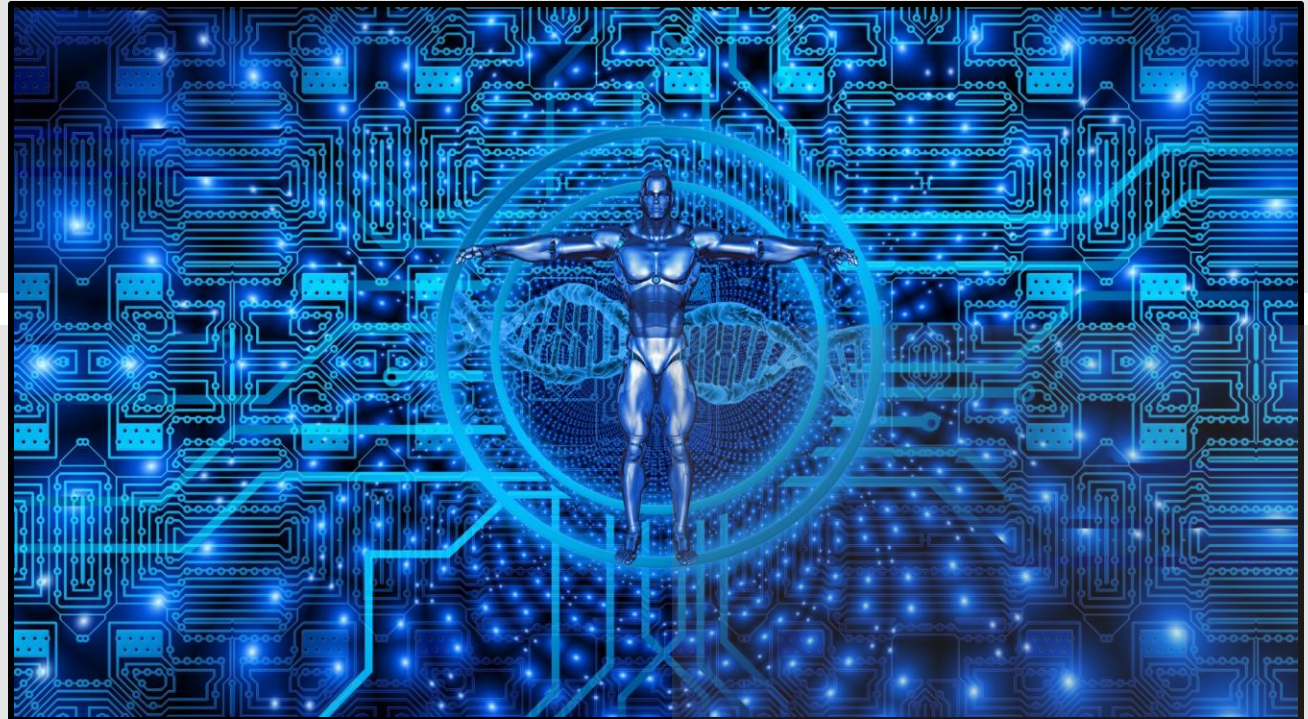


Transdisciplinary
Approaches to
**Advanced
Technology in
Society**

Nicholas C.
Zingale, PhD
EDT Conference
June 24, 2021



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Meet the "future" President of the University of Rijeka



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Advanced Technology in Society

- Is still being defined
- Includes the “silicon future”
- Asks big questions about the future of life



Advanced Technology in Society's “Silicon Future”

- Human-Machine Connections
- Artificial Intelligence (AI)
- Extended Reality (XR)
Augmented Reality (AR) | Virtual Reality (VR) | User Experience (UX)



Advanced Technology in Society's "Silicon Future"

Case Western Reserve research team from new Human Fusions institute aims for \$10 million Avatar XPrize competition; winner will best 'transport a human's sense, actions and presence' to another place

...Tyler has been on a mission to extend ... space and time. ... to the

In 15 years at Case Western Reserve, Tyler has been on a mission to extend his physical touch—the "essence of the physical touch"—the "essence of the physical touch" that drive has led to groundbreaking work in prosthetics and the body's nervous system to provide a prosthetic touch to a prosthesis so an amputee can feel a tomato—fundamentally changing the way we think about touch. Now Tyler, the Kent H. Smith Professor of Case School of Engineering,

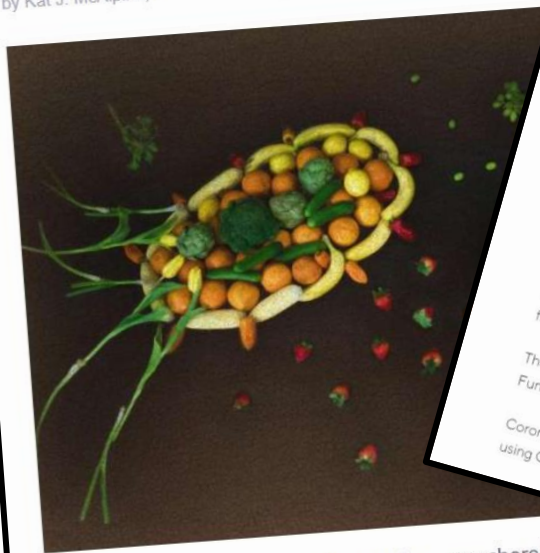
To Stem Suicide and Sexual Assault, the Air Force Dons Headsets

Officials are hoping that an immersive virtual reality experience aimed at getting airmen to intervene will succeed where years of traditional training have failed.



Beyond synthetic biology, synthetic ecology boosts health by engineering the environment

by Kat J. McAlpine, Boston University



In a new *Nature Communications* study, researchers from BU's Micro...

There's a lot of interest right now in how different microbiomes—like the one made up of all the bacteria in our guts—could be harnessed to boost human health and cure disease. But Daniel Segrè has set his sights on a much more ambitious vision for how the microbiome could be manipulated for good: "To help

Artificial intelligence to predict heart disease

31 MAY 2021 | 2 MINS

A new project using artificial intelligence technology could spell a medical breakthrough for people suffering from, or at risk of, coronary artery disease, the single leading cause of death in Australia. The approach being developed by researchers at The University of Western Australia could allow for more accurate diagnosis and faster reporting across all aspects of healthcare, improving the quality and consistency of patient care. The UWA team of experts in cardiac imaging and artificial intelligence was awarded \$896,606 through a Medical Research Future Fund Frontiers grant to develop a tool to predict the risk of coronary heart disease from heart computed tomography (CT) scans. Coronary artery disease resulting from the build-up of plaque affects more than 1.2 million Australians; however traditional methods using CT imaging of the heart are cumbersome, time-consuming and may have limited accuracy.

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Advanced Technology in Society's "Silicon Future"

Beauty filters are changing the way young girls see themselves

The most widespread use of augmented reality isn't in gaming: it's the face filters on social media. The result? A mass experiment on girls and young women.

by **Tate Ryan-Mosley**

April 2, 2021

started using filters to edit pictures of herself on social media when she was 13 years old. She remembers everyone in her middle school being on Snapchat. "Technology when it became available, and they had fun playing with it," she says. "People weren't trying to look good

'Some people feel threatened': face to face with Ai-Da the robot artist

Self-portraits by ultra-realistic android go on show at Design Museum in London



▲ Ai-Da, described as the world's first ultra-realistic robot artist, at the opening of the exhibition Ai-Da: Portrait of the Robot, at the Design Museum in London. Photograph: David Parry/PA

She, if it can be called a she, began her career with abstract art but has now moved to self, if they can be called self, portraits and they are alarmingly

'Engineered pandemic' as big a threat as nuclear war, report warns

One in six chance that a catastrophic event could occur in next 100 years, expert calculates

By Anne Gulland, GLOBAL HEALTH SECURITY DEPUTY EDITOR
2 June 2021 · 7:00am



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Advanced Technology in Society's "Silicon Future" The Interactive Biography of Stanley Bernath

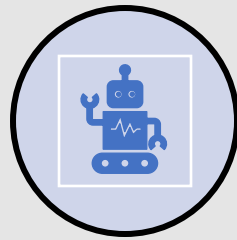


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Advanced Technology in Society's Big Questions



How are these technologies shaping and reshaping our human experience?



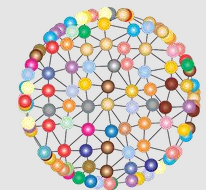
How are technologies influencing the ways we interact?



What do we want technologies to do for us/humanity?



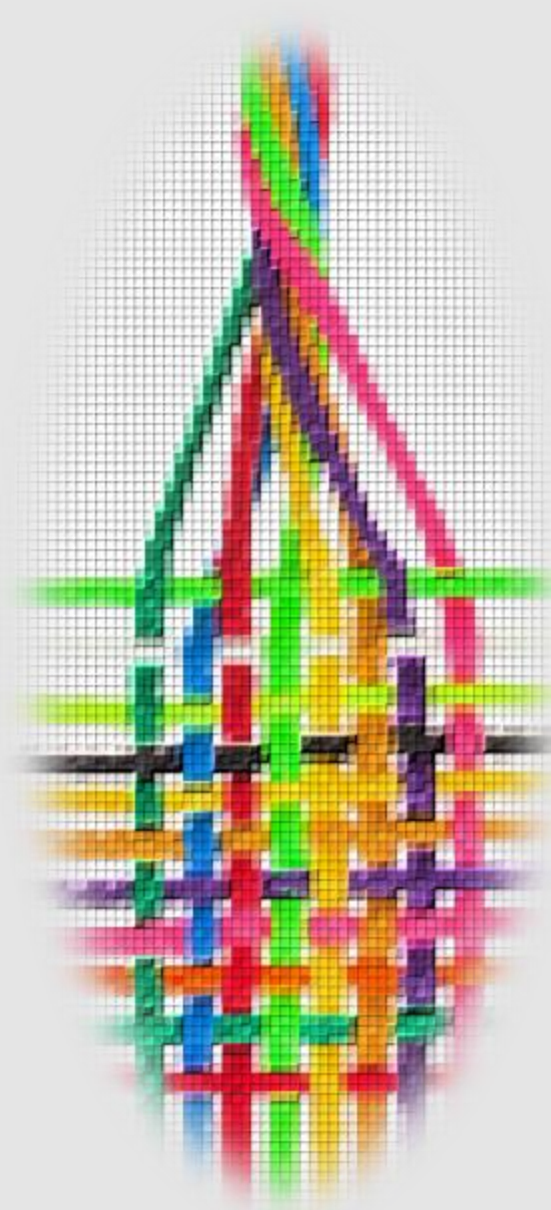
What do we want the future of life to look and feel like?



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Advanced Technology in Society's Need for Transdisciplinarity

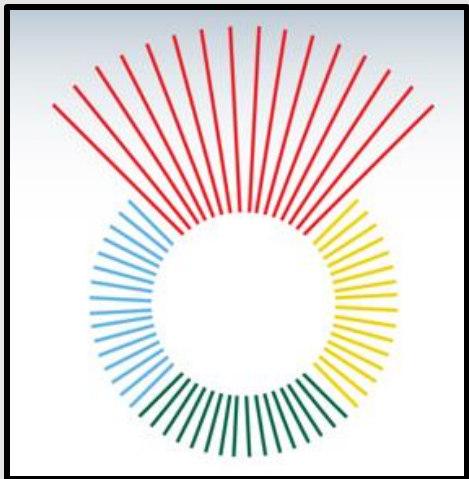
- It is impossible to answer these questions from one perspective, like engineering or business.
- Big questions require transdisciplinary approaches.
- TD allows us to tackle wicked social challenges and not get stuck in retrospective thinking/learning.
- Wicked problems do not have one clear answer, are intertwined with other social challenges.
- TD transcends boundaries that silo disciplines and divide university from community.
- TD allows for us to see problems in a new way, thus generate new knowledge/ideas for solutions.
- TD will also help us keep humanity at the core of the questions we ask and solutions we seek.



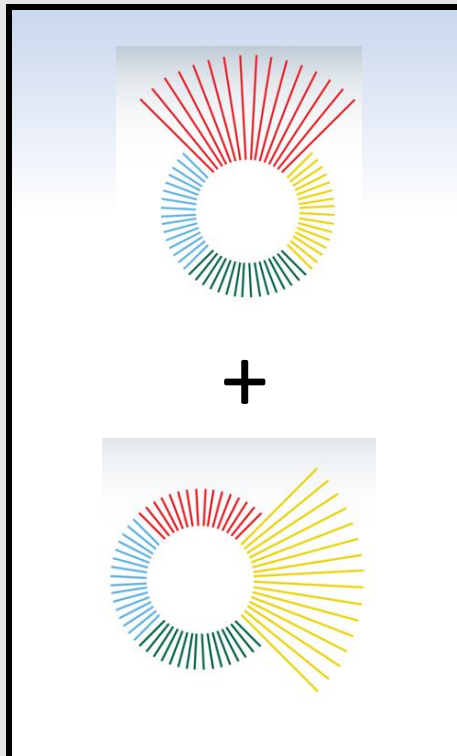
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Transdisciplinarity

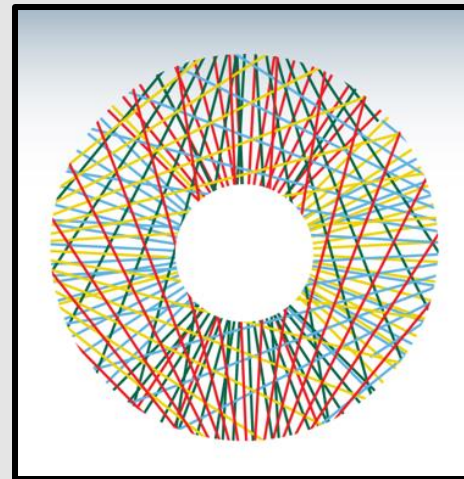
Monodisciplinary



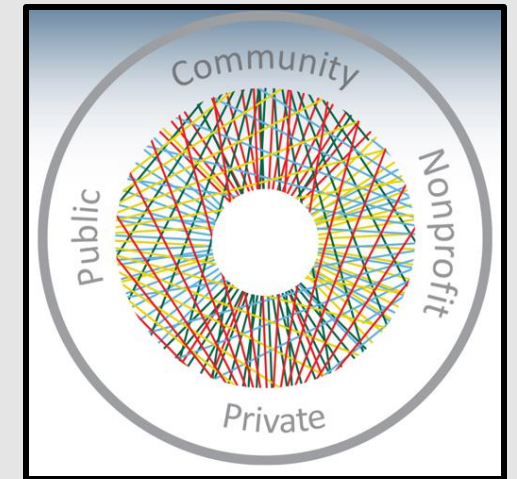
Multidisciplinary



Interdisciplinary



Transdisciplinary



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Case Study: the transfer of touch over distance via neuroreality™



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Case Study: a multi-university, transdisciplinary team



Biomedical Engineering
Electrical Engineering
Computer & Data Science



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Human-Centered Convergent Research



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Urban Affairs, Public Administration
Transdisciplinary Studies



University of Colorado
Boulder

Mechanical Engineering



Mechanical & Aerospace Engineering



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OF WYOMING

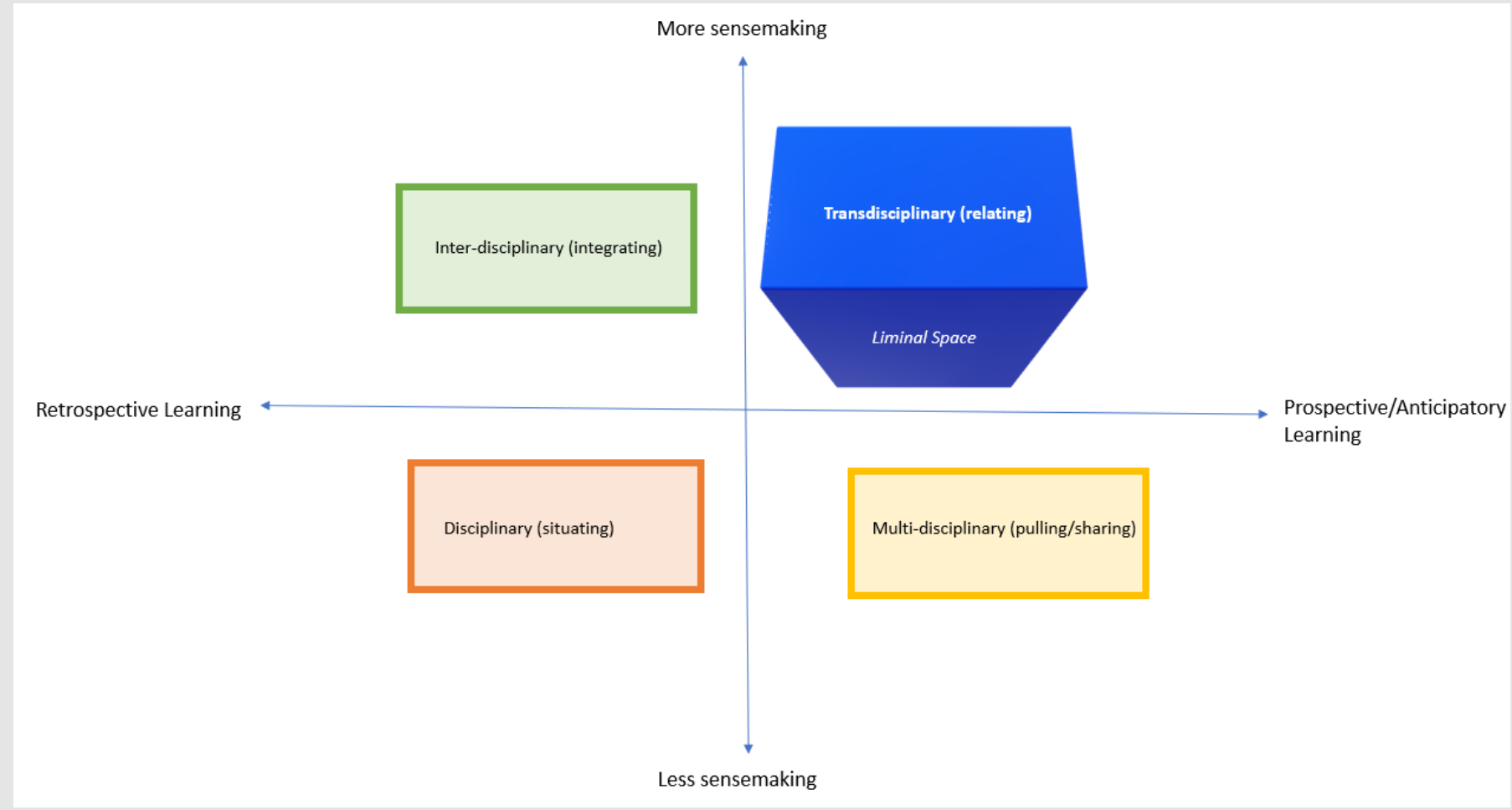
Politics, Public Affairs, Int'l Studies

**Carnegie
Mellon
University**

Sensory & Cognitive Neuroscience

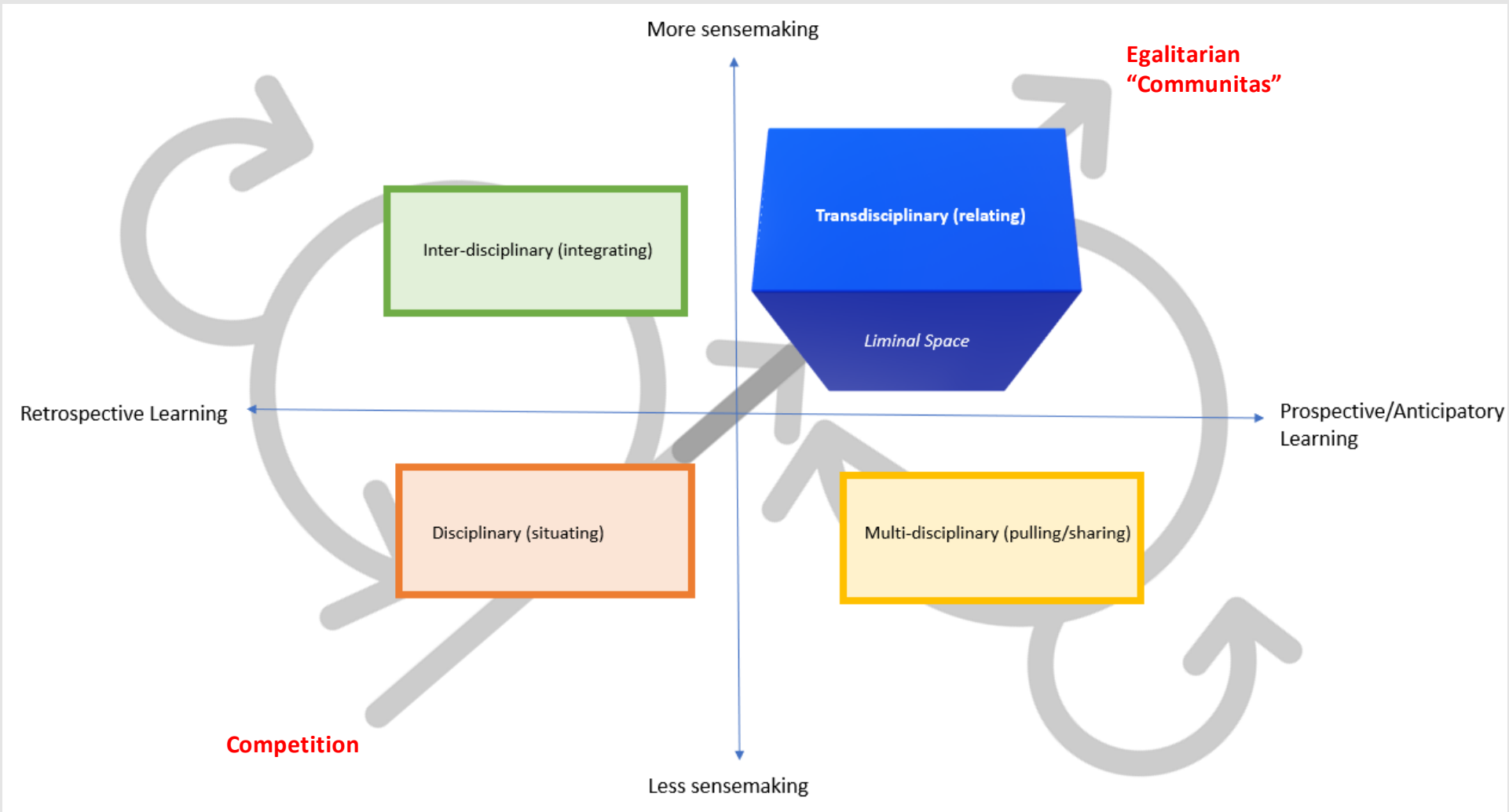
Transdisciplinarity

Towards Greater Sensemaking and Anticipatory Learning

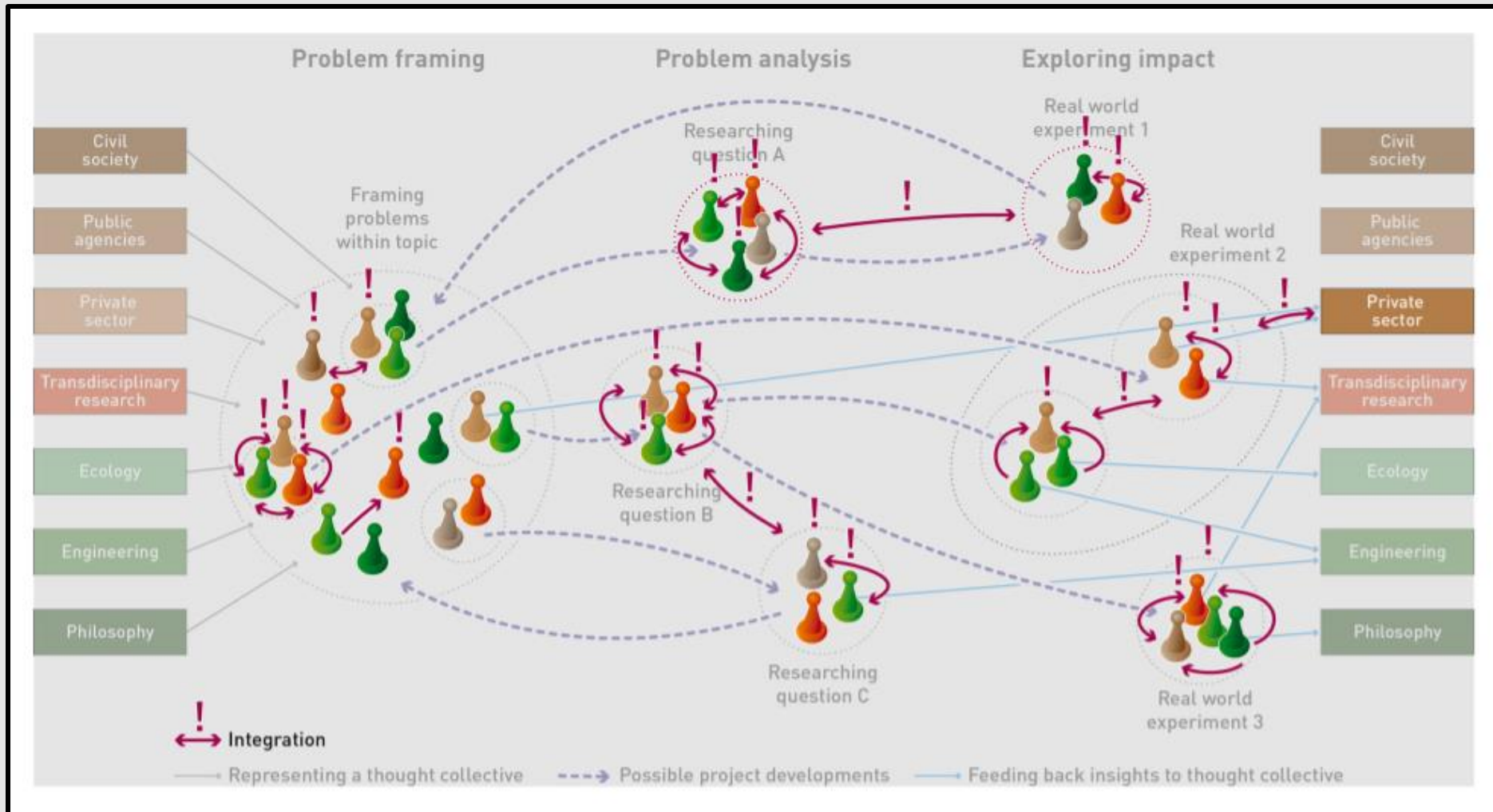


Transdisciplinarity

An Iterative Process: From Competition to Egalitarian



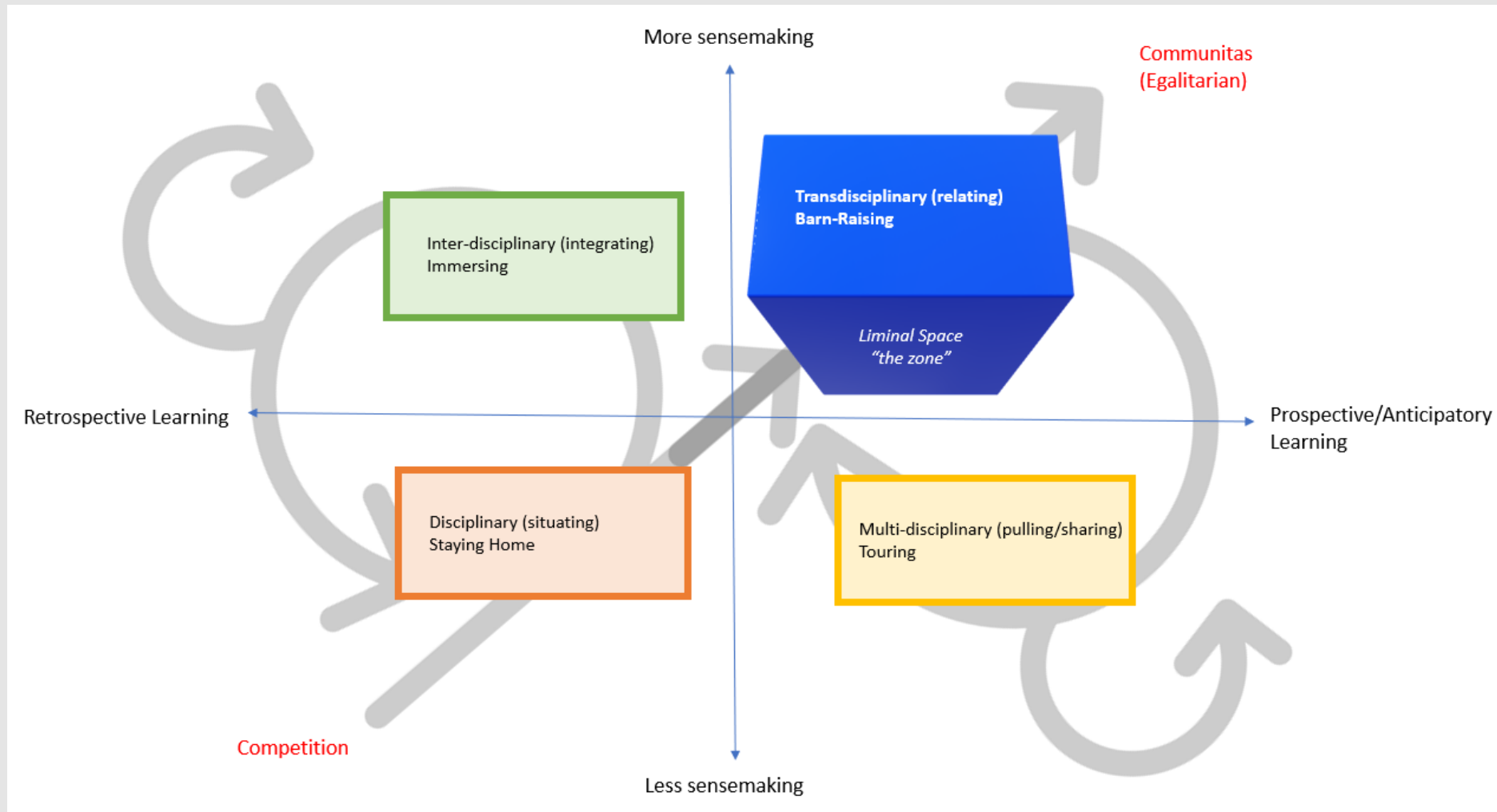
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Model taken from Pohl et al. 2021

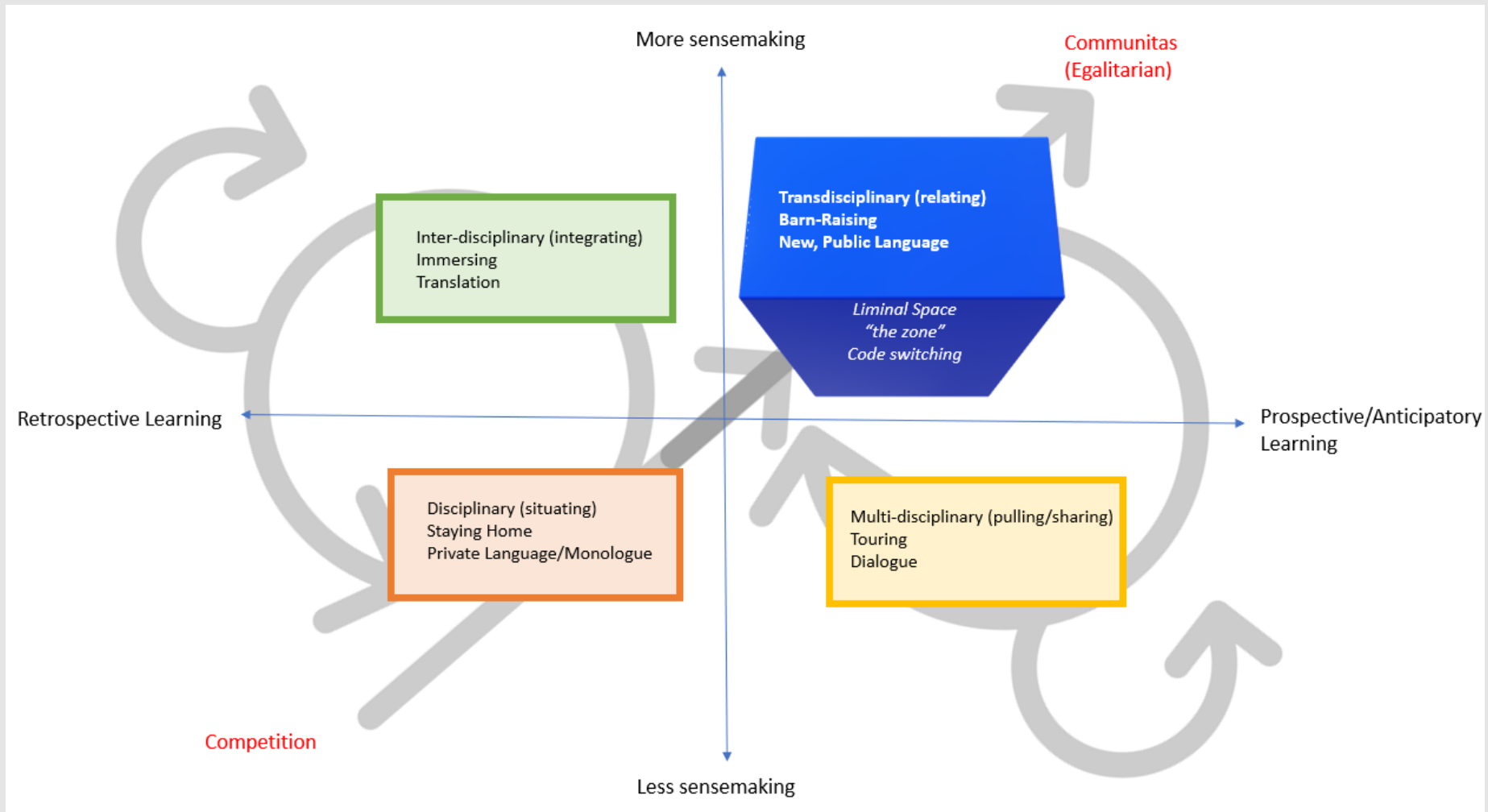
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Interacting: From Staying Home to Barn-Raising



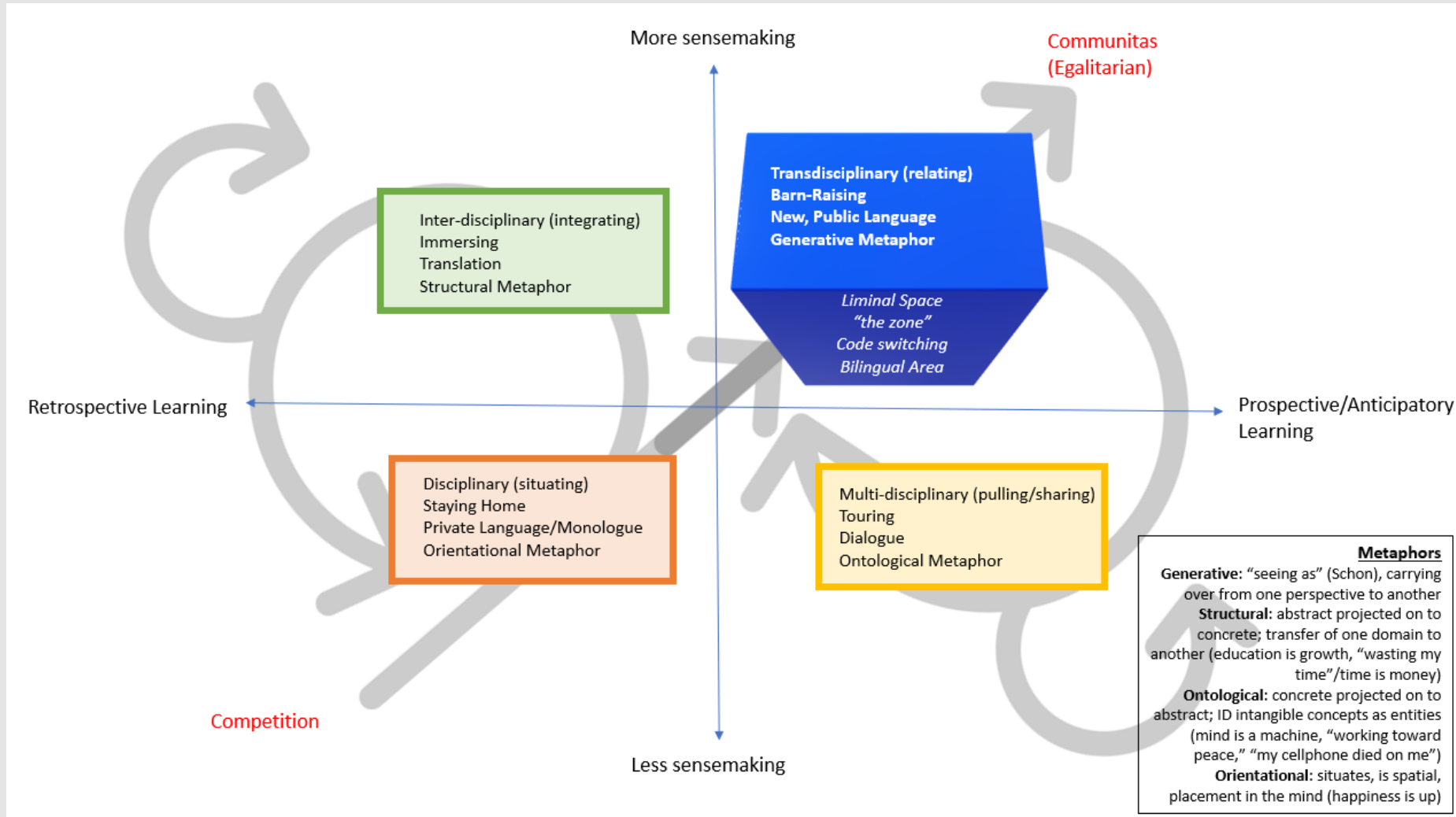
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Language: from Private to Public



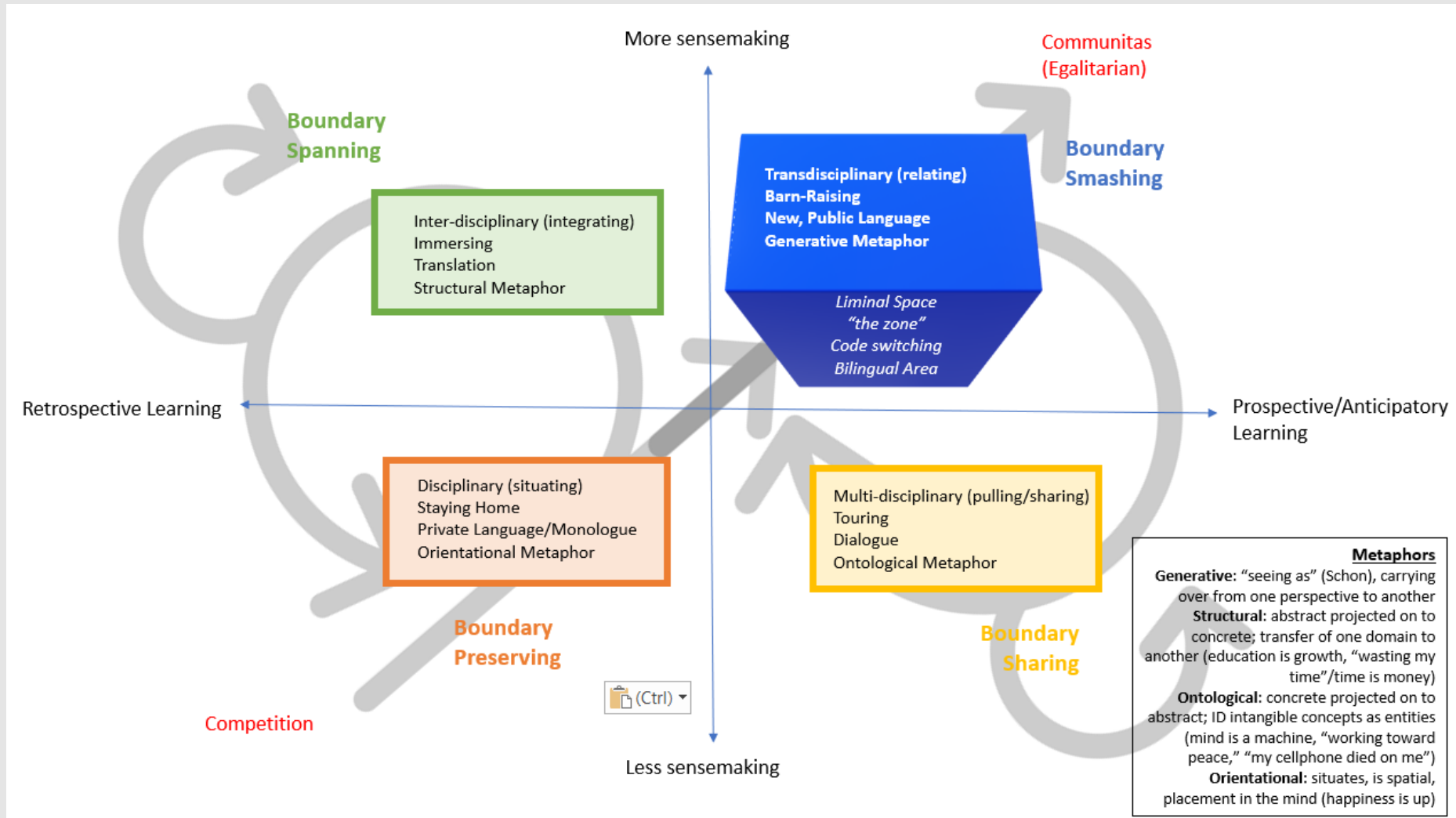
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Boundary Objects: Generative Metaphors

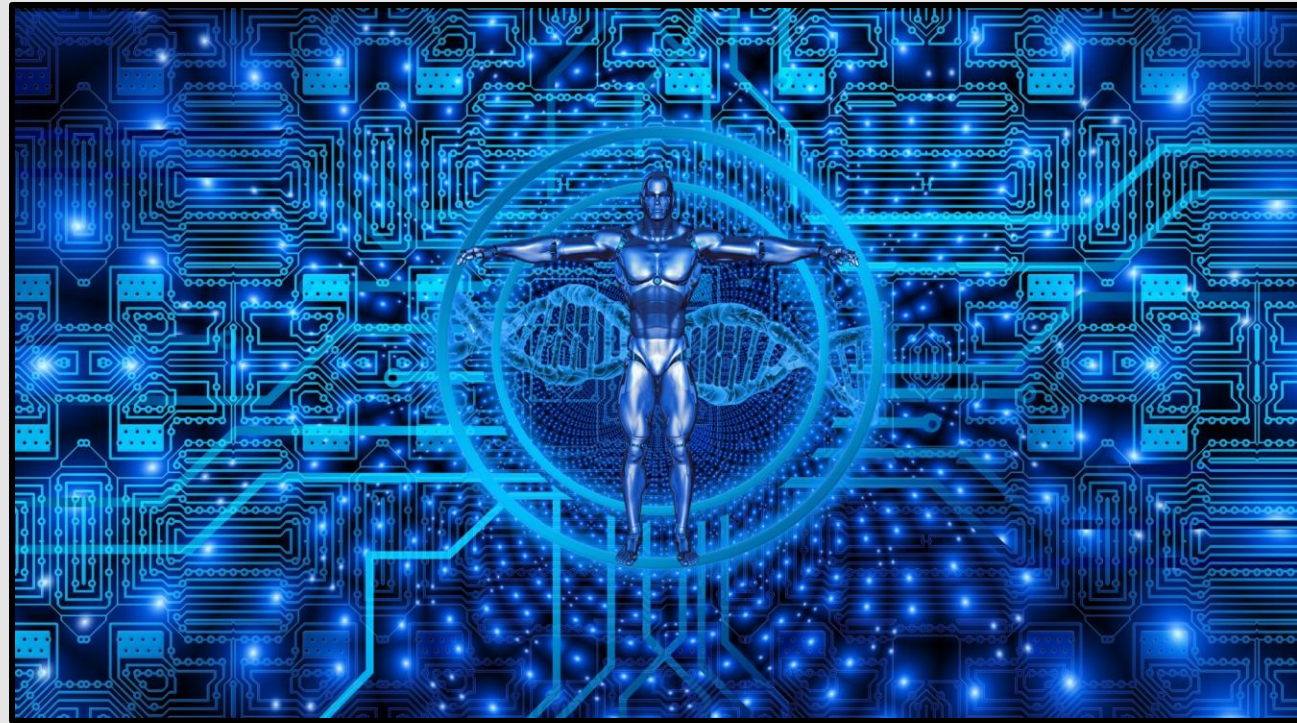


Transdisciplinarity

Boundaries: from Preserving to Smashing



Transdisciplinarity and Advanced Technology in Society



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Questions and
comments?



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