Supervising Interdisciplinary Theses

TEACHING FOR SUSTAINABILITY | 12 OCTOBER 2023

Provide the protected time and space to reflect on your own approach to supervising interdisciplinary thesis, inspired by the content and discussions during the seminar

Invitation

- Becoming present
    - Calming breaths
    - Check-in with your body
    - Set your intention
    - Something else
    - Nothing else

Agenda

- Introduction

- Conceptual Understanding & Boundary Setting
  - → Concept Mapping

- General Approaches to Supervision

- Opportunities and Challenges

- Supervising Interdisciplinary Theses
  - Student Learning
  - Supervision Approaches
  - Student Competencies

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Introduction

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DIVISION FOR HIGHER EDUCATION DEVELOPMENT

A specialised pedagogical support unit, tasked with advancing educational excellence across all academic levels at Lund University.

Teaching for Sustainability

Serves as a **hub** for educators at Lund University, offering a platform for training, resources, and community building

- Name

- Department & Faculty

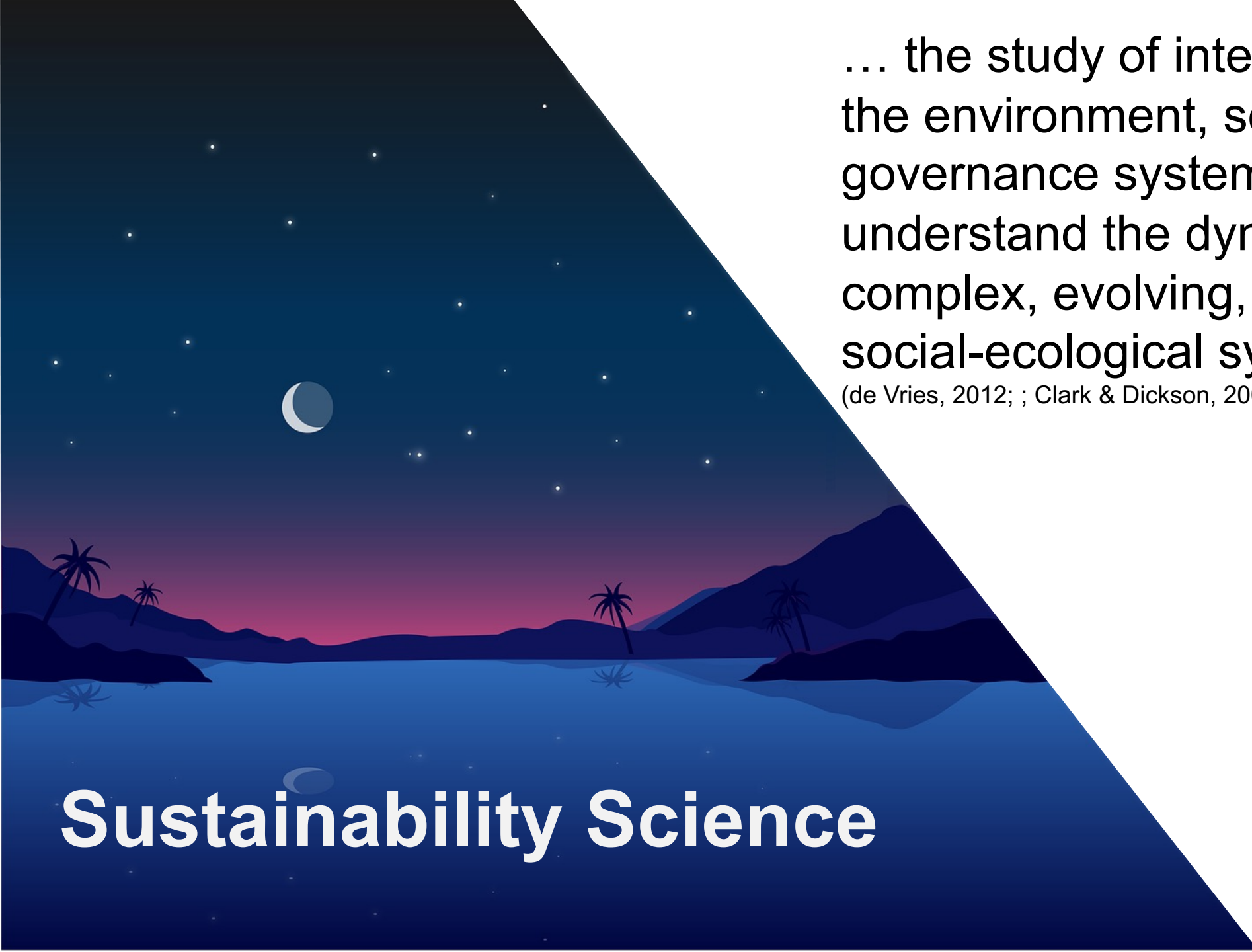- Experience Supervising

- Question, Comment, Curiosity

Conceptual Understanding & Boundary Setting

Conceptual Understanding

- Sustainability

- Interdisciplinary

- Supervision

… the study of interactions between the environment, society, and the governance system in order to understand the dynamics of the complex, evolving, and coupled social-ecological systems

(de Vries, 2012; ; Clark & Dickson, 2003)

Sustainability Science

… an emerging interdisciplinary discipline "… that seeks to understand the fundamental character of interactions between nature and society"

(Kates et al., 2001)
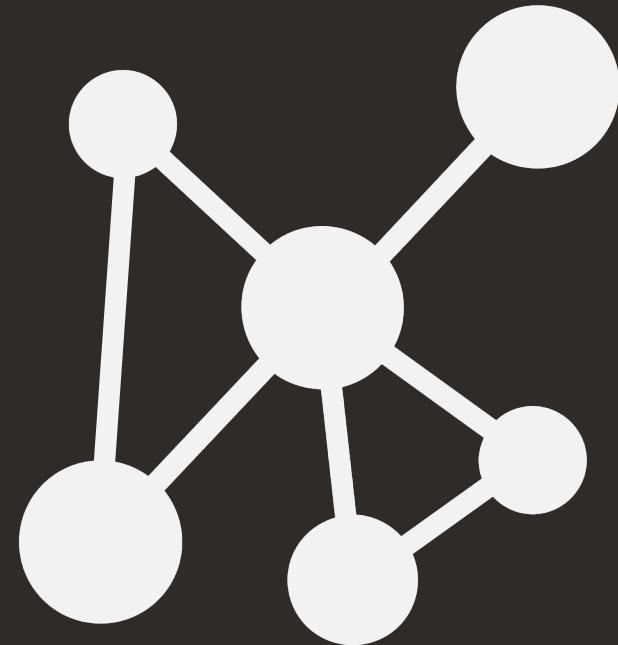
Sustainability Science

INTERDISCIPLINARY

Definitional Clarity

Concept Map

- A networked visualisation that organises and represents knowledge about a particular subject
  - Hierarchical Structure
  - Labelled Relationships
  - Cross-Links
  - Multiple Connections

Concept Map

- To establish a common understanding and vocabulary around the chosen concept(s).

- To identify relationships between related concepts.

- To consider boundaries that guide literature review or research.
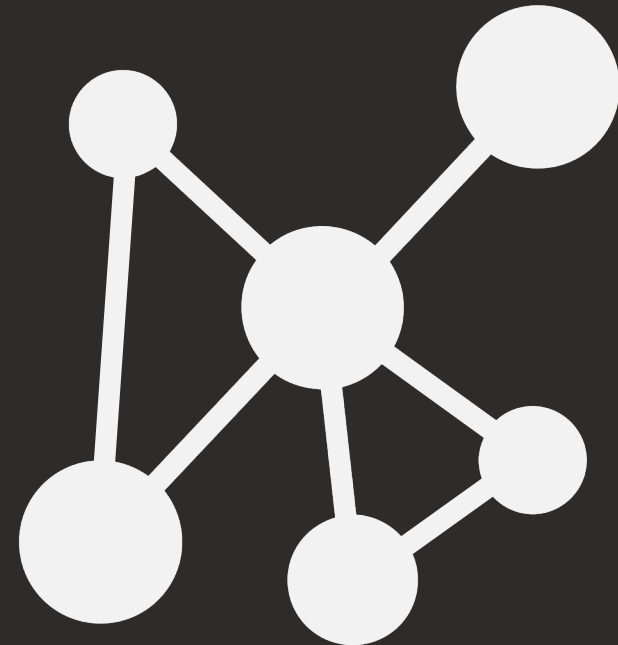
Concept Map

1. Choose a medium.

2. Begin by choosing a central concept(s), and write them in the center of your map.

3. Individually, brainstorm related concepts, theories, frameworks, methods, people, or sub-topics. Consider their placement based on their relevance or importance.

4. Draw lines from the central concept(s) to these related concepts. Consider the structure, strength, or nature of the relationship.

5. Label each line with a verb or short phrase that describes this relationship.

6. Spend an appropriate amount of time to capture the depth and complexity of the central concept.

Best Practices

- Start with a Clear Central Concept

- Aim for a Hierarchical Structure

- Keep a Single Root Concept

- Use Meaningful Keywords

- Colour Code Your Concept Maps

- Connect Related Ideas

- Make Sure Linking Phrases Make Sense

- Be Consistent

- Keep it Simple

- Link to Further Resources

- Iterative

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Activity: Concept Mapping

Instructions

- Collectively discuss your understanding of ***interdisciplinarity***

- Capture your understanding in a concept map

- Follow the provided instructions on screen

- During the activity, you shall:
  – Focus on the process
  – Reflect on how you feel during the activity
  – Consider how you may implement this

We have **ten** minutes for this discussion.

You will be asked to **share** the outcome of your discussion on flipchart paper.
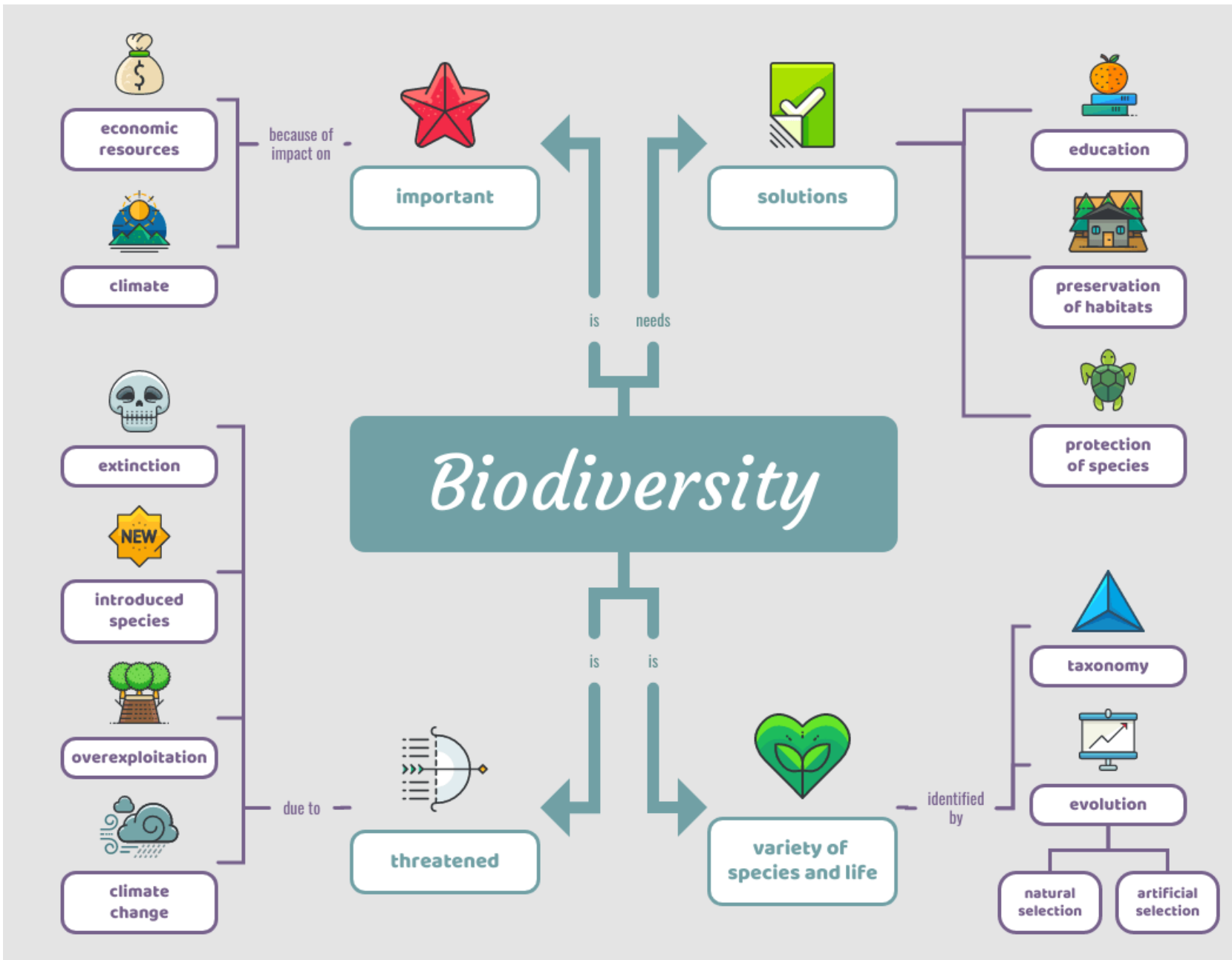
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Concept Map

1. Choose a medium for your concept map, such as pen and paper or a digital canvas
   (i.e. Whimsical, Miro, MindMeister).

2. Begin by choosing a central concept(s) for exploration, and write them in the center of your map. The central concept(s) shall serve as the anchor for your exploration, guiding the scope and focus of your map.

3. Individually, brainstorm related concepts, theories, frameworks, methods, people, or sub-topics; write them down surrounding the central concept(s). Consider their placement – in categories or groups – based on their relevance or importance to the central concept(s).

4. Draw lines from the central concept(s) to these related concepts. Consider not only the strength of the relationship but also its nature. Is it complementary, contradictory, synergistic, interdependent, causal, correlational, hierarchical?

5. It may help to label each line with a verb or short phrase that describes this relationship. Examples include 'influences,' 'is influenced by,' 'contradicts,' 'complements,' synergistic,' 'interdependent,' 'supports', 'challenges', 'tangential', 'unsure/unknown,' etc.

6. Spend an appropriate amount of time on this individual mapping exercise to capture the depth and complexity of the central concept.

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Boundary Setting

- Dominant disciplinary or theoretical perspective?

- Easiest to identify? Place?

- Confusion? Clarity?

- Excluded? Revised?

- Assumptions?

- …

Biodiversity concept map

- economic resources
- climate
  — because of impact on → important

- important — is ↑ | needs ↑ — solutions

- solutions
  - education
  - preservation of habitats
  - protection of species

Biodiversity

- extinction
- introduced species
- overexploitation
- climate change
  — due to → threatened

- threatened — is ↓ | is ↓ — variety of species and life

- variety of species and life — identified by →
  - taxonomy
  - evolution
    - natural selection
    - artificial selection

https://venngage.com/blog/concept-map-example/

https://creately.com/guides/how-to-create-concept-maps/

Interdisciplinarity

Integration of epistemologies, knowledge, skills, methods and tools – among different disciplines by institutions, organisations, and individuals for the purpose of solving "real-world" problems

Discipline

A subdivision of knowledge overseen by a scientific community – with common vocabularies, epistemologies, methods, norms, as well as formal and informal communication networks

Multidisciplinary – Interaction
Interdisciplinary – Integration
Transdisciplinary – Transgression

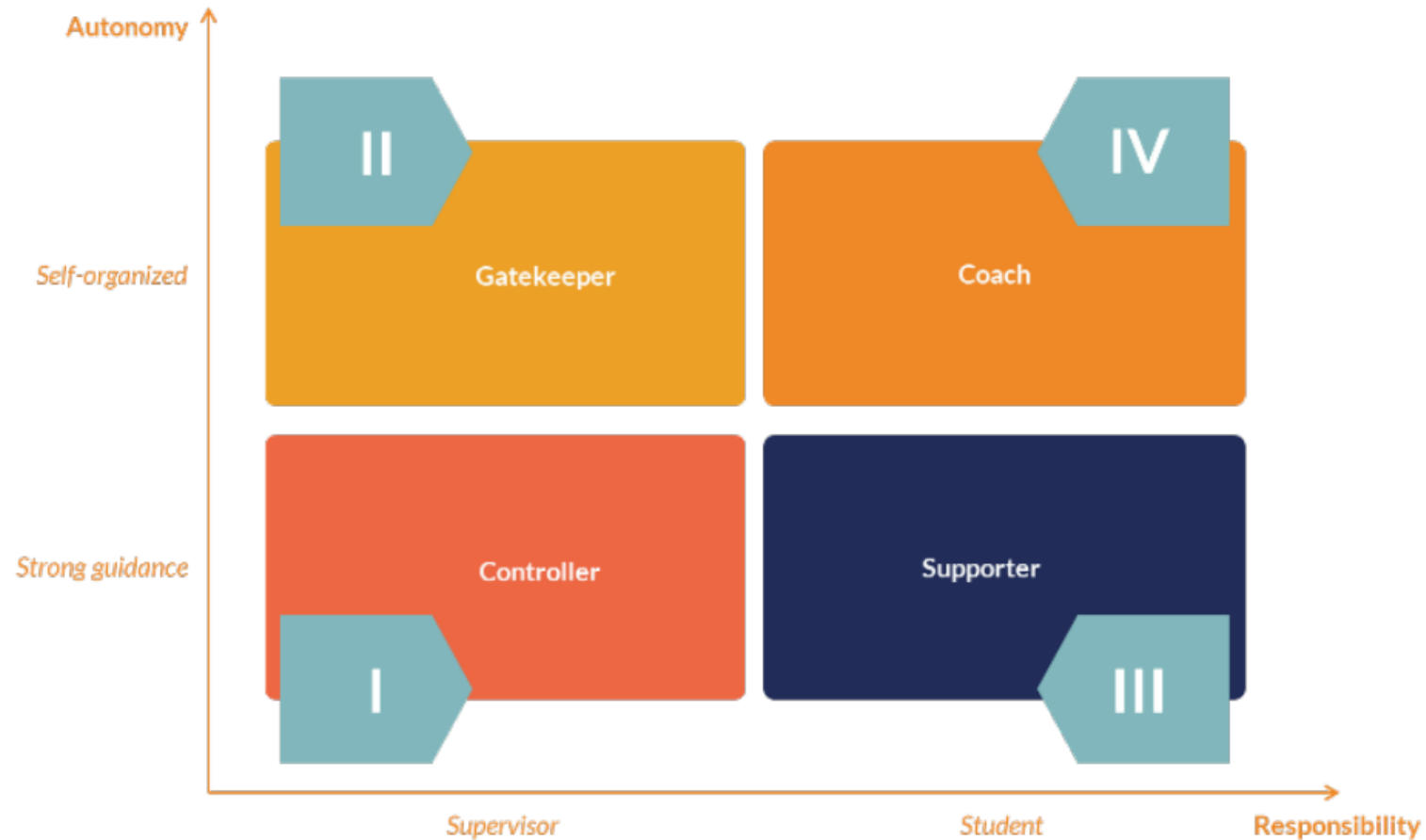# General Approaches to Supervision

General Approaches to Supervision

- Student-driven agenda

- Autonomy in selection of research topic

- Interactive feedback (through dialogue)

- Wellbeing check-ins

- Celebrate milestones

- Encourage self-reflection

Supervision

Schefer-Wenzl, S., & Miladinovic, I. (2022). An Approach for Continuous Supervision of Bachelor's and Master's Theses in Engineering Studies. In D. Guralnick, M. E. Auer, & A. Poce (Eds.), *Innovations in Learning and Technology for the Workplace and Higher Education* (Vol. 349, pp. 312–320). Springer International Publishing. https://doi.org/10.1007/978-3-030-90677-1_30

Opportunities & Challenges

Activity: Opportunities & Challenges

Instructions

- Collectively brainstorm various opportunities & challenges when supervising interdisciplinary theses

- Write a bulleted list for each on the whiteboard

- During the activity, you may wish to consider various perspectives:
  - For supervisors
  - For students
  - For the programme/department/university/society
  - The process
  - The thesis as a deliverable
  - Learning outcomes

We have **ten** minutes for this activity.

You will be asked to share the outcome of your discussion on the whiteboard.

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Supervising Interdisciplinary Theses

- Student Learning

- Supervision Approaches

- Student Competencies

Characteristics of Interdisciplinarity

- Disciplinary Grounding
- Teamwork
- Communication
- Knowledge Integration
- Critical Awareness

Borrego, M., & Newswander, L. K. (2010). Definitions of Interdisciplinary Research: Toward Graduate-Level Interdisciplinary Learning Outcomes. *The Review of Higher Education*, *34*(1), 61–84. https://doi.org/10.1353/rhe.2010.0006

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Interdisciplinary Expertise

- Navigational

- Hybrid

- Interactional

Carl Gombrich
Academic Lead at the London Interdisciplinary School

Sustainability Competencies
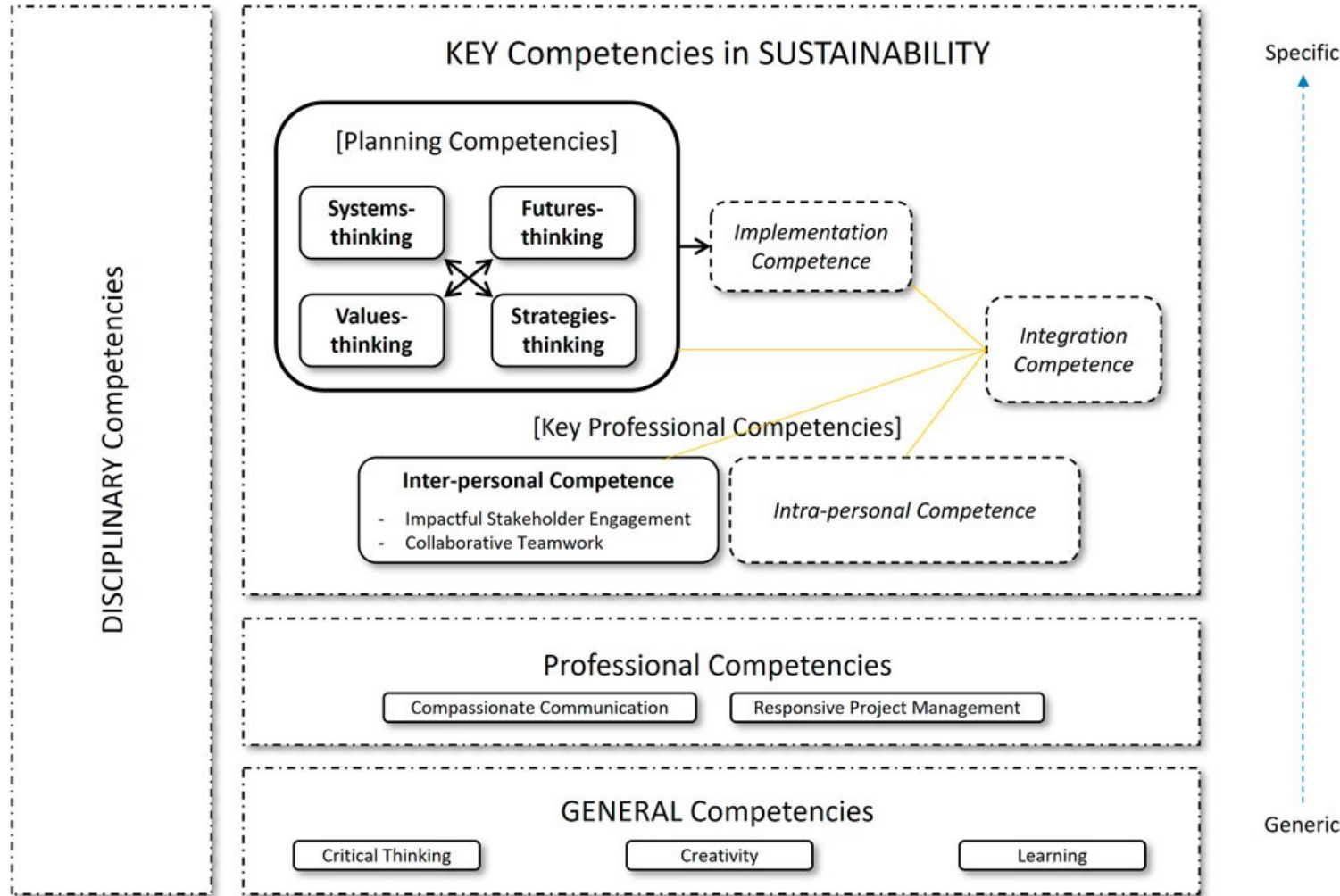
Redman, A., & Wiek, A. (2021). Competencies for Advancing Transformations Towards Sustainability. *Frontiers in Education*, *6*. https://www.frontiersin.org/articles/10.3389/feduc.2021.785163

Interdisciplinary Competencies

VALUES, ATTITUDES, AND BELIEFS
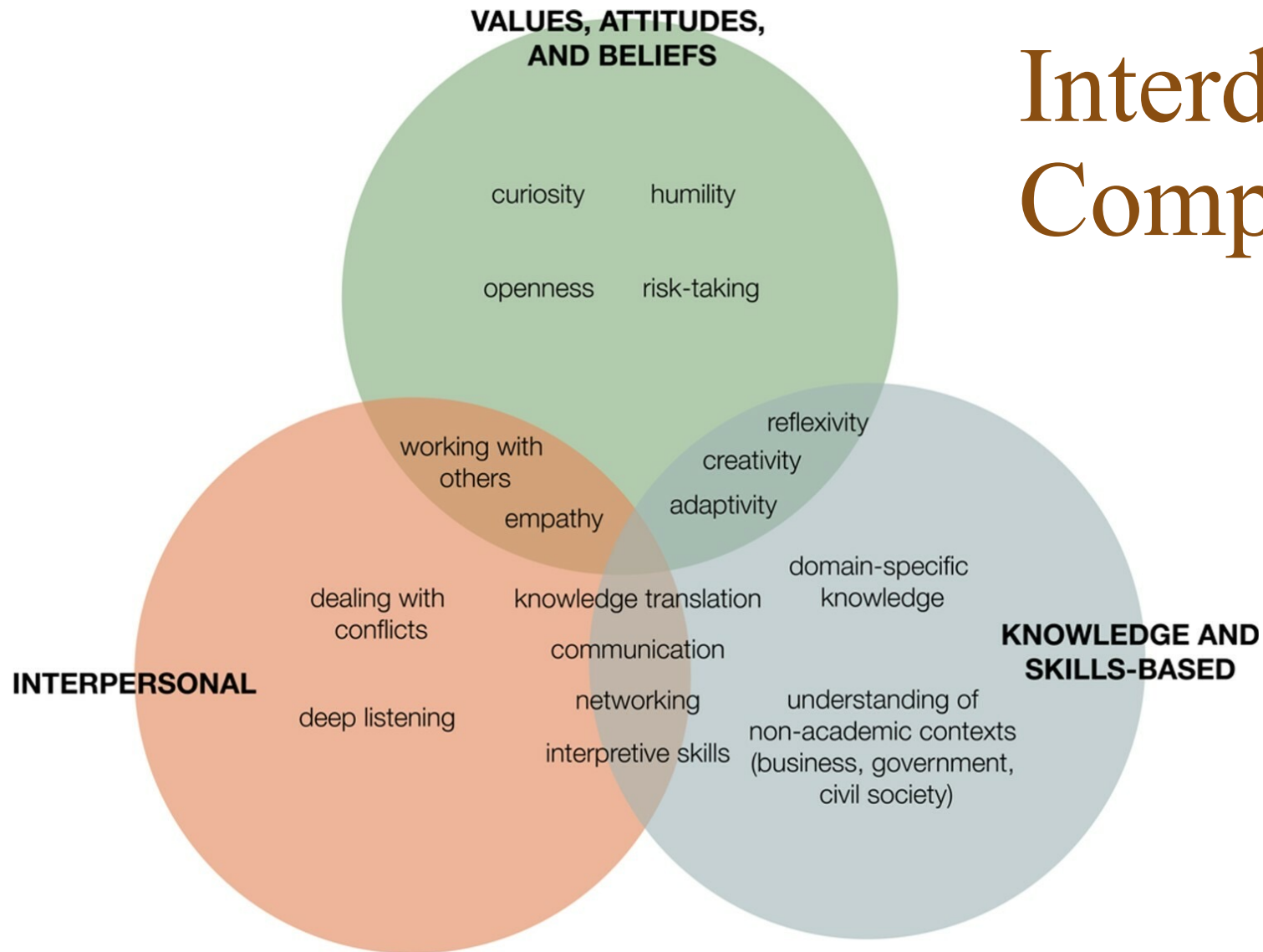
curiosity   humility

openness   risk-taking

reflexivity
creativity
adaptivity

INTERPERSONAL

working with others
empathy

dealing with conflicts

deep listening

knowledge translation

communication

networking

interpretive skills

KNOWLEDGE AND SKILLS-BASED

domain-specific knowledge

understanding of non-academic contexts (business, government, civil society)

Ramachandran, A., Abdi, K., Giang, A., Gladwin, D., & Ellis, N. (2022). Transdisciplinary and interdisciplinary programmes for collaborative graduate research training. *Educational Review*, *0*(0), 1–18. https://doi.org/10.1080/00131911.2022.2134312

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Supervision Approaches

- Concept Mapping

- Socratic Questioning

- Peer Supervision

- Co-Supervision

- Various Communication Approaches

- Industrial Thesis

Student Competencies

- Synthesis

- Dealing w/ complexity

- Boundary setting

- Integrating disciplinary knowledge and methods

Socratic Questioning

- A method of inquiry that seeks to explore complex ideas, concepts, and beliefs by asking questions that challenge assumptions, clarify meaning, and reveal underlying principles.
    - Clarification of ideas
    - Exploration of assumptions
    - Enhanced understanding
    - Self-reflection
    - Independence

Collin, S.-O. Y., Umans, T., Broberg, P., Smith, E., & Tagesson, T. (2016). Producing academic theses: The Kristianstad model. In E. Astahova (Ed.), *Scientific works* (pp. 441–462). Peoples Ukrainian Academy University Press.

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Socratic Questioning

- **Clarification Questions**
  - How would you say that in a different way?
  - Can you give an example?

- **Justification Questions**
  - How did you arrive at that conclusion?
  - What evidence do you have?

- **Experimental Questions**
  - Can you find a counter-example?
  - What do you think would happen/change if…?

- **Metalevel Questions**
  - Why did you start from here?
  - What are you assuming when you say…?
  - How did you approach that problem?
  - What approach do you think would achieve your research objective?

Phillipson, N., & Wegerif, R. (2016). *Dialogic Education: Mastering core concepts through thinking together*. Taylor & Francis.

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Peer Supervision

- Receiving feedback from **<u>both</u>** supervisors and peers

- Design for passive, active, and very active students
  → *expectation setting*

- Most effective when students see their role as 'helping each other'
  → *knowledge, methods, skills, and social/emotional wellbeing*

- Most students found listening to the peer-provided feedback very valuable, whereas others did not. →

Seiden Hyldegård, J., & Jensen, H. N. (2023). The implied peer: Thesis writers' feedback activities and experiences in group supervision. *Studies in Higher Education*, *48*(11), 1754–1766. https://doi.org/10.1080/03075079.2023.2212273

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Peer Supervision

- **The 'Implied' Peer –** This role influences and forms students' expectations and experiences of what participation in group supervision 'ideally' means.
  - Train and discuss feedback practices within the programme
  - Focus on exchange of ideas, knowledge, material, support
  - Helpful attitudes
    - Ice breaking
    - Committing
    - Listening
    - Disconnecting

Seiden Hyldegård, J., & Jensen, H. N. (2023). The implied peer: Thesis writers' feedback activities and experiences in group supervision. *Studies in Higher Education*, *48*(11), 1754–1766. https://doi.org/10.1080/03075079.2023.2212273

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Co-Supervision

- Collaborative supervision of a student's thesis project by two or more academic supervisors, each bringing their unique expertise to enrich the research process
  - **Supervisors share a common vision**
    (e.g., timeline, deliverable, assessment criteria)
  - **Supervisors have defined roles**
    (e.g., content, communication)
  - **Supervisors foster a student-centric approach**
    (i.e., onboarding feedback, conflict resolution)

→ Training new supervisors

Grossman, E. S., & Crowther, N. J. (2015). Co-supervision in postgraduate training: Ensuring the right hand knows what the left hand is doing. *South African Journal of Science*, *111*(11–12), 1–8. https://doi.org/10.17159/sajs.2015/20140305

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Various Communication Approaches

- Foster Self-Directed Learners
  - Promote help-seeking by making explicit multiple resources
  - Prompt students to reflect on their own performance
    - Improve awareness (e.g., progress, process, performance)
    - Diagnose weaknesses and propose solutions
  - Challenge unproductive beliefs
    - "I don't know" "I can't do…"
  - Connect learning and effort to student values / societal impact
  - Share your own research approach or metacognitive process
  - Be aware of the example you set

Lovett, M. C., Bridges, M. W., DiPietro, M., Ambrose, S. A., & Norman, M. K. (2023). *How Learning Works: Eight Research-Based Principles for Smart Teaching* (2nd edition). Jossey-Bass.

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Industrial Thesis

- The most important means to prevent or correct the problems appear to be *communication between all the stakeholders* especially in the early phases of the process.

- Consultancy companies are more challenging than product companies.

- Experience increases readiness within the industry-academia cooperation

- Requires a trusting and confidential relationship between the supervisor and instructor (i.e., industry contact) → instructor as former student

Jaakkola, H., Mikkonen, T., Systä, K., & Henno, J. (2022). Practices for Supervising Master's Theses in Company Context: An Anti-Pattern Approach. 2022 45th Jubilee International Convention on Information, Communication and Electronic Technology (MIPRO), 609–614. https://doi.org/10.23919/MIPRO55190.2022.9803528

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Industrial Thesis

- **Department- & Programme-Level Recommendations**
  - Provide institutional infrastructure to maximise opportunities and collaborations beyond faculty member supervision, such as training in team skills and integrative research
  - Cultivate a variety of disciplinary backgrounds among students and faculty teams
  - Commit enough resources for faculty members to support TD and ID collaborative programmes, such as teaching or service relief, funding mechanisms for cross-faculty collaboration, support staff, or PhD programme admissions open to multi-faculty supervision and collaboration
  - Create a unified set of degree requirements for TD and ID programmes that allow space and time to pursue different forms of graduate work
  - Build TD and ID programmes with stakeholders to support integrative graduate research that has relevance outside of academia by scaffolding a number of smaller group projects, retaining a greater sense of continuity in their peer and stakeholder relationships

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Student Competencies

Student Competencies

- Synthesis

- Dealing w/ complexity

- Integrating disciplinary knowledge and methods

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Synthesis

- The ability to combine parts of a whole in a new and different way
    - Critical thinking
    - Analytical skills
    - Conceptual understanding

- Student approaches
    - Concept mapping
    - Synthesis matrix
    - Purpose-oriented or audience-centered approaches
    - Mental models
      (i.e. DPSIR, The Feynman Technique, OODA Loop)
    - Implement knowledge management strategies
      (i.e., reference management software)

Dealing with complexity

- Acknowledgement and acceptance
   →Understand what creates complexity

- Focus on what the student can control
   → Adjust scope, concepts, methods, timeline, etc.

- Practice chunking
   → Break tasks down into smaller, more manageable "chunks"

- Create or find islands of simplicity
   → Focus on progress by accomplishing tasks that are possible, which may reduce complexity over time

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Integrating Knowledge & Methods

- Select disciplines and strategies that serve your research objective
    - Triangulation
        - Data triangulation
        - Conceptual triangulation
        - Methodological triangulation
    - Conceptual saturation
    - …

Activity: Implementation

Instructions

- **Part One**: Individual Reflection
  - Reflect on the relevance and implementation of these strategies

- **Part Two**: Group Discussion
  - Discuss your experiences, ideas, and suggestions for implementation

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Thank You!