**Should we start deep-sea mining?**

Role play - complex problem solving - multi-stakeholders’ perspective.

A diagram of a deep sea drilling

Description automatically generated

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**Why a role play on deep sea mining?**

Sustainability issues compel us to address complex problems with multiple stakeholders due to the interconnected nature of environmental, social, and economic challenges. These issues transcend individual interests and require collaboration among diverse stakeholders to achieve long-term solutions. Balancing environmental conservation, social equity, and economic viability necessitates the involvement of various actors, including governments, businesses, communities, and non-profit organizations. By considering multiple perspectives and engaging all stakeholders, we can foster holistic approaches that promote sustainability and address the interdependencies within our global systems. As an educator, incorporating role play activities in the classroom is crucial, this is especially important when addressing complex problems that involve multiple stakeholders. The aim of such a role play includes developing the following perspectives and skills.

**Active Engagement and Experiential Learning**: Role play encourages active engagement among students by immersing them in real-world scenarios. It goes beyond passive listening or reading and allows students to actively participate, make decisions, and experience the consequences of their actions. By assuming different roles and perspectives, students gain firsthand experience and develop a deeper understanding of the complexities and challenges associated with the issues they are exploring.

**Collaboration and Communication Skills**: Complex problems often require collaboration and effective communication among multiple stakeholders. Role play activities provide an opportunity for students to practice these essential skills. By taking on different roles, students learn to articulate their ideas, negotiate, persuade, and find common ground with others. They develop empathy and the ability to see issues from various perspectives, fostering better collaboration and communication in real-life situations.

**Critical Thinking and Problem-Solving**: Role play activities present students with complex problems that require critical thinking and problem-solving skills. They must analyze information, evaluate different options, and make decisions based on limited resources and conflicting interests. By engaging in role play, students are challenged to think critically, consider multiple viewpoints, and develop creative solutions. This cultivates their ability to tackle complex problems and make informed decisions in the face of uncertainty.

**Empathy and Understanding of Diverse Perspectives**: Role play helps students develop empathy and a deeper understanding of diverse perspectives. By stepping into the shoes of different stakeholders, students gain insight into the motivations, concerns, and constraints that shape individuals' actions and decisions. This fosters empathy, tolerance, and appreciation for diverse viewpoints, promoting a more inclusive and compassionate mindset.

**Skills for the Future**: Role play activities equip students with skills that are valuable in various professional contexts. The ability to collaborate, communicate effectively, think critically, and understand diverse perspectives is highly sought after in today's complex and interconnected world. By engaging in role play, students develop skills that can be applied to future careers, such as negotiation, conflict resolution, and stakeholder management.

**How to facilitate the role play?**

**Option 1: Assignment w/ pre-work**: This activity can be a graded role play that student teams can prepare in class. For a deeper and more meaningful experience, the students can be given their roles in advance, and asked to do some research on the issues associated with deep sea-mining, and prepare specific responses to how they would address each stakeholder group. The students would turn this in before advance of class (to ensure that all were prepared). It is also useful for the students to prepare a document like this so that they can reflect on how their viewpoints change based on discussions ith other stakeholders.

The students will then engage in timed, in-class discussions with each of the stakeholder groups, and perhaps even form alliance with them. The structure below works fine. The studens could then turn in their final written positions and learnings, and/or present these in class, answering the questions included in their individual assignments.

***Introduction and Context*** *:* The facilitator can introduce the topic by providing background information and setting the context for the role play, and provide a grid showing the order that the teams will meat and the schedule. The facilitator can reiterate the problem and the objectives of the activity.(5 minutes)

**Role Play Execution**: Students should group with their assigned team/role and meet with the other stakeholders to which they have been assigned, for about 8 minutes each, allowing a couple of minutes to debrief and move to their next stakeholder match. They should engage in dialogue, negotiation, and decision-making as their respective stakeholders, perhaps forming alliances. The facilitator should remind the,m after 7 minutes to wrap up, and by 10 minutes to meet with the next team. The facilitator should encourage active participation, respectful communication, and adherence to the roles and perspectives assigned. At the end each group can summarize their position and complete the assignment related to their team. (up to 60 minutes)

**Facilitate the final discussion**: After the role play, the facilitator can engage participants in a discussion where students can share their perspective and decisions if time permits. (60 minutes maximum)

**Reflection and Learning Outcomes**: Conclude the activity by having students share insights, challenges faced, and lessons learned. They can Discuss the complexities, trade-offs, and potential solutions that emerged during the role play. They can reflect on their learning outcomes, both in terms of content knowledge and the development of skills such as collaboration, critical thinking, and empathy. Encourage them to consider how the experience can be applied to real-world sustainability challenges. (10-20 minutes)

**Option 2: Assignment without prework:** Provide the group the assignment at the beginning of the roleplay, or perhaps in a prior class. No additional preparation is required.

**Introduction and Context** The facilitator can introduce the topic by providing background information and setting the context for the role play. The facilitator can explain the problem, and the objectives of the activity. As part of this a discussion the facilitator can ask students to identify the key stakeholders relevant to the problem or scenario. (10 minutes)

**Preparation**: The facilitator should then ask students to read the brief common to all stakeholder group. (5 minutes)

**Role Assignment**: The facilitator can assign student to specific stakeholder roles. This can be done using the list of stakeholder group in the room. Each group should then read their own brief. (5 minutes)

**Role Play Execution**: Students should then engage in dialogue, negotiation, and decision-making as their respective stakeholders. The facilitator should encourage active participation, respectful communication, and adherence to the roles and perspectives assigned. At the end each group can summarize their position. (up to 60 minutes)

**Facilitate the final discussion**: After the role play, the facilitator can engage participants in a discussion where students can share their perspective and decisions. (60 minutes maximum)

**Reflection and Learning Outcomes**: Conclude the activity by having students share insights, challenges faced, and lessons learned. They can Discuss the complexities, trade-offs, and potential solutions that emerged during the role play. They can reflect on their learning outcomes, both in terms of content knowledge and the development of skills such as collaboration, critical thinking, and empathy. Encourage them to consider how the experience can be applied to real-world sustainability challenges. (20 minutes)

By following these steps, students can actively engage in the role play, gain a deeper understanding of complex problems, develop empathy for diverse perspectives, and enhance their problem-solving skills while exploring sustainability issues with multiple stakeholders.

**Brief common to all stakeholder groups**

Deep-sea mining refers to the extraction of valuable minerals and resources from the ocean floor, particularly from the depths of the deep-seabed. As traditional terrestrial sources of minerals become depleted, interest in deep-sea mining has grown due to the potential abundance of valuable resources in these largely untapped areas. However, the pursuit of deep-sea mining raises important environmental, social, and legal considerations.

The potential associated with deep-sea mining lies in the vast reserves of minerals found in the deep-seabed. These contain valuable elements like copper, nickel, cobalt, zinc, and rare-earth elements. These minerals are essential for various industries, including electronics, renewable energy technologies, and electric vehicle batteries.

The stakes associated with deep-sea mining are multifaceted. From an environmental perspective, deep-sea mining can cause significant disturbance to delicate and poorly understood ecosystems. The extraction process can result in the loss of unique species and habitats, as well as potential impacts on the wider marine environment. There are concerns about the potential release of sediments, noise pollution, and the generation of plumes that may affect surrounding ecosystems.

From a social and economic standpoint, deep-sea mining presents both opportunities and challenges. Proponents argue that it could contribute to economic growth, job creation, and technological advancements. However, there are concerns about the potential negative impacts on local communities, particularly those dependent on healthy marine ecosystems for their livelihoods. There are also questions about the equitable distribution of benefits and the potential for resource exploitation by powerful entities.

To address the complex challenges associated with deep-sea mining, the International Seabed Authority (ISA), established under the United Nations Convention on the Law of the Sea (UNCLOS), is responsible for regulating mining activities in the international deep-seabed beyond national jurisdiction. If countries or companies start to request licenses for deep sea mining, The ISA will need to have a mining code ready within two years, this is a set of rules and regulations that will govern deep-sea mining operations. This code would aim to strike a balance between resource exploitation and environmental protection, ensuring the sustainable management of deep-sea mining activities.

As of today, the development of the mining code is just starting, involving extensive consultations, scientific research, and negotiations among member states, industry stakeholders, and civil society organizations. The code will address various aspects, including environmental impact assessments, requirements for mining licenses, financial obligations, and monitoring and enforcement mechanisms. The objective is to establish a comprehensive framework that safeguards the marine environment while allowing for the responsible exploration and exploitation of deep-sea mineral resources.

Ultimately, the creation of a mining code will play a crucial role in shaping the future of deep-sea mining, ensuring that potential benefits are balanced with environmental protection and social considerations. The process reflects the international community's recognition of the need for sustainable and responsible practices in this emerging industry.

You are all assigned to a specific stakeholder group, your mission is to develop strategies and recommendations to influence the decisions of the International Seabed Authority (ISA) You can work in groups and contact the other stakeholders to exchange with them.

**The stakeholder group in the room**

1. **A startup that aims to mine the deep seabed.**
2. **An island state that could support deep sea mining.**
3. **An NGO very concerned by Deep-sea mining.**
4. **Scientific institutions who study the deep seabed**
5. **An automotive company who could benefit from minerals.**
6. **A group of humans selected randomly who be assigned the mission of representing the seabed.**

**Brief for the NGO who is very concerned by Deep-sea mining.**

You have expressed concerns about deep sea mining and its potential environmental impacts:

Your team believes that regulatory frameworks for deep sea mining need to be strengthened to ensure mining proceeds sustainably and protects vulnerable deep-sea ecosystems that are only beginning to be understood. You support a precautionary approach. Deep sea ecosystems are very slow to recover from any disturbances. Mining could damage habitat and disrupt ocean currents/food webs that many species depend on for long periods of time.

Mining in international waters risks damage across national boundaries that could undermine decades of conservation work. Global cooperation is needed for management. Important questions remain about the impacts on biodiversity, especially rare or endemic deep-sea creatures. More research is needed before approval of any mining.

Minerals collected could be alternatives to rare earth minerals mined on land, but the environmental costs need to be considered relative to benefits. Your team advocates for regional environmental management plans, impact assessments, conservation of hydrothermal vent sites, financial mechanisms for protection/restoration before any commercial deep sea mining starts. In case there would be pressures to rapidly open possibilities to mine the deep seabed, you would consider calling for a moratorium and rally different stakeholder to your cause.

**How we suggest you proceed:**

* **List the stakeholder who could influence decisions.**
* **Exchange with these stakeholders to understand if they are supportive or against deep sea mining, understand their views and what could be their own actions.**
* **Describe your current position and what you would do to influence decisions.**

**Brief for a group of humans selected randomly who be assigned the mission of representing the seabed.**

By including non-human entities in stakeholder representation, we can foster a more comprehensive understanding of sustainability issues, promote ethical considerations, and work towards a more inclusive and holistic approach to preserving our planet's well-being for current and future generations. This approach has been advocated by diverse philosophers and political scientists.

Non-human entities like ecosystems, species, landscapes cannot advocate directly for their own interests in policymaking as humans do. A group is needed to represent their perspective. A randomly selected group has been setup by the International Seabed Authority (ISA) to represent the seabed. Having such a group dedicated to considering non-human interests aims to achieve a better balance in policy between human economic priorities versus ecological well-being and longer-term sustainability. Your group acts as independent assessors and advisors to decision makers at ISA, you are not the decision makers.

**How we suggest you proceed:**

* **Interview all stakeholders.**
* **Define all Pro’s and Con’s arguments for mining the deep seabed.**
* **Rank them from highly uncertain to highly certain.**
* **Suggest recommendations and propose next steps to the ISA.**

**The brief for a scientific institution who study the deep seabed.**

Our scientific knowledge of the deep seabed is continually expanding, but there are still significant gaps in our understanding. Due to the extreme conditions of the deep sea, including high pressures, low temperatures, and total darkness, conducting research in these areas poses significant challenges. Here are some key points regarding our current understanding of the deep seabed:

Mapping: We have made considerable progress in mapping the topography of the deep-seabed, thanks to technological advancements such as sonar systems. However, there are still large areas of the deep-sea floor that remain unmapped or poorly understood.

Biodiversity and Ecosystems: Research expeditions have revealed a remarkable diversity of organisms in the deep seabed, including unique and often poorly understood species. However, our knowledge is still limited, particularly in remote and unexplored regions.

Geological Processes: Scientists have gained insights into geological processes and the formation of mineral deposits in the deep seabed. However, much of this knowledge is based on localized studies, vast areas of the deep-sea floor that have not been adequately explored.

Climate and Carbon Cycling: Ongoing research is uncovering the significance of deep-sea ecosystems in sequestering carbon and their potential impacts on climate change. However, our understanding of these processes and their long-term effects is still evolving.

Anthropogenic Impacts: Human activities, such as deep-sea mining, bottom trawling, and pollution, are affecting the deep seabed. While research is shedding light on the potential impacts of these activities, we still have limited knowledge of their long-term consequences and the ability of deep-sea ecosystems to recover from disturbances. You see the current interest in deep-sea mining as opportunity to foster collaborations that would advance scientific knowledge. This could include partnership with public institutions, industry partners, Non-Governmental Organizations and Local stakeholders. However, this could also be a source of conflict of interest as partners can have vested interest You will need to consider how you can maintain scientific integrity, independence, and objectivity.

**How we suggest you proceed:**

* **Exchange with stakeholders to understand what could be done in terms of scientific collaboration.**
* **For each stakeholder, consider what could you do? What would you avoid doing?**
* **Define how you could influence decision making while maintaining integrity**

**A startup that aims to mine the deep seabed.**

Your company is a startup focused on exploring and developing the potential of polymetallic nodules found in the deep ocean as a source of critical metals. These nodules contain high concentrations of metals like cobalt, nickel, copper, and manganese, which are crucial for various industries, including renewable energy, electric vehicles, and electronics manufacturing.

The company's mission is to provide a responsible and sustainable source of these metals while minimizing the environmental impact of their extraction. The Metals Company aims to contribute to the transition to a low-carbon economy by reducing the reliance on land-based mining and promoting a more environmentally friendly alternative.

For you the question is not if but when you will start mining the deep seabed.

The Metals Company invests in technological advancements to improve the efficiency and environmental performance of their operations. This includes developing innovative extraction methods, minimizing waste generation, and optimizing resource utilization. You have started to publish reports on the environmental impacts of deep-sea mining. You want everyone to support your mission, you are ready to engage with various stakeholders to advance your plans.

**How we suggest you proceed:**

* **List the stakeholder who could influence decisions.**
* **Exchange with these stakeholders to understand if they are supportive or against deep sea mining, Understand their potential own action.**
* **Describe your current position and what you would do to influence decisions.**

**An automotive company who could benefit from minerals.**

In today's automotive industry, access to raw materials is a critical concern. However, there is growing awareness of the environmental and social impacts associated with deep-sea mining. In light of these concerns, your company has made a firm commitment to prioritize recycling as a sustainable alternative.

Deep-sea mining: While deep-sea mining may offer access to untapped resources, your company recognizes the potential risks and negative consequences associated with this practice. Deep-sea mining can disrupt delicate marine ecosystems, leading to irreversible damage to biodiversity and habitats. Furthermore, the long-term environmental impact of deep-sea mining remains uncertain.

You believe that recycling serves as a more sustainable and responsible solution to address our company's raw material needs. By recycling materials, we reduce the pressure on natural resource extraction and minimize the environmental footprint associated with mining operations. Recycling also aligns with our commitment to a circular economy, where materials are reused, and waste is minimized. It allows us to extend the life cycle of materials and contribute to a more sustainable future.

**How we suggest you proceed:**

* **List the stakeholders you work with in the future.**
* **Exchange with any stakeholders that could help you take a position.**
* **Describe your current position and what you would do to influence decisions.**

**An island state that could support deep sea mining.**

You represent an island that looks for new economic opportunities as its phosphate mines are being depleted. You see deep-sea mining as an opportunity for the energy transition. Minerals available on seabed are essential for renewable energy technologies, electric vehicles, and other clean technologies. You believe that deep-sea mining is a sustainable alternative to land mining. In fact, a significant portion of your land has become unusable due to phosphate mining, with up to 80% of the island being mined.

You would be ready to request a mining license, this would force the ISA to accelerate the development of the deep-sea mining code.

**How we suggest you proceed:**

* **List the stakeholders you could work with in the future.**
* **Exchange with any stakeholders that could help you take a position.**
* **Describe your current position and what you would do to influence decisions.**

**Facilitate Discussion and Reflection**

You can have a small team who act as the ISA Council representatives. This can be participants or a couple of teaching assistant for instance.

This small team can listen to 5 minutes statements from each stakeholder group, the team has 3 minutes to ask questions to each of the stakeholder group. Then they make a ruling that is shared with the class.

Info on ISA

* The International Seabed Authority (ISA) Council is the main decision-making body of the ISA, the international organization responsible for regulating deep-sea mining activities.
* The ISA Council consists of 36 member states elected by the ISA Assembly, which includes all member states of the ISA. The Council represents a diverse group of countries from different geographic regions to ensure a balanced and inclusive decision-making process. The Council holds regular sessions to discuss and make decisions on various matters related to deep-sea mining and the management of mineral resources on the international seabed.
* The Council formulates policies, guidelines, and regulations for deep-sea mining activities to minimize the potential environmental impacts of deep-sea mining. It makes decisions on matters such as environmental regulations and on the approval of exploration and exploitation contracts submitted by both private and public entities interested in deep-sea mining activities.

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