Futures thinking competency for ESD: teaching resources

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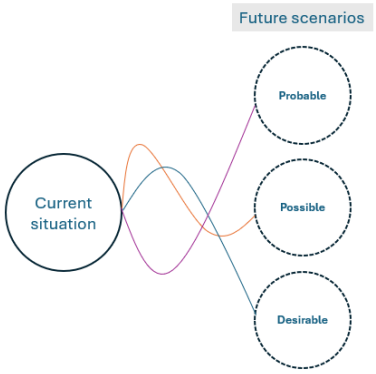

Introduction

For many subject areas, futures thinking (understanding and meaningfully contributing towards current and future challenges) is not a new topic and you can adapt and enhance existing methods and tools (understanding the impact of history, modelling techniques, for example) to develop students sustainability competencies by ensuring students can explore the interrelationships between social, economic, and environmental factors.

For subject areas new to futures thinking the following resources are a selection of tools and approaches that you can use in your course design and learning and teaching. Detailed resources on the theory and practice underpinning futures thinking for ESD can be found in Learn more about ESD

If appropriate, consider co-creating futures thinking learning activities with students (and if appropriate external stakeholders) to select sustainability related topic areas that are meaningful to students and relevant to your subject area.

If you have any resources that you use in your teaching that you think will be support student system thinking competency development and will be accessible to other subject areas, please contact cie@liverpool.ac.uk

Example learning outcomes for futures thinking competencies

Example learning outcomes for developing futures thinking (anticipatory) competencies - a student with futures thinking competency can:

Knowledge

- Identify the risks associated with complex systems that can lead to unintended consequences or negative cumulative effects.
- Evaluate the impacts and interconnections between the activities of different generations, demographic groups, and cultures, recognising that there may be tensions and competing factors between them.
- Identify the causes and possible solutions to inequity at intragenerational and intergenerational global levels.
- Identify those natural systems have non-negotiable limits and may become unstable or collapse if subjected to excessive pressures or changes.
- Identify risks and uncertainties associated with the transformation of the natural environment.
- Identify the need for decisions about natural resources to involve judgements, not just about economic viability but about risks to future ecological, social, or cultural wellbeing.

Skills

- Generate and evaluate different approaches to sustainable development and assess their likely impact, within the context of their own discipline/subject.
- Use historical knowledge and an understanding of the consequences of past actions to envision how futures may be shaped.
- Develop, understand, and evaluate multiple outcomes.
- Create their own visions for the future.
- Apply the precautionary principle.
- Assess the consequences of actions.
- Evaluate risks and their potential impacts.
- Identify future scenarios and use them to inform decision making.
- Use backcasting skills - starting with defining a desirable future and working backwards to identify policies and programmes that will connect that to the present.
- Use forecasting skills - looking at past trends and present conditions to extrapolate anticipated future outcomes.

Attributes and values

- Be flexible, resourceful, and adaptable to fit changing and/or unforeseen circumstances if it is likely to have a positive outcome for sustainable development.
- Imagine and envision sustainable futures.
- Consider the impacts, both positive and negative, of heritage and cultures when planning for the future.
- Apply an awareness of intergenerational fairness to decisions and planning.
- Be prepared to learn from others and consider their perspectives.
- Learn to unlearn when situations and contexts demand alternative solutions.
- Demonstrate an open mindset to new approaches to problem solving.
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Adapted from QAA, 2021 page 25.

Topics for futures thinking learning activities

Make sure the sustainability topic area you select to focus on is meaningful to your subject area, of interest to your students, and connects with outside world. CIE's UN Sustainable Development Goals (SDGs) teaching resources is a useful resource to develop explore possible sustainability topic areas.

Example learning activities for futures thinking

Learning activities that you can adapt to your specific teaching context:

Perceptions of the Future

The following learning activities focus on students reflecting on their perceptions and emotions about the future.

'Where do you stand' (POLAK) game

Aims:

- An introductory activity for students to explore where they 'stand' or how they perceive a specific image of the future.
- Help students to reflect on their initial preconceptions about a specific topic prior to subsequent future thinking learning activities.

Learning activity:

- Students are asked to identify where they are on a spectrum across four quadrants (see Appendix 1) relating to a future scenario.
- They are then asked to adjust their position depending on how optimistic or pessimistic they are.
- You can adapt this method to different classroom or online activities, for example through using polling technologies within a large class, or physically in a smaller seminar class.
- Use the distribution of students to discuss and explore their different perceptions and preconceptions on the given future scenario how they arrived at their positions.

Developed from Haywood et al, 2017.

Future headlines/ day in the life of/ cover page

Aims:

- To uncover and challenge the assumptions and aspirations students might have about the future.
- To enable students to explore and reflect on uncertainties about the future.

Learning activity:

- Future headlines - students are asked to describe or draw a newspaper (or it could be social media related) headlines from a specific date in the future on a given sustainability issue.
- Day in the life – students are asked to describe how a particular persona goes about their typical day in the future. Facilitate discussions between students about why this might happen or what might happen differently.
- Encourage students to describe and capture visceral experiences and feelings in each scenario.

Future artifacts/ advice from the future

Aims

- Instead of looking 'at' the future, students are invited to briefly 'be' in the future by experiencing what it would feel like.

Learning activity:

- Students are asked to represent future scenarios in a rich variety of formats and presentations, so that they (and other stakeholders) can fully 'experience it.'
- Another way to embed students in future situations that they can deeply experience is by role-playing or simulation.

CIE staff are facilitators of the 2030 SDGs Game that can be used to enable students to explore the UN's Sustainable Development Goals looking towards 2030. Please contact cie@liverpool.ac.uk for more details.

The following futures thinking learning activities are focused on analytical and systematic approaches to investigating the future:

Forecasting

Aims:

- Forecasting is a common technique in many subject areas – extracting past data into the future typically into a single feasible prediction.
- Economic, political, ecological forecasts are common in how we envision the future.
- Introduce students to where forecasting can be effective and where it can be less reliable or inaccurate.
- Introduce students to volatile and unpredictable real-world contexts (TUNA, VUCA) where forecasting is not effective.

Methods:

- Relevant to your subject area develop learning activities where students can create future outcomes from specific past data sets.
- Require students to critically analysis historical forecasts to establish where they have been accurate, where they have proved to be unfulfilled and why.

Strategic Foresight

The following resources have been adapted from the UNDP's Foresight manual empowered futures for the 2030 agenda and are based on a strategic foresight approach to investigating the future:

> "Foresight is the umbrella term for those innovative strategic planning, policy formulation and solution design methods that don't predict or forecast the future but work with alternative futures."

To introduce strategic foresight processes to your students, a few learning activity suggestions:

Horizon scanning

Aims:

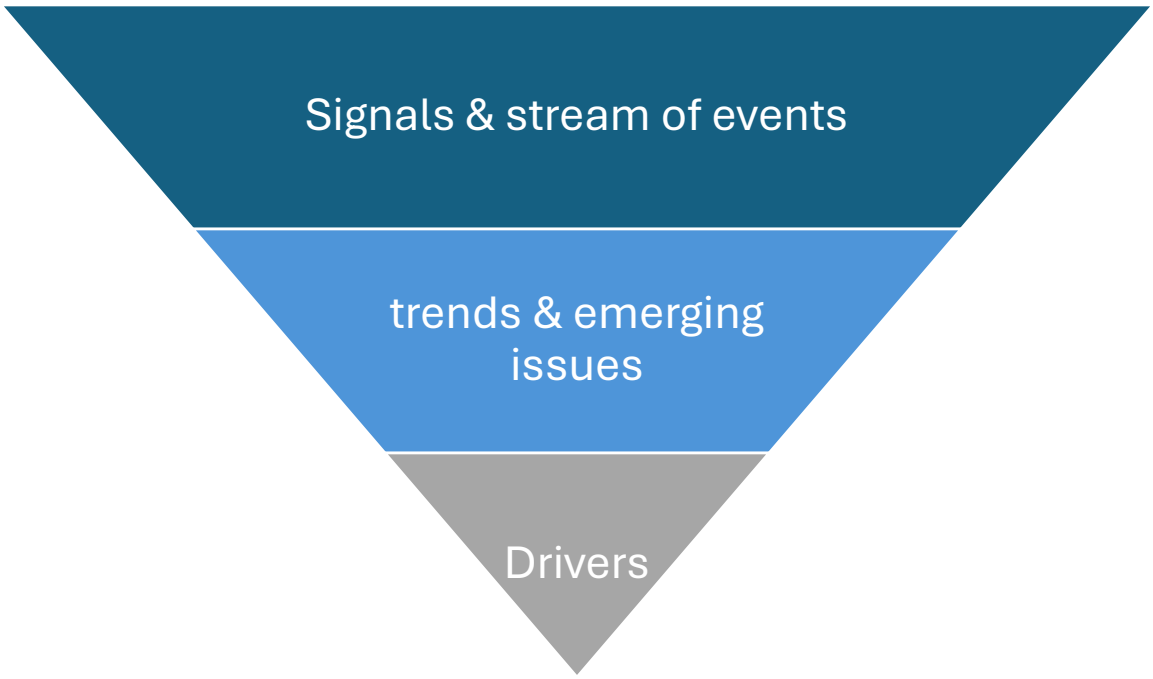
- Better understand the nature and pace of change.
- Identify potential opportunities, challenges, and likely future developments relevant to the selected context.
- Scanning does not seek to make predictions, but to identify and explore new, innovative ideas, as well as underling patterns of change.
- Tries to avoid extrapolating present into future (with data on trends coming mostly from the past) and quantitative calculations of probabilities.
- Oriented towards being on the "look-out" and searching for "weak signals" that might emerge into powerful trends.
- Regular continuous process to monitor the external environment.

Concerned with the following key questions:

- What questions do we need to respond to?
- What is important and what is less important?
- What do we think we know (known knowns)?
- What do we need to know (known unknowns)?
- What do we expect that we do not know (unknown unknowns)?

Learning activity:

Ask students to capture the following data on a specific sustainability issue:



- Signals – individual events and issues (data points), distinguishable from irrelevant issues 'noise.'
- Trends – underlying patterns of change that have a clear direction of change.
- Drivers – mature trends that have an obvious impact across sectors and industries.
- Uncertainties – emerging issues that are happening, but we cannot agree on how they will evolve and in which direction.
- Weak signals – less advanced or noisy issues or trends.

Focus on uncertainties and wild cards in the foresight process:

Wild cards:

- Black swans – low probability high impact events.
- Grey swans – predictable to a certain extent e.g. earthquakes.
- Dirty white swans – surprising only due to cognitive bias.
- Red swans – in reality not that impactful.
- Red herrings – misleading or fake signal.
- Dragon king – large extreme events that do not really come out of nowhere e.g. 2008 financial crash.
- White elephant – everybody is aware of it, but nobody wants to recognise its presence or relevance.

Then ask students to organise this data using commonly used methods such as STEEPLE or PESTLE + V - these can be adapted to different subject contexts:

- STEEPLE: social, technological, economic, environmental, political, legal, ethical domains. You could include these additional domains: demographic, ethnical, regulatory, values.
- PESTLE + V: political, economic, social, technology, legal, environmental, values.

See Appendix 2: horizon scanning analysis template.

Scenario development

Aims:

- Not predictions, strategies, or plans.
- Represented perspectives, hypothesis, expectations, and assumptions about the past, present, and future.
- Limited examples as a point of reference.
- For sensemaking, dialogue and innovation.
- Help students (and stakeholders) develop a shared understanding.
- Essence of the future or full description pathways to the future.

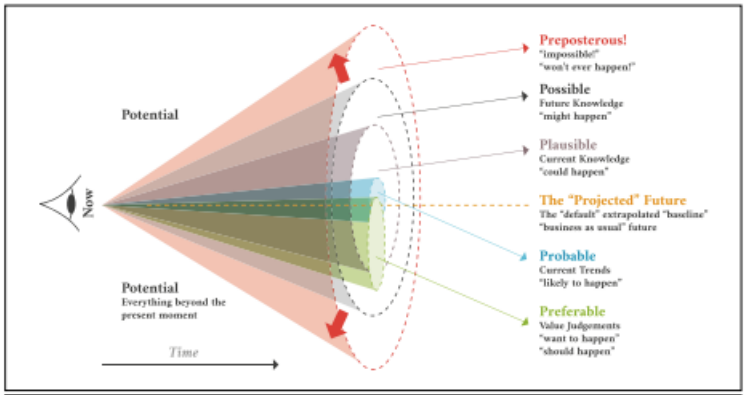
Learning activity:

- From the previous horizon scanning and trends activity ask students to create scenarios using the 'future cone' model (see below).
- Capture the essence of a future situation in short statements or by using other media if appropriate.

Their scenarios need to be:

- Convincing, consistent and plausible.
- One scenario should not overlap or correlate with another scenario.
- Full pathways from the present to the future – 'how it all came to be.'
- Over a 5 to 10 year timescale.
- Give each scenario a meaningful name.

Futures cone:



The 'future cone' is a method of creating a space of possible and preferable futures – not just probable 'forecasted' futures:

- Preferable – want or should happen.
- Probable – likely to happen.
- The 'projected' future – business as usual.
- Plausible – could happen.
- Possible – might happen.
- Preposterous – won't ever happen!

See Appendix 3: Futures cone template.

Additional scenario development methods and approaches that you could use to develop future thinking learning activities from the UNDP's Foresight manual empowered futures for the 2030 agenda manual for students includes:

- 2x2 Matrix – four alternative divergent scenarios are developed from two selected critical uncertainties.
- Generic images – matrix of generic 'alternative futures' ('growth', 'collapse, 'discipline' controlled regulated futures, and 'transform' a radically different future) that students can use to aid future scenario development.
- Branching scenarios – is a decision tree process based on a series of 'yes' or 'no' decisions creating two diverging scenarios.
- Dialogue approaches – appreciative inquiry and liberating structures are dialogue-based methods that can be adapted to support scenario development that are particularly useful with multiple stakeholders.
- 3 Horizons – can help identify implications of alternative policy or strategies in relation to a changing environment.

- Casual layered analysis – is an approach to exploring different stakeholder's narratives (data, systems, worldviews, metaphors) around an issue or future scenario.

Strategies to aid creative thinking in scenario development

If students are struggling to think of creatively (particularly possible or preposterous future scenarios) you could adapt creativity exercises commonly used in design thinking.

Backcasting

Aims:

- 'Backcasting' is concerned with changing the present to try to change the conditions that will work towards creating a desired future.
- Insights come from the expected future situation (feed-forward) rather than in relation to expectations (goals/objectives) set in the past (feed-back)
- Attempts to understand how a particular future situation might develop.
- Reminds students that the future is not linear and can have many alternative outcomes depending on decisions made, and the impact of external events.

Learning activity:

- Using the scenarios created in the previous activity, ask students to work backwards to identify major events, data points, and signals that will generate the future scenario to outline a potential trajectory – 'how it might happen.'
- In outline, ask students to consider what actions or policies are needed now to connect to the future.

Precautionary principle

Aims:

- To enable students to consider systematically the potential implications of any future scenario that may cause harm to humans or the environment.
- An opportunity for students to consider diverse stakeholder perspectives, value judgments, unintended consequences, mitigation and adaption considerations.

UNESCO precautionary principle

> "When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. Morally unacceptable harm refers to harm to humans or the environment that is threatening to human life or health, or serious and effectively irreversible, or inequitable to present or future generations, or imposed without adequate consideration of the human rights

of those affected. The judgement of plausibility should be grounded in scientific analysis.

Analysis should be ongoing so that chosen actions are subject to review. Uncertainty may apply to, but need not be limited to, causality or the bounds of the possible harm. Actions are interventions that are undertaken before harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportional to the seriousness of the potential harm, with consideration of their positive and negative consequences, and with an assessment of the moral implications of both action and inaction. The choice of action should be the result of a participatory process."

Learning activity:

- Ask students to apply the precautionary principle to their developed scenarios.
- Identify possible harm to humans or the environment.
- Consider the moral implications of harm to future generations.
- What mitigations or modifications to the policy or strategy would be required?
- Ask students to reflect on the values and judgements they use to make these assessments.

Horizon mission

Aims:

- This version of backcasting is one of the best approaches to identify disruptive, transformative innovation in any field - an exercise to explore a 'preposterous' future scenario.

Learning activity:

- Firstly, ask students to use a scenario from the previous activity to create a fantastical scenario mission ("horizon mission"), one that could be considered completely infeasible given the existing technology or other factors.
- Then, ask students to ''decompose'' that mission by asking: ''supposing that such a mission had actually taken place, what technologies and other considerations would be required?''

Policy and strategy development

Aims:

- To introduce students to connecting future scenarios to actions and plans – policy and strategy.

- Not a clear process as future scenarios refer to the environment, whilst policy and strategy refers to an organisational level.

Learning activity:

- Ask students to test how their future scenarios might affect the ability to deliver a specific project or strategy. Get students to reflect on different combinations of risks and opportunities for innovation for each scenario.
- You could use an adapted scenario-strategy matrix (see appendix 4) to enable students to outline and reflect on specific policy or strategy factors that would need to be in place to make each scenario deliverable.
- The specific policy or strategy will vary with context under consideration – you could give this to students at the start (e.g. strategy to reduce poverty in Liverpool by 50% in 10 years) or ask students to create their own strategy relative to the selected context.

References

Education for Sustainable Development guidance (QAA, 2021)

Foresight manual empowered futures for the 2030 agenda (UNDP, 2018)

Hayward P., Candy C. (2017), The Polak Game, Or: Where Do You Stand? Journal of Futures Studies. Vol. 22. http://dx.doi.org/10.6531/JFS.2017.22(2).A5

Additional resources

Enhancing General Education with Strategic Foresight

Future Literacy UNESCO future literacy in higher education research program

Journal of Futures Studies

Appendix 1: 'Where do you stand' (POLAK) game matrix

Taken from Hayward et al (2017)

The matrix consists of 4 quadrants:

Upper Left: Things are good and getting better. We have to work with larger forces and play our part; Lower Left: Things are getting worse; There is nothing I can do about it. I cannot make things worse, so I am free of the responsibility of trying to do that. Upper Right: Things are getting better; AND we can act to make things even better. Lower Right: Things are getting worse generally; But I can act to make a difference here and now, in this place. It may not change the futures, but it is still worthwhile.

Appendix 2: Horizon scanning analysis template

	Signals	Trends	Drivers	Uncertainties
Social				
Technological				
Economic				
Environmental				
Political				
Legal				
Ethical				

Appendix 3: Futures cone template

Scenarios 'futures cone'	
Preferable 'want or should happen'	Scenario name: Description:
Probable 'likely to happen'	Scenario name: Description:
The 'projected' future 'business as usual'	Scenario name: Description:
Plausible 'could happen'	Scenario name: Description:
Possible 'might happen'	Scenario name: Description:

Preposterous 'won't ever happen!'	Scenario name: Description:

Appendix 4: Scenario-strategy matrix

Scenarios	Policy/ strategy considerations
Preferable Scenario name:	
Probable Scenario name:	
The 'projected' future Scenario name:	
Plausible Scenario name:	
Possible Scenario name:	
Preposterous Scenario name:	