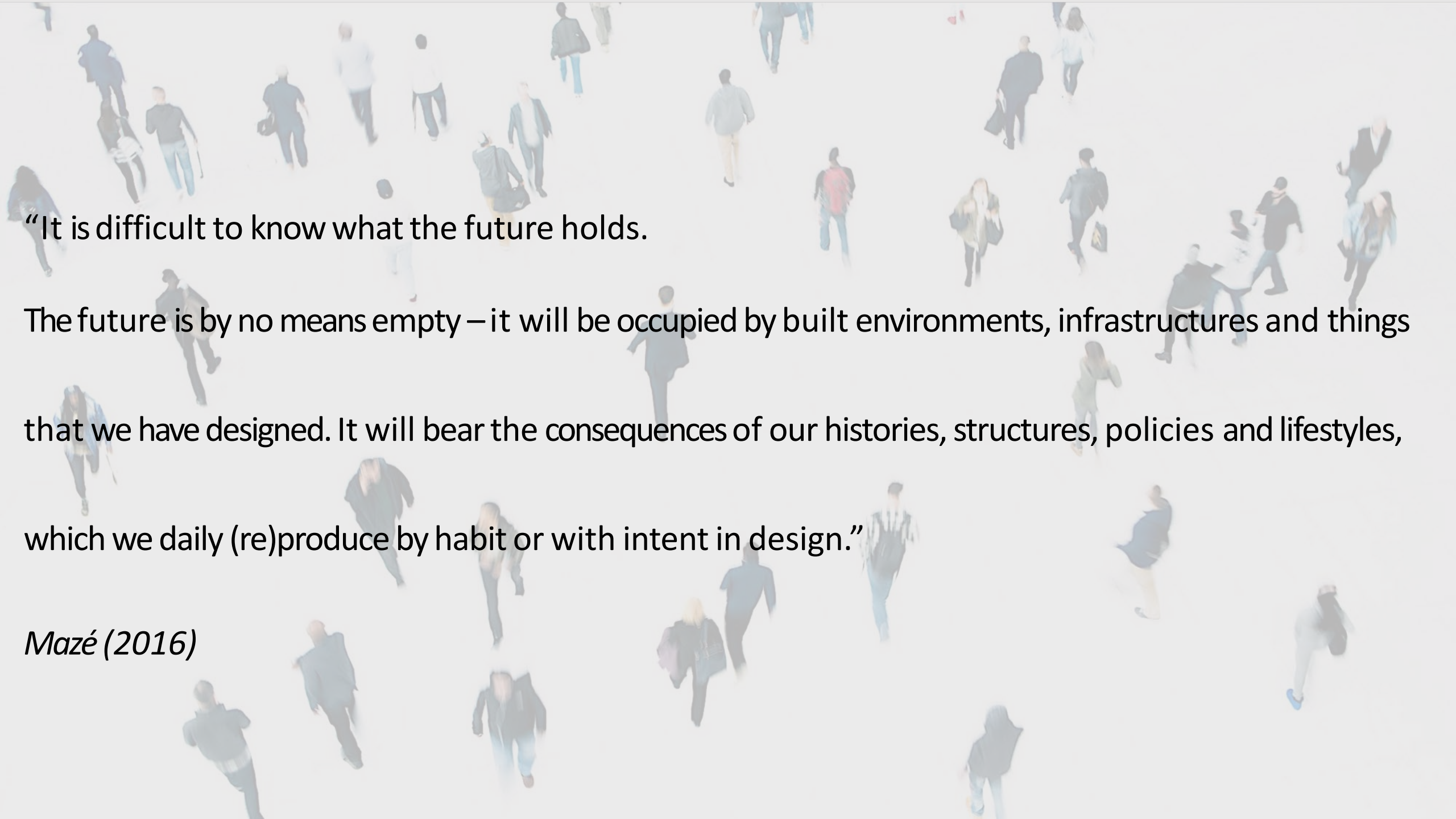
Everything begins and ends with humans



INNOVATION  
SCHOOL  
THE GLASGOW  
SCHOOL OF ART

LIVING  
MACHINES

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“It is difficult to know what the future holds.

The future is by no means empty – it will be occupied by built environments, infrastructures and things that we have designed. It will bear the consequences of our histories, structures, policies and lifestyles, which we daily (re)produce by habit or with intent in design.”

*Mazé (2016)*





# Innovation

Research methodologies such as Constructivist Grounded Theory facilitate explore and understanding of user needs requirements though the iterative process of data collection whilst searching for variation as a comparative exercise.

This offers innovative opportunity due to its focus on people and the recognition of innovation opportunity as theory develops (Charmaz)



“Innovation and research practices must consider democratized voices and user experiences as valuable catalysts to creativity and technology well-being for all” (Marston, Shore, et al., 2022)

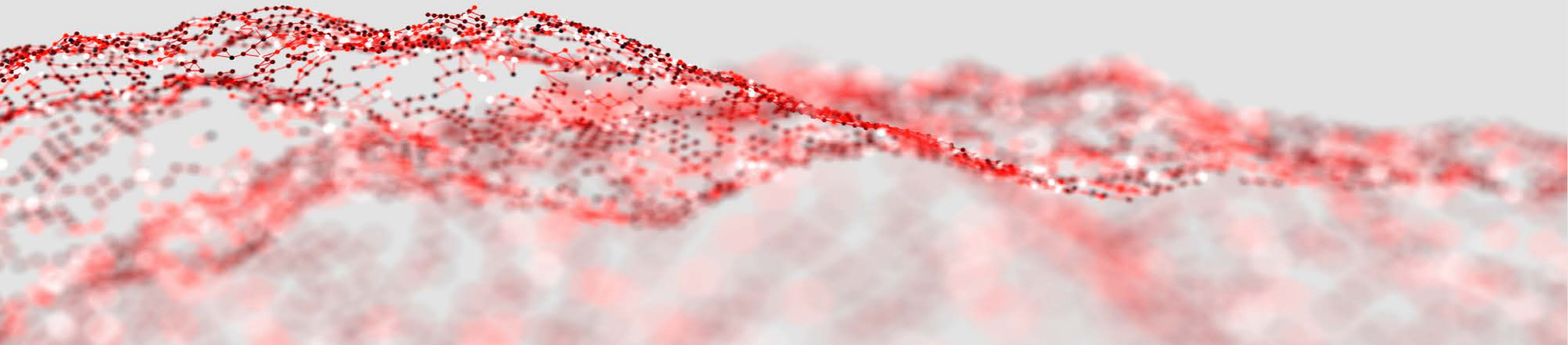


# Innovation

In addition, the value of anthropological approaches that relate culture, day to day experiences and user observation is linked to an innovations rate of adoption (Rogers, 2003)

Observing people using products and services can lead to the discovery of unmet and unarticulated needs which can lead to a breakthrough in innovation (Shore, 2019)

Design and context of use are important factors to innovation in terms of adoption; however, Technology Readiness Levels can be indicators of adoption and uptake (Östlund, et al., 2023)



# TRL's = Technology innovation success?

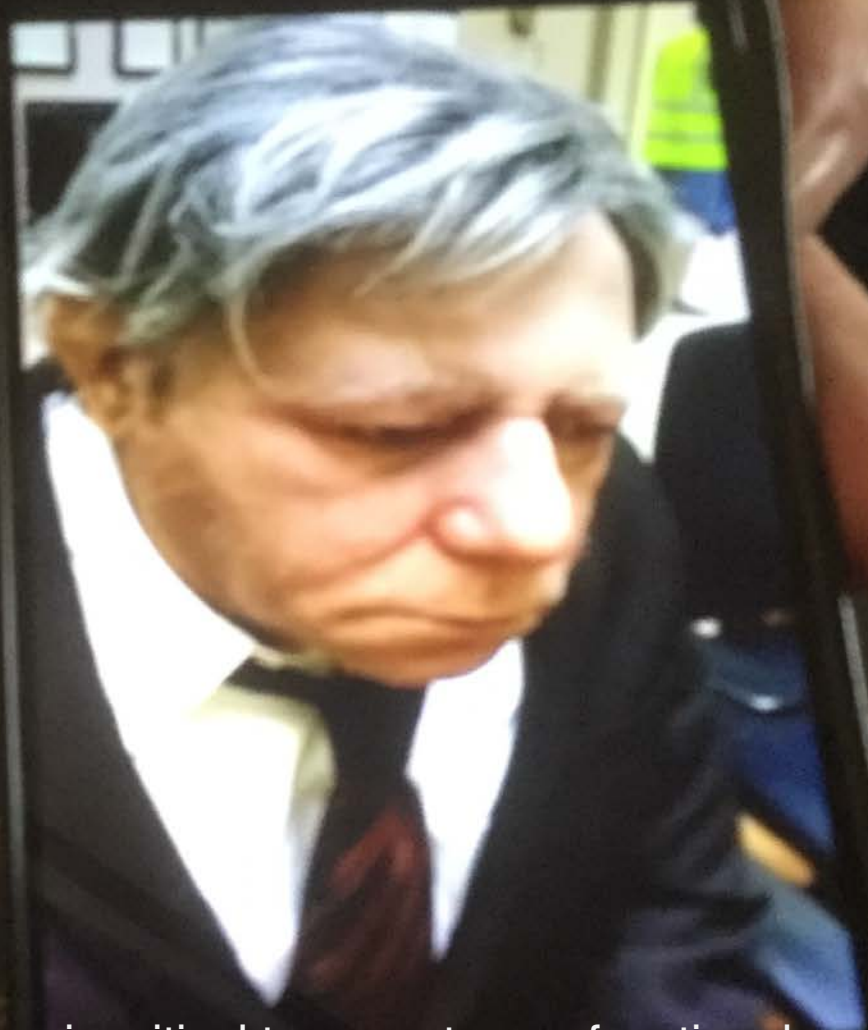
Technology Readiness Levels are often relied on to define a success of a technology innovation, as an example – ReWalk, and Paro the seal - established devices and on the market TRL 8-9 (Bodenhagen, et al., 2019)



Early in development of a technology device, it is also important to consider and immerse in the worlds and understand the lived experiences of the people we are designing for....



# Embodiment



Good quality machine and body connective awareness is critical to acceptance, functional recovery and adoption of robotic assistive devices.

In addition, discovering human or mechanical preferences and perceptions by users can optimise adoption (Shore, 2019)

# Technology Acceptance

TAMs (Technology Acceptance Model) are applied typically as a means to predict user acceptance of a technological application  
(Shore, 2019)



There are few TAMs that evaluate or predict user adoption or acceptance of robotic assistive devices – Exoscore is a specific design tool offering phased insights to understanding perceptions to exoskeletons and facilitates concept iteration  
(Shore et al., 2019)



# Technology Adoption

Assistive robot usage can carry the stigma of being dependent or declining in abilities and presents a barrier to technology adoption.

User-centred design can also be used to de-stigmatise technologies, resulting in a greater probability of acceptance.

Motivation to use technologies can be further enhanced when the technology offers some alternative uses or functionalities aside from those related to healthcare or the provision of assistance.

(Shore, 2019)

# User eXperience...

The importance of UX researchers can enhance the knowledge and inform the design of technologies with approaches such as participatory design sessions, the UX researcher determining the user needs requirements optimise acceptance by stating the perceptions and experiences as shared and expressed by the people.

(Barresi et al., 2022)

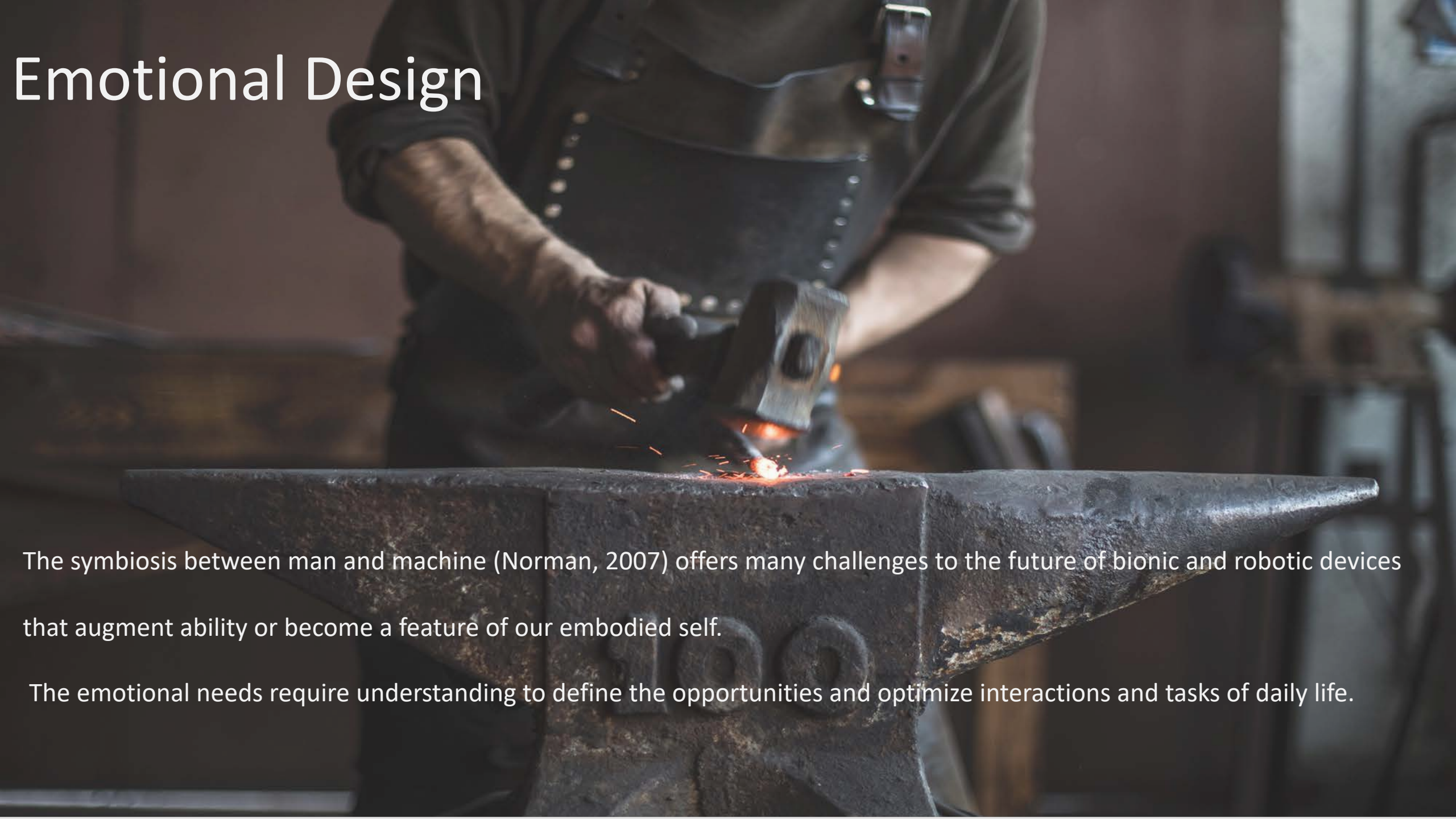








# Emotional Design

A blacksmith is shown in a workshop, wearing a dark shirt and a protective apron. He is using a hammer to shape a piece of glowing red-hot metal on a large, dark anvil. Bright sparks are flying from the point of contact between the hammer and the metal. The background is slightly blurred, showing other parts of the workshop.

The symbiosis between man and machine (Norman, 2007) offers many challenges to the future of bionic and robotic devices that augment ability or become a feature of our embodied self.

The emotional needs require understanding to define the opportunities and optimize interactions and tasks of daily life.



# Universal Design



Design can be viewed as a source for improving life, and awareness of everything that is designed; is made and used by people (EIDD 2004).

Universal design approaches may be helpful to development of robotic assistive technologies (Shore, 2019)

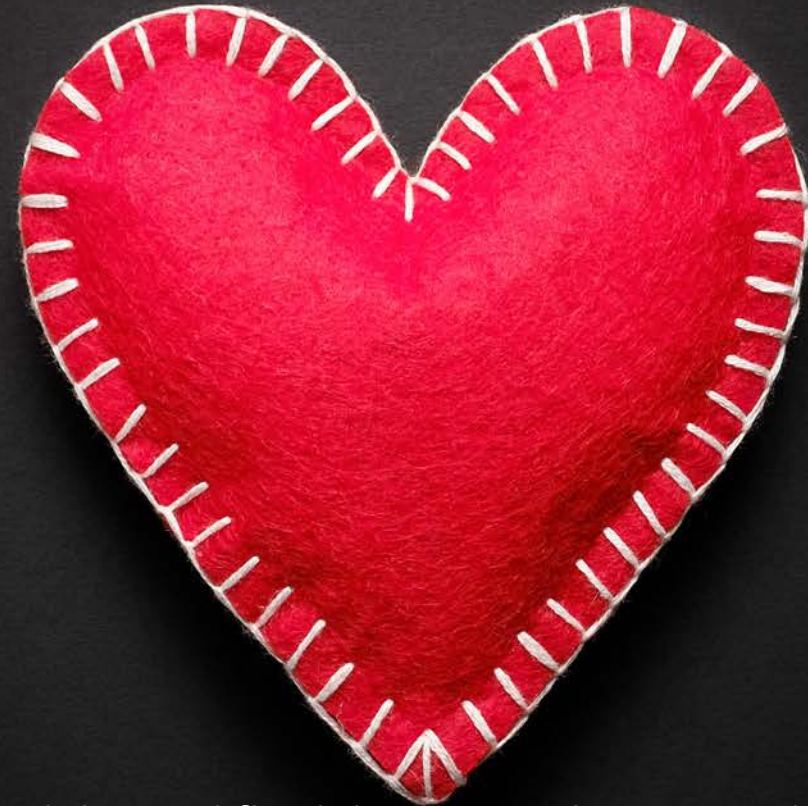






# Lifespan & Abilities

World Health Organization (WHO) –  
health is a state of complete physical, mental, and social well-being, not merely the absence of disease and infirmity



‘Lifespan’ approach to design that features and emphasizes an adaptability and flexibility to match user needs and/or changes

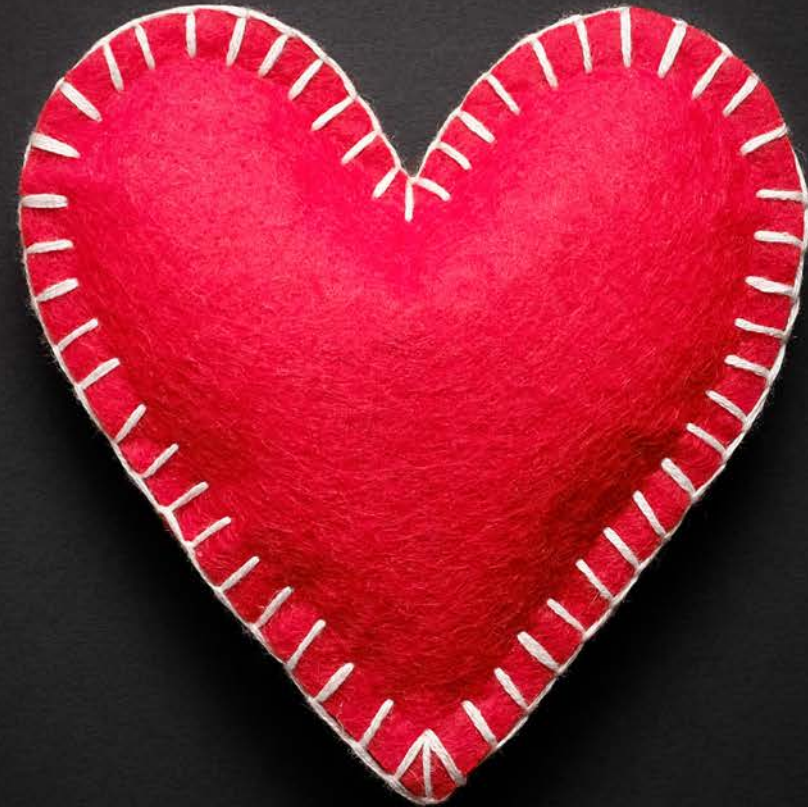
As a result of longer lifespan and medical advances we are now living longer in our own homes, often with some form of functional limitation (Shore, 2019)





# Abilities & Health

World Health Organization (WHO) –  
health is a state of complete physical, mental, and social well-being, not merely the absence of disease and infirmity



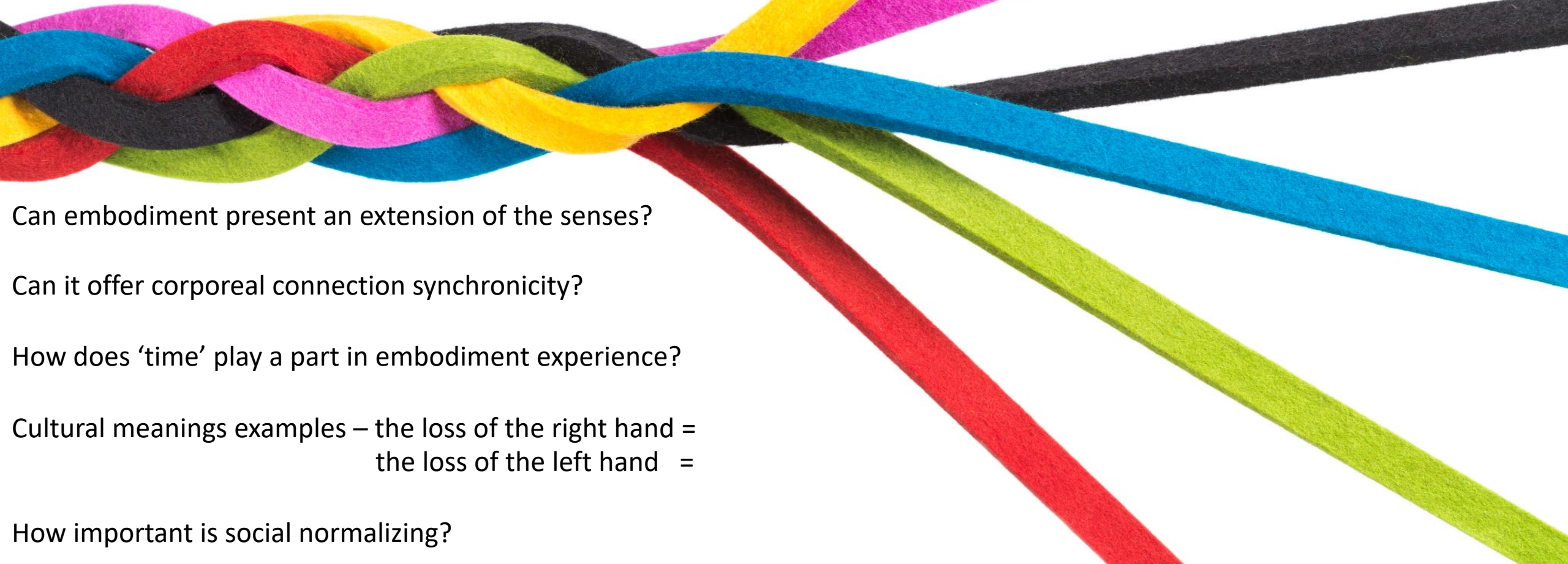
If health is a position of optimum opportunity to perform and engage with life and society –  
robotic and/or embodied interventions can have a place to support the avoidance and absence of disease and infirmity





# Embodiment

Personal, Social, Cultural meanings and impact on embodied experience



Can embodiment present an extension of the senses?

Can it offer corporeal connection synchronicity?

How does 'time' play a part in embodiment experience?

Cultural meanings examples – the loss of the right hand =  
the loss of the left hand =

How important is social normalizing?

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Thank You

Questions?



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