Blended Learning and Total Engagement – Posters that Teach

Adina Stan, UNSW Global, University of New South Wales, Australia
Mahnaz Armat, UNSW Global, University of New South Wales, Australia
Elyssebeth Leigh, University of Technology, Australia
Elizabeth Rosser, UNSW Global, University of New South Wales, Australia
Nikki Hayes, UNSW Global, University of New South Wales, Australia

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Abstract:
Electronically-mediated technologies are prohibited from use in a major assessment component of a blended learning subject. This subject employs a multidisciplinary problem-based approach to explore international issues and perspectives using a rich blend of face-to-face, electronically-mediated, individual and team-based activities. The assessment is a role-play simulation which occurs during the second half of a year-long pathway to university program. Belief in the importance of helping students integrate knowledge with an understanding of learning strategies informs the design of this particular assessment task. To complete the task, small teams develop and display a hand-drawn poster summarising their understanding of a real life 'wicked problem' explored in depth during the semester. Composing and preparing their poster ensures that students create visual evidence of their learning about the context of a complex contemporary international issue which varies from year to year. It also introduces students to higher order thinking and develops critical and creative thinking skills.
By exploring the features of one such poster, the paper applies an 'artefact plus exegesis' approach to introduce and describe the principles informing the design of the assessment strategy. The task compels students to question information, seeking deeper engagement with data and generating first-hand engagement with the issue. The learning design also facilitates students' crucial skills of knowledge generation and learning management, and helps them apply this knowledge to other aspects of their future learning. This task bridges the gap between the technical and non-technical skills essential for success in the 21st century.

Keywords: blended learning, assessment, 'wicked problem', role play simulation

Introduction

International Issues and Perspectives is an interdisciplinary subject, part of UNSW Foundation Studies, a university pathway program. It is designed to assist both international and Australian local students develop knowledge, skills and understandings which support an appreciation of the complexity of international issues. The course has been designed using the principles of **problem-based learning** in order to assist students to develop their problem-solving, research, critical thinking and communication skills. Problems are used to drive the curriculum and learning occurs through the problem solving process, when students are required to work collaboratively and to take personal responsibility for their learning while teachers act as facilitators. **A blended learning approach** enables both face-to-face learning workshops and online activities on platforms such as UNSW Moodle or UNSW Wikispaces. In this way, the course accommodates multiple learning needs, styles and outcomes and creates an empowered community of learners who come together to build and share robust knowledge. To further enhance the authenticity of the learning experience, assessment is performance-based and requires learners to demonstrate that they have mastered and are able to apply specific skills and competencies in situations resembling real world contexts (Khaira & Yambo, 2005).

This paper concentrates on one such assessment, the Role Play, a multidisciplinary and multimodal activity that enables learners to take on the role of real-life stakeholders and respond to real-life complex issues. While electronically-mediated technology underpins and supports nearly all the stages of the Role Play, there is one assessment component for which the use of such technology is prohibited. This is the Mind Map Poster analysis. This paper will analyse in details the learning principles underpinning the Mind Map Poster and argue that in this case it is the very absence of technology that is conducive to in-depth learning and creative, original expression. We aim to show that it is the fine-tuned, context-appropriate blend of advanced electronically-mediated technology and low-level technology, such as coloured pencils that may be the most effective use of technology in the classroom.

Role Play Overview

The Role Play assessment is a mature simulation-based learning strategy based on a design first developed at UNSW Foundation Studies by Elizabeth Rosser over ten years ago. Known as *The Big Paper b-Sim,* the original design was modelled on the highly successful *Mekong e-Sim* created by R. McLauchlan, D. Kirkpatrick, H. Maier and P. Hirsch (Baron & Maier, 2004). In its current format, the Role Play maintains its core structure and methodologies with changes to allow for upgrades in the technological tools used.

In the Role Play, participants attempt to solve contemporary international issues, known as 'wicked problems'. These are ill-defined social problems that are by their nature confronting, and as such have no known definitive or objective solutions (Rittel & Webber, 1973). Some of the real-world wicked problems students have investigated and responded to, include fuel for the future, fracking, water security, plastic pollution and gender inequality. The use of the role play approach fosters an environment of open inquiry, debate and reflection within an atmosphere of urgency that reflects contemporary international events (van Ments, 1989).

Learners step into the role of real-life stakeholders, develop empathy and experience real-life complex issues from multiple perspectives. The duration of the role play is five weeks and the group size is scalable. On average approximately eighty to one hundred learners across several class groups in Australian and offshore campuses participate; the latter join in via UNSW Wikispaces and/or Skype. Learners' age range from 16 to 21.

Learners are divided into teams and adopt the role of real-life stakeholders in a specific 'wicked' international issue introduced via a multi-media scenario. Each team has a unique UNSW wiki space within which to explore the role of their stakeholder and record their research and analysis in preparation for a public forum that brings together all stakeholder groups. This is known as the Emergency Summit. These online fora are maintained throughout the Role Play.

In preparation for the Emergency Summit, teams create an original Mind Map Poster to visually illustrate their response – in role as the stakeholder – to the 'wicked problem' raised in the introductory scenario. The stakeholder insights that each team publishes to their Wiki are crucial to the effectiveness and relevance of their response throughout the Role Play. Mind Map Posters will be displayed for viewing by all the teams in a gallery walk at the beginning of the three-hour Emergency Summit. During the summit, an emergency scenario is released and teams respond to this by creating an Action Plan to address the underlying problem/s. That plan is also visually presented as a poster, and then pitched in a two-minute presentation. Following this, learners step out of role to consider all ideas presented during the Emergency Summit and vote for the solutions they think have the most potential. This step allows all students the opportunity to reconsider their own ideas and reflect on the complexity of the wicked problem and the relevant solutions put forward by all the stakeholder teams. Following the Emergency Summit, students prepare individual Debriefing Reports in which they record their reflections on their learning experience throughout the Role Play.

Performance in the Role Play accounts for 30% of the formal assessment in the course with the following team and individual assessment components:

- The Mind Map Poster that illustrates visually the unique stakeholder response to the Introductory Scenario – a team assessment worth 10%;
- The Action Plan Poster that illustrates visually the implementation of creative solution ideas in response to the Emergency Scenario – a team assessment worth 10%;
- The Debriefing Report, a reflection on the manner in which lenses impact stakeholder responses to the wicked problem raised in the Role Play and lessons learnt in terms of teamwork – an individual assessment worth 10%.

The Mind Map Poster is the main focus of this paper. While, other elements of the Role Play rely heavily on technology-mediated learning, such technologies are prohibited from the performance of this particular component. This paper analyses one such poster to introduce the pedagogical principles and learning outcomes underpinning its instructional design.

Figure 1 below sets out the Role Play Learning Design with an emphasis on the Issues Investigation Stage (in weeks 3 and 4 of the process), which is the focus of this paper. This is the stage when the Mind Map Poster is prepared and, as such, it is a turning point in the process; it marks the learners' transformation from novices to experts. Hence, the Mind Map poster is a visual expression of teams' acquired expertise in the wicked problem raised in the Introductory Scenario.

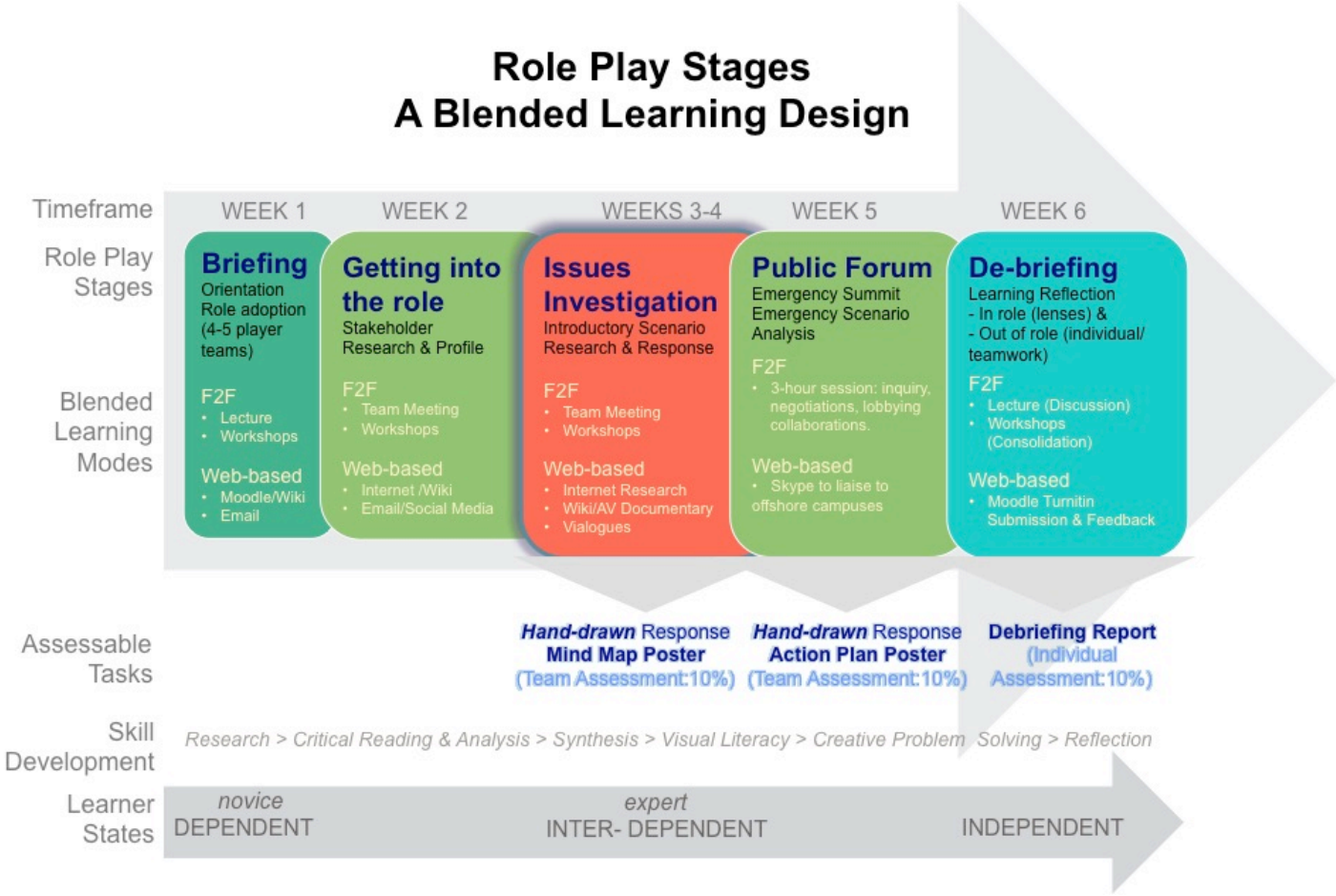

Figure 1: *Role Play Stages – A Blended Learning Design* ©

Conceptual Framework

The next section introduces educational concepts that support and underpin the Role Play learning design including the open/closed game dichotomy, mantle of the expert, and visual literacy.

Open vs. Closed Game

The overall instructional design is developed around the 'open game' principles outlined by Christopher and Smith (1988, pp. 148-151). This is because unlike closed games that are puzzles with pre-determined answers, open games are fluid and changeable by nature; players with conflicting interests navigate complex and nuanced relationships to reach collaborative solutions to ill-defined real-life problems.

Preliminary activities involving team and stakeholder selection as well as the introduction of the 'wicked problem' are aimed at revealing the heterogeneity of group members. Productive differences of opinions are valued as fuel for creative team-based learning, critical thinking and original expression. Progression from one stage to the next is driven by the release of new tasks, questions or news flashes (trigger events) intended to stimulate more focused lines of inquiry. Nevertheless, different stakeholder teams pursue their own directions and interests within the bounds of the wicked problem and their stakeholder role. Learners are, therefore, more likely to be process-minded than goal-oriented. In this context, the role of the teacher is to monitor proceedings and intervene as little as possible, preferably not at all while helping teams stay aware of their learning goals, time frames and required outcomes.

The transformative nature of the role play encourages learners to progressively gain expertise in their stakeholder role and insight into the complexity of related issues, and also has potential to create a deliberate sense of ambiguity, which is integral to the 'wickedness' of the problem they are addressing (Rittel & Webber, 1973). Hence, players find themselves constantly thoughtful and questioning as they are prompted to react to the unfolding situation. Thus, the emphasis of learner performance and assessment is on behaviour/performance rather than outcome. The authentic possibility of multiple decisions and outcomes ensures a safe environment for bold critical thinking, direct emotional engagement, originality and creative problem solving.

Mantle of the Expert

Acting as real-life organisations, the learners are entrusted with a 'mantle of the expert' which authorises them to investigate and address the issues ***as if*** they were the organisation experts (Heathcote & Bolton, 1995). This 'mantle' of expertise changes thinking and learning ***about*** the issues, to that of thinking ***from within*** the issues. Acting within this 'mantle', learners investigate and respond to the issues from the perspective of contributors to, victims of or activists against the issues rather than neutral passive observers. In this way learners experience an active, urgent and purposeful view of learning, in which knowledge is to be acted upon on, not merely taken in (Heathcote & Bolton, 1995). In addition to empowering the learners to drive their own learning, the 'mantle of the expert' gives legitimacy to trial and error and learning from errors. This stimulates critical review and self- and peer-correction as the learners engage with the task and co-construct their knowledge. This is especially so, as different stakeholder teams liaise with each other in search for relevant collaborations and partnerships that can help them address the issues. The gradual realization that there are a variety of stakeholders with opposing or even conflicting interests reveals the tension and reinforces the life-like 'wickedness' of the problem. The role of the teacher/lecturer is to facilitate a learning environment that develops in the learners qualities of leadership, competency and responsibility for their own learning (Aitken, 2013).

Visual Literacy

In the words of John Debes, who first used the term in 1968, 'visual literacy' describes the capacity of a learner to "discriminate and interpret the visible actions,

objects, and/or symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication" (cited in Braden, 2001). Visual literacy is a key learning goal of the Mind Map Poster, which the players prepare in Week 4 (Figure 1 above). This is a hand-drawn visual expression of the learners' insights into and stakeholder response to the Role Play 'wicked problem'. As such, the poster is designed to communicate complex and meaningful messages demonstrating the learners' ability to construct and express meaning visually.

The theoretical framework underpinning the Mind Map Poster is visual discourse analysis, "a theory and method of studying the structures and conventions within visual texts, and identifying how certain social activities and social identities get played out in their production" (Albers, 2007). The rationale for selecting visual discourse analysis is that it provides learners with a more comprehensive and versatile form of expression where the focus can more readily be on creativity and message complexity rather than formality. This is especially so given the fact the participating learners are international students whose first language is not English.

Consequently, in preparation for the Role Play, learners explore relevant visual literacy techniques as well as corresponding skills of visual exploration, critique and reflection. Some of the techniques include analysis of visuals in terms of colour, size and symbolism of different image elements, positioning on the page, overall context of the image, possible direct and underlying messages, intended audience reaction, impact, etc.

In addition, a series of relevant visually represented analytical tools are explored either with a view to deciphering or illustrating complex visual messages. Some of these are:

- **Critical Lenses** such as socio-economic, financial, cultural, political, environmental, etc. Different stakeholders may highlight different aspects of the issues depending on the unique lenses. For example, in *The Plastic Age?* Role Play, a stakeholder such as the 5 Gyres Institute may be inclined to view the plastic pollution 'wicked problem' through environmental, education, scientific lenses while a plastic manufacturing company (e.g. MBA Polymer) is likely to use economic and financial lenses.

- **Issues**, namely, important problems or challenges that are difficult to address in isolation because of their strong connections with and implication for other problems or challenges. These *must* be consistent with the relevant stakeholder lenses.

- **Scale** of the issues and/or stakeholder impact (individual, group/family, local, regional, national, international, bilateral, multilateral, global)

- **SWOT Analysis** (Stakeholder Strengths, Weaknesses, Opportunities and Threats)

- **Stakeholder Disposition Map** to position the Role Play stakeholders with regards to the main issues on a scale ranging from a position of power (in favour and influencing the situation) to one of a victim (against and unable to influence the situation). This also allows the disposition of stakeholder against each other depending on their similar or antagonistic interests.

- **Fishbone Diagram (Ishikawa Diagram)** to identify and illustrate cause and effect relationships (https://www.mindtools.com/pages/article/newTMC_03.htm)

- **Forces and Impacts** of relevant issues

- **Known Knowns/Unknowns - Unknown Knowns/Unknowns** to drive in-depth meaningful research of the issues (http://mysticmundane.blogspot.com/2008/03/knowns-unknowns-and-project-management.html)

The Role of Technology

In the International Issues and Perspectives program, technology is not merely a tool for instruction delivery, but it is thoughtfully integrated into the curriculum to optimise learning and empower students to become independent learners (Mills & Tincher, 2003, Garrison & Kanuka, 2004). Thus, we believe we have achieved an effective blend of **instructional modalities** (facilitator-driven, learner-driven, flexible learning) and **delivery media** (multimedia, UNSW Moodle, lectures, workshops, PowerPoint Presentations, Prezis, Vialogues, workbooks); **instructional methods** (face-to-face and technology-based), **web-based technologies** (e.g. UNSW Wikispaces, Prezis, PowToons, Vialogues, Worldle, online discussion forums and blogs) and **learning states** (dependent, inter-dependent, independent). The combination of these depends on learning goals, course content, teaching and learning styles, and learner characteristics (Dziuban, Hartman & Moskal, 2005 in Kosar, 2016).

Hence, the Role Play also combines a rich blend of instructional modalities and methods that facilitate the learners' transformation from novices to experts (in terms of content knowledge) and from interdependent to independent learners (in terms of study skills and competencies). Lectures are used to introduce the Role Play wicked problem, stages and weekly tasks while workshops are allocated to learner-driven learning. The Role Play is hosted on UNSW Wikispaces (Figure 2), where teams develop and publish their stakeholder profile, investigations and response to the Introductory Scenario. They also use the wiki discussion board to liaise and seek collaborations with other participating stakeholders. An example can be viewed at: http://ufsb2016.unsw.wikispaces.net/

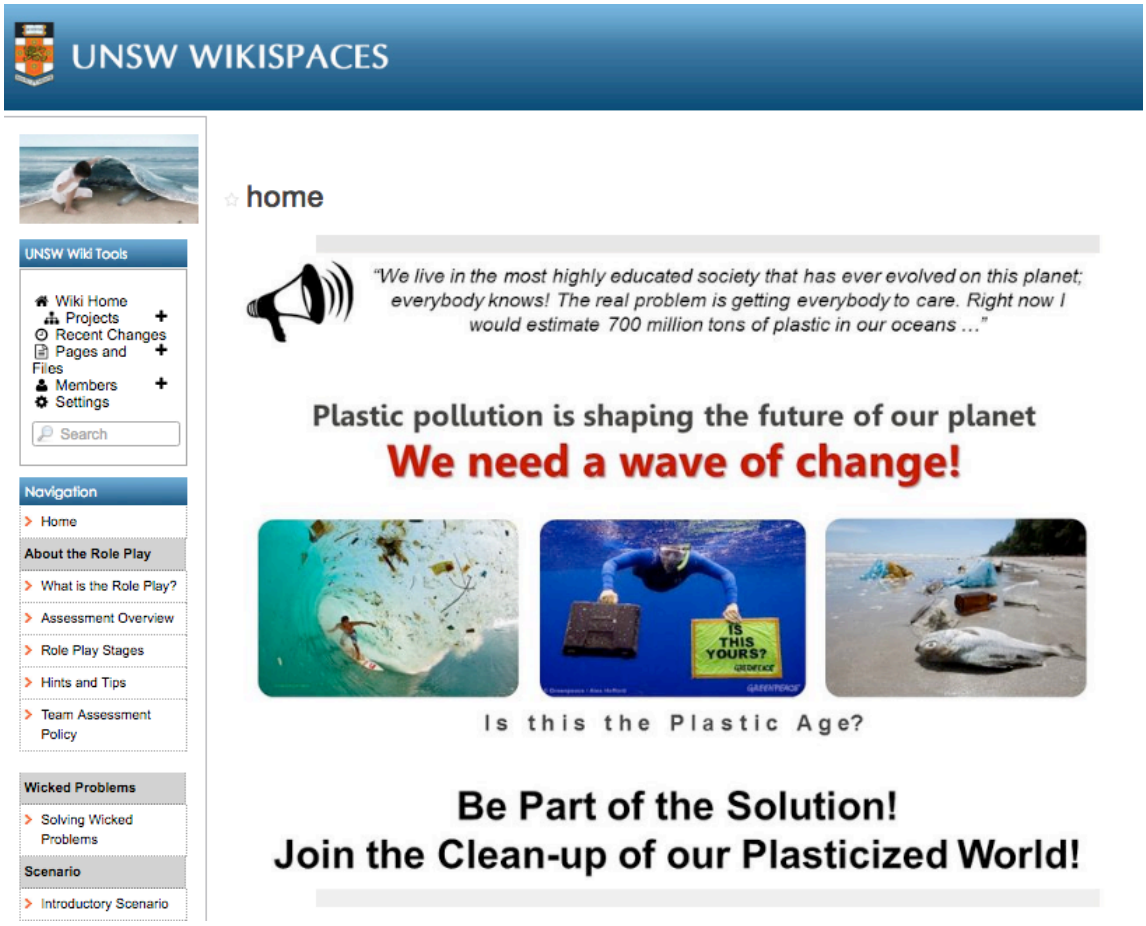

Figure 2: *A snapshot of the 2016 Role Play Assessment WIKI: The Plastic Age?* (http://ufsb2016.unsw.wikispaces.net/)

The Introductory Scenario, which offers an overview of the wicked problem, is a multimedia program which teams analyse via Vialogues (Figure 3). This online software facilitates private and autonomous team discussions about the video, creating opportunities for both synchronous and asynchronous interactions.

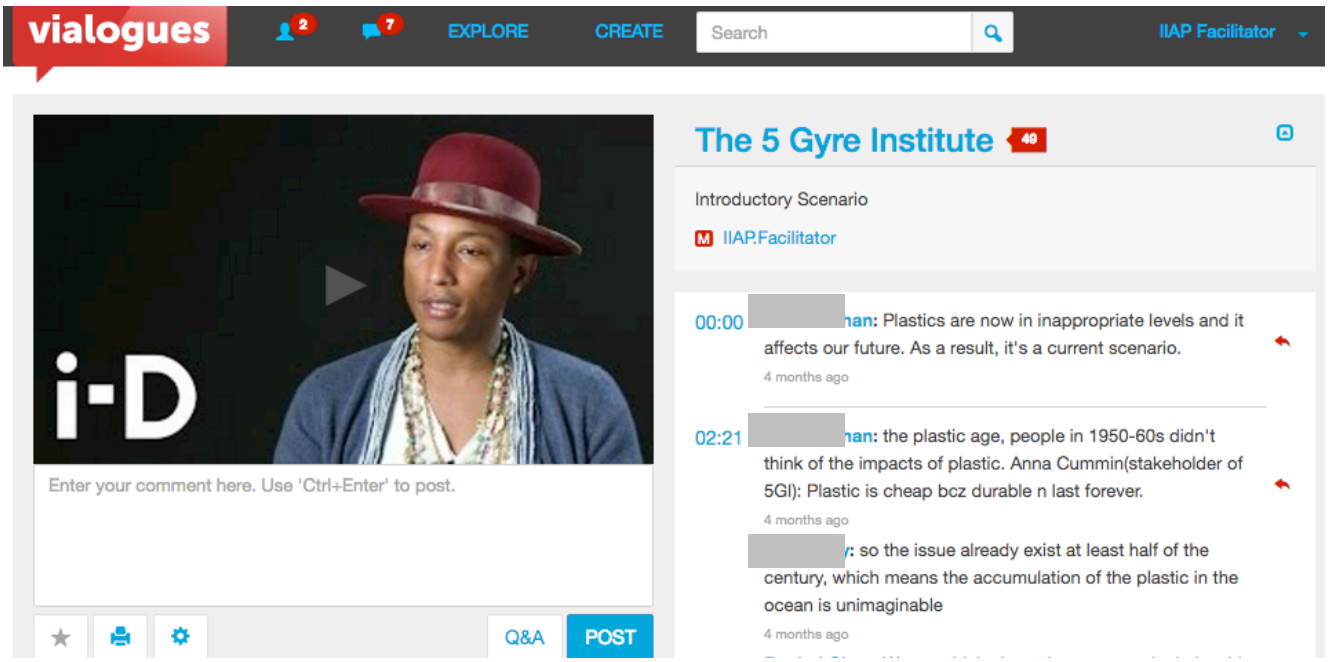

Figure 3: *A snapshot of an online discussion about the Introductory Scenario 2016 Role Play Assessment WIKI: The Plastic Age?*

For privacy reasons, the names of the students participating in this discussion have been covered.

While the stakeholder analysis and wicked problem investigation in the early stages of the Role Play are mediated by information and communications technology (ICT), the ensuing stakeholder response to the issues raised in the Introductory Scenario is presented visually in the form of a hand-drawn Mind Map Poster. In fact, the use of *any* electronically-mediated technology is prohibited in the performance of this task. This is to avoid learners' acceptance of knowledge/authority without questioning it, to ensure more genuine engagement with the issues, engage deeper thinking, foster a higher level of creativity and reward originality. The same applies in the case of the Action Plan, the stakeholder response to the Emergency Scenario, which occurs in the subsequent stage of the Role Play, the Emergency Summit.

Plagiarism-checking software is used for the submission and assessment of the final Role Play assignment, the Debriefing Report. This is to reinforce the academic rigor against plagiarism through the issue of an originality report.

The Mind Map Poster

This Mind Map Poster in Figure 4 was submitted by the stakeholder group representing 5 Gyres Institute and was their response to the plastic pollution 'wicked problem' raised in *The Plastic Age?* Role Play in September 2016. It represents visually the team's analysis and response to the major issues through the lens of their stakeholder. At the time when the posters are submitted, learners are not expected to put forward any solutions to the problems but only to indicate their position and response to the issues.

Conventional referencing is not required on the poster. This is to encourage active engagement with the ideas and drive creative, original expression.

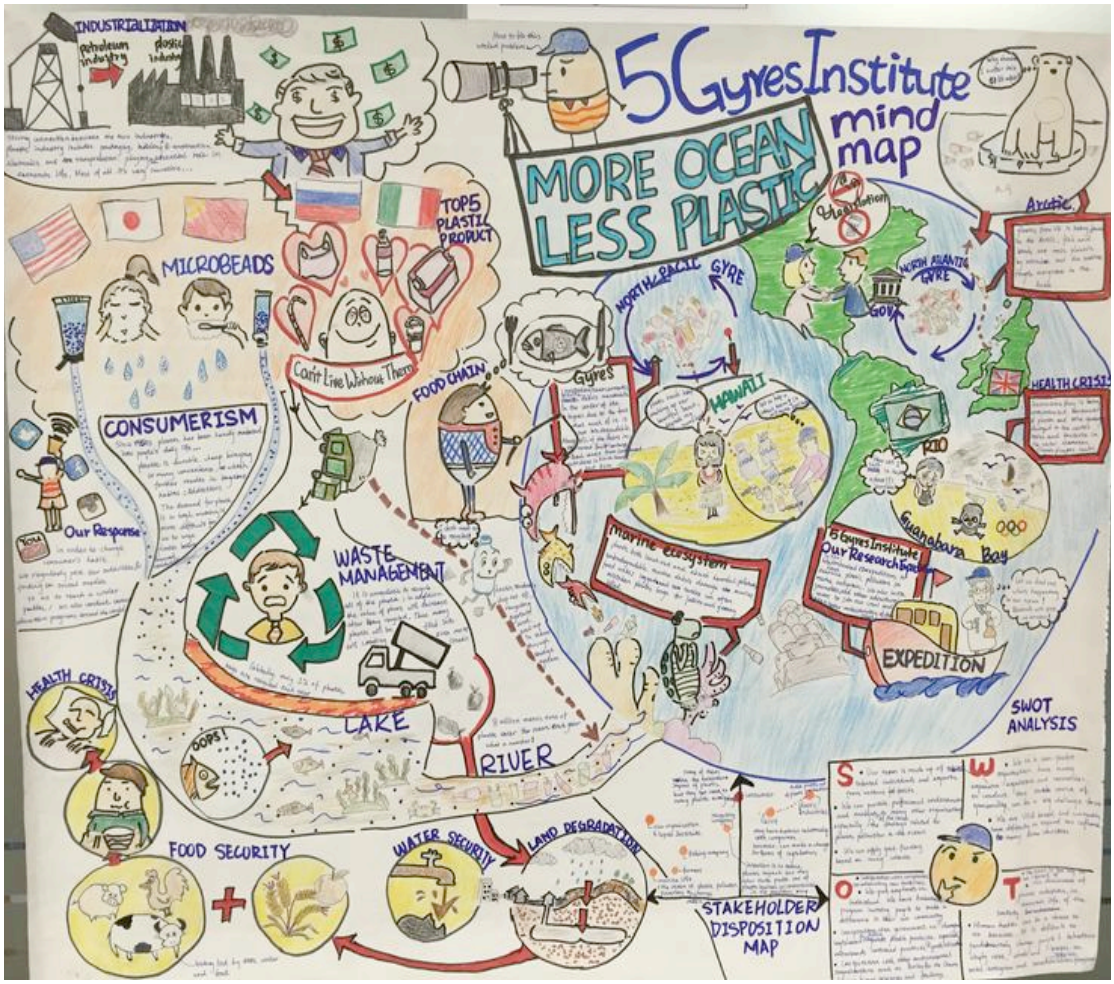

Figure 4: *Mind Map Poster illustrating the response of the 5 Gyres Institute Stakeholder to the plastic pollution 'wicked problem' raised in The Plastic Age? Role Play in September 2016*

Student permission has been given for using these materials.

After the completion of the Mind Map Poster, stakeholder teams are given the option to write a brief summary of the illustrated message. This allows them to critically reflect on their work and their mastery of visual literacy and gain further confidence in their own learning.

In the words of the 5 Gyres Institute Stakeholder Team, "*the Mind Map Poster aims to illustrate, from the top left corner: plastic is massively produced (**industrialisation**) and consumed globally (**consumerism**) however, there is a failure to manage it thoroughly during recycling. Plastic waste, which is not biodegradable, is dumped into landfills that pollute the soil. This leads to **land degradation** that contaminates drinking water systems and food production (**water and food security**). In addition, toxic microbeads directly flow into lakes and rivers through the drainage systems. Fish accidentally eat micro-plastics and, thus, toxins penetrate the **food chain** all the way up to humans (**health crisis**). Plastic waste that does not get recycled ends up in*

the oceans and tends to accumulate in the centre of ***ocean gyres*** *or float to seashores of many islands (****global environmental system****). The toxic plastic damages the* ***marine ecosystem*** *casing the* ***Arctic ecosystem*** *to become the victim of plastic pollution due to the chain of effects.* ***Responses*** *from our organization include: promoting activism through social media, conducting research expedition, corporation with government in legislation and beach clean-up action."*

The 'Wicked Problem'

Before embarking on the analysis of the pedagogical merits of the Mind Map Poster task, it is necessary to provide a brief summary of the relevant Introductory Scenario and associated News Flashes.

The Introductory Scenario is called: *The Plastic Age: A Documentary feat. Pharrell Williams* (https://www.youtube.com/watch?v=Pt6KlPCX1BU&t=2s). Through a series of interviews supported with visual and scientific evidence, the program draws attention to the 'profoundly dark effect' that plastic might have on the future of the ocean and implicitly the planet and cautions against *The Plastic Age*. Over 280 million tonnes of plastic are produced each year, and unlike paper, metal or glass, this does not oxidise or biodegrade but it persists and worse it ends up in the oceans making the ratio of plastic to plankton 100:1. One result of this is *The Great Pacific Garbage Patch* - a soupy collection of marine debris nearly the size of Australia. This has alarming environmental, economic and social consequences for Pacific Islands such as Hawaii. Bionic Yarn in partnership with Pharrell Williams and G-Star RAW produced the world's first denim line collection from plastic recycled from the oceans.

This scenario was selected because it offers the learners a useful starting point not only in terms of introducing the wicked problem but also for its original problem solving approach based on Bionic Yarn creatively capitalizing on plastic waste to develop a commercial opportunity: producing high performance yarns and fabrics from discarded raw materials including plastics. Also relevant to the Role Play is the fact that this solution is totally consistent with Bionic Yarn's economic and sustainability lenses. Moreover, this solution is made possible through partnerships with other stakeholders including Parley for the Oceans, Pharrell Williams, G-Star RAW. Hence, in the early stages of the Role Play process, the learners are shown an indirect example of how in-depth understanding of the problem can generate creative solutions within the stakeholder role.

In addition to the Introductory Scenario, further direction is given through several News Flashes or trigger events released on the Role Play Wiki. These aim to provide alternative perspectives of the relevant issues and/or stakeholders in order to escalate the tension and further reveal the 'wickedness' of the problem. In this case, News Flashes drew attention to the fact that plastic microbeads that rinse off synthetic clothes and cosmetics escape household drains and are increasingly found in US and Australian seafood (ABC TV *Catalyst: Micro-plastics*, 2016).

Mind Map Poster Analysis & Assessment

Visual literacy, in its complexity, meaning rendering layers of meaning through visual symbols, is the overarching learning goal of the Mind Map Poster activity. This is condensed in the following three assessment criteria (also see Figure 5):

1. **Relevance of stakeholder response** – the visual message needs to demonstrate understanding of specific information, issues, stakeholder interests included in and arising out of the Introductory Scenario and News Flashes.

2. **Depth of stakeholder analysis** – evidence of insight into own stakeholder role in terms of interests, scope and type of action, possible stakeholder collaborations and conflicts, strengths, weaknesses, opportunities and threats.

3. **Effectiveness of visual representation of major issues** – clarity of visual message

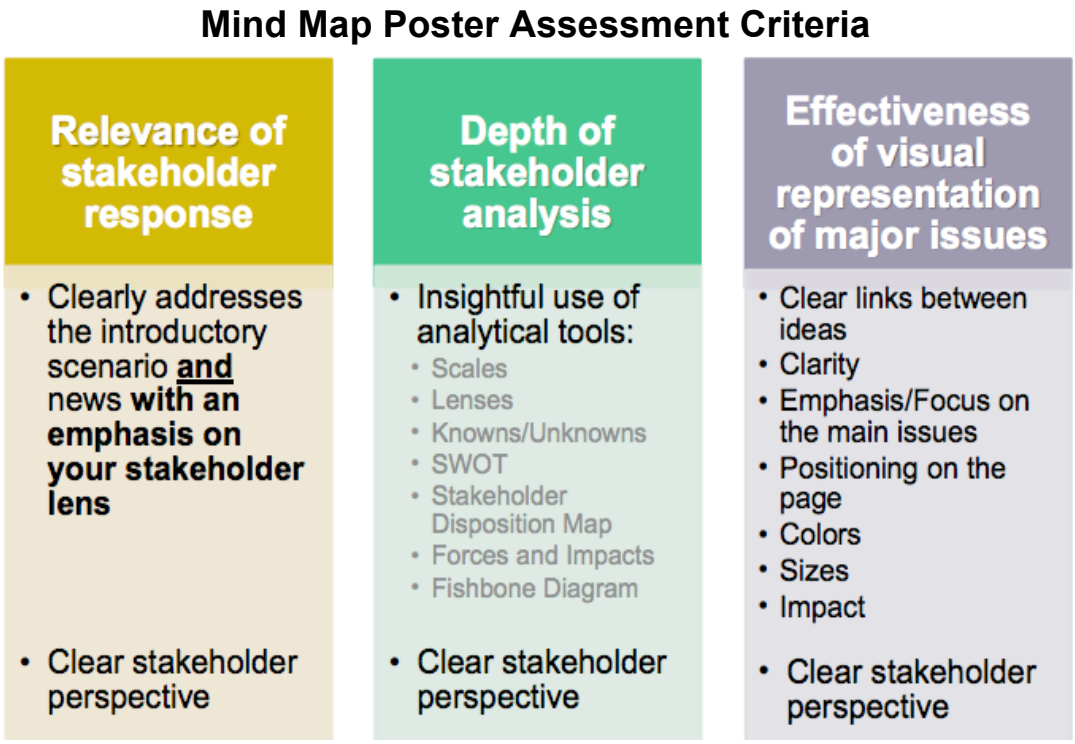

Figure 5*: Mind Map Poster Assessment Criteria*

The Mind Map Poster will be analysed from the perspective of the three assessment criteria and in light of the conceptual framework outlined above.

1. Relevance of stakeholder response

The Poster focuses clearly on plastic pollution by illustrating in bright red heart bubbles the world's love affair with the top five plastic products 'we can't live without' (Figure 6 below). The image of the happy money-making industrialist of indiscriminate nationality surrounded by the flags of USA, Japan, China, Russia and

Italy suggests, as does the Introductory Scenario, that most plastic generates from heavily industrialised countries and that it is a very lucrative enterprise. Further relevant to the scenario is the illustration of an overburdened and inefficient waste management system that leads to irresponsible landfills and soil contamination. The ensuing elements build on the issues raised in the scenario and provide broader but still relevant insights such as land degradation determining an increasingly toxic water cycle with repercussions on water and food security and ultimately generating a health crisis. This critical follow-through cleverly addresses all the three assessment criteria but above us points to genuine engagement with the issues in and arising out of the scenario.

In addition, the references to microbeads in toothpaste and soap filtering through to rivers systems meaningfully integrate elements of the News Flashes, which indicate constant monitoring of the Wiki activities.

The key element that consolidates the visual message is the stakeholder *response* or reaction to these issues. It is in the formulation of this response that the developing expertise of the learners is framed. It is relevance and quality of this response that gives authenticity to the overall message of the Poster and differentiates high quality from mediocre performances. In this case the response is relevant and strongly in role. The 5 Gyres Institute aims to change consumer habits through activism via social media and other education programs.

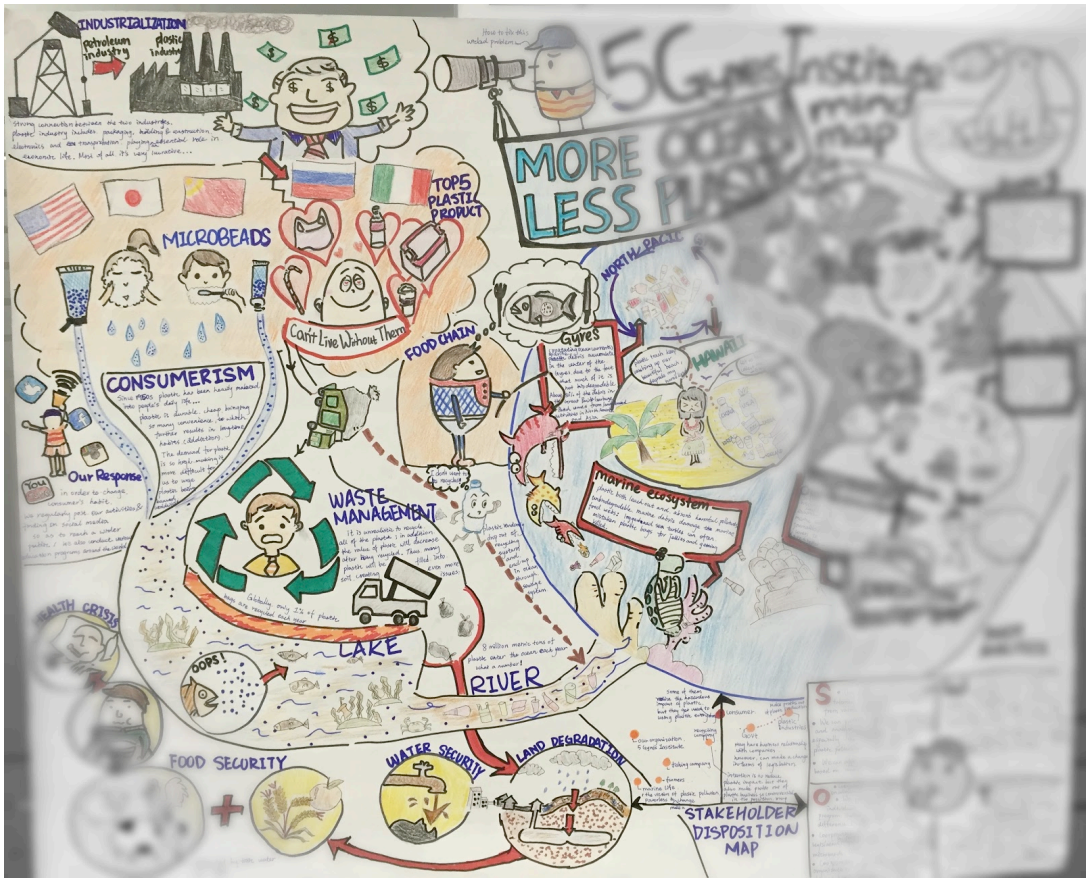

Figure 6: *Mind Map Poster illustrating the response of the 5 Gyres Institute Stakeholder to the plastic pollution 'wicked problem' raised in The Plastic Age? Role Play in September 2016*
To direct the reader's attention to the left side of the poster, the right side has been intentionally blurred.

The illustration of the 5 gyres with a main focus on the North Pacific Gyre, with its Great Pacific Garbage Patch and the island of Hawaii is not only relevant to the scenario but is also strongly in role (Figure 7 below). This is further substantiated by the initiative of a research expedition to further investigate the issues and search for solutions.

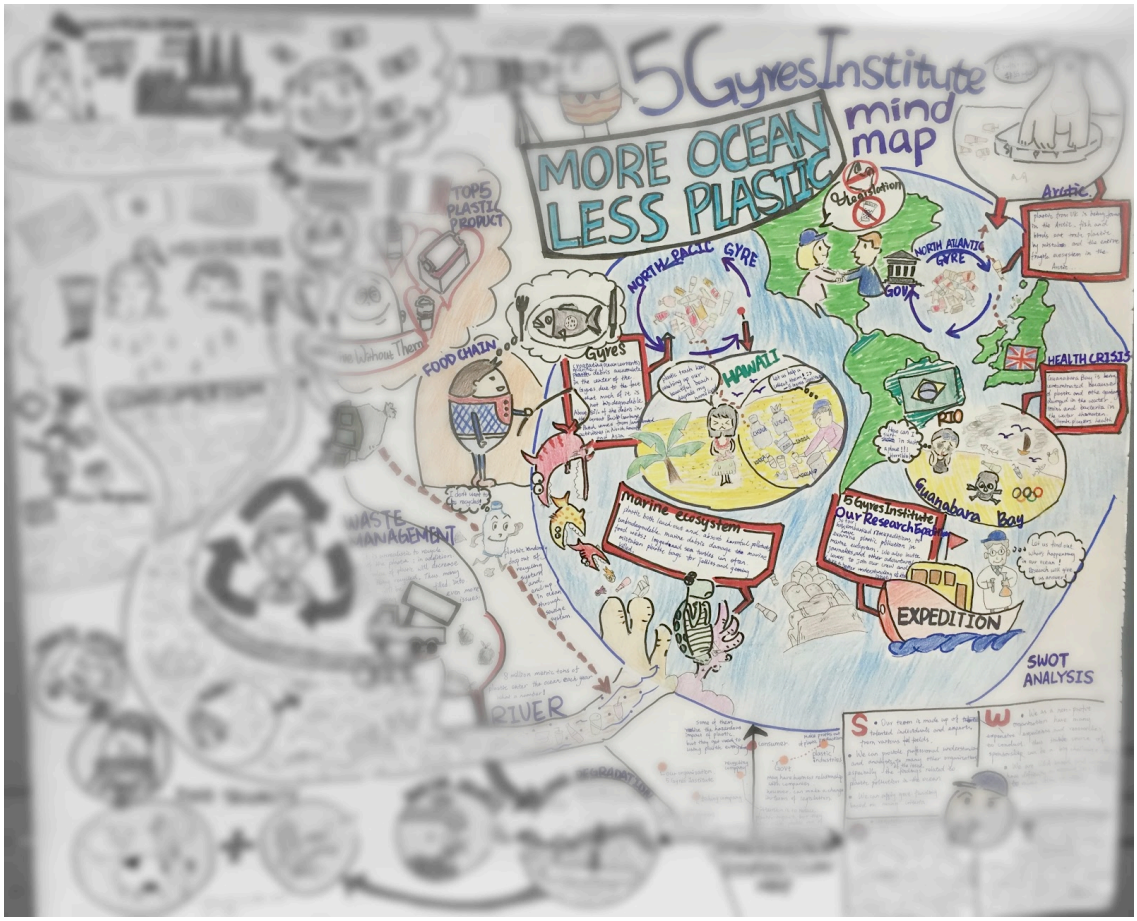

Figure 7: *Mind Map Poster illustrating the response of the 5 Gyres Institute Stakeholder to the plastic pollution 'wicked problem' raised in The Plastic Age? Role Play in September 2016*

To direct the reader's attention to the right side of the poster, the left side has been intentionally blurred.

2. **Depth of stakeholder analysis**

The message of this Mind Map Poster is especially compelling and insightful in that it is not limited to the illustration of the issues raised in the Introductory Scenario and News Flashes but goes far beyond these to extrapolate and visualize the stakeholder position towards the wicked problem based on the learners' analysis of the lenses, scale and capabilities of the 5 Gyres Institute.

The illustration of the globe as highlighted in Image 4 points to the 5 Gyres Institute operating on a global scale and the depiction of the 5 gyres collecting and spinning round marine debris indicates the stakeholder focus and scope rather clearly. The little vignettes associated with each gyre reveal localized underlying issues arising out of the plastic pollution. The issues illustrated are mainly of an environmental or health nature while the stakeholder responses tend to be based on science, education or adventure. All these are consistent with the lenses and capabilities of the 5 Gyres Institute. This demonstrates the learners' ability to filter a wide range of information

and critically distil meaning *as if* they were the 5 Gyres Institute. It is the purposeful autonomy of learning design that stimulates such confident thinking.

On the other hand, the aspects of the Poster that are illustrated in Figure 5 aim to reveal the stakeholders and issues that cause the plastic pollution of the gyres to occur. The fact that these issues are presented on a side (the left of the Poster) and outside the globe symbolizes that the 5 Gyres Institute is powerless to influence any of these. This adds another layer of meaning to the Poster and further consolidates that stakeholder position.

Furthermore, the SWOT and Stakeholder Disposition Map (Figure 8) offer further insight into the stakeholder capabilities to address the relevant issues and relate to other stakeholders in doing so.

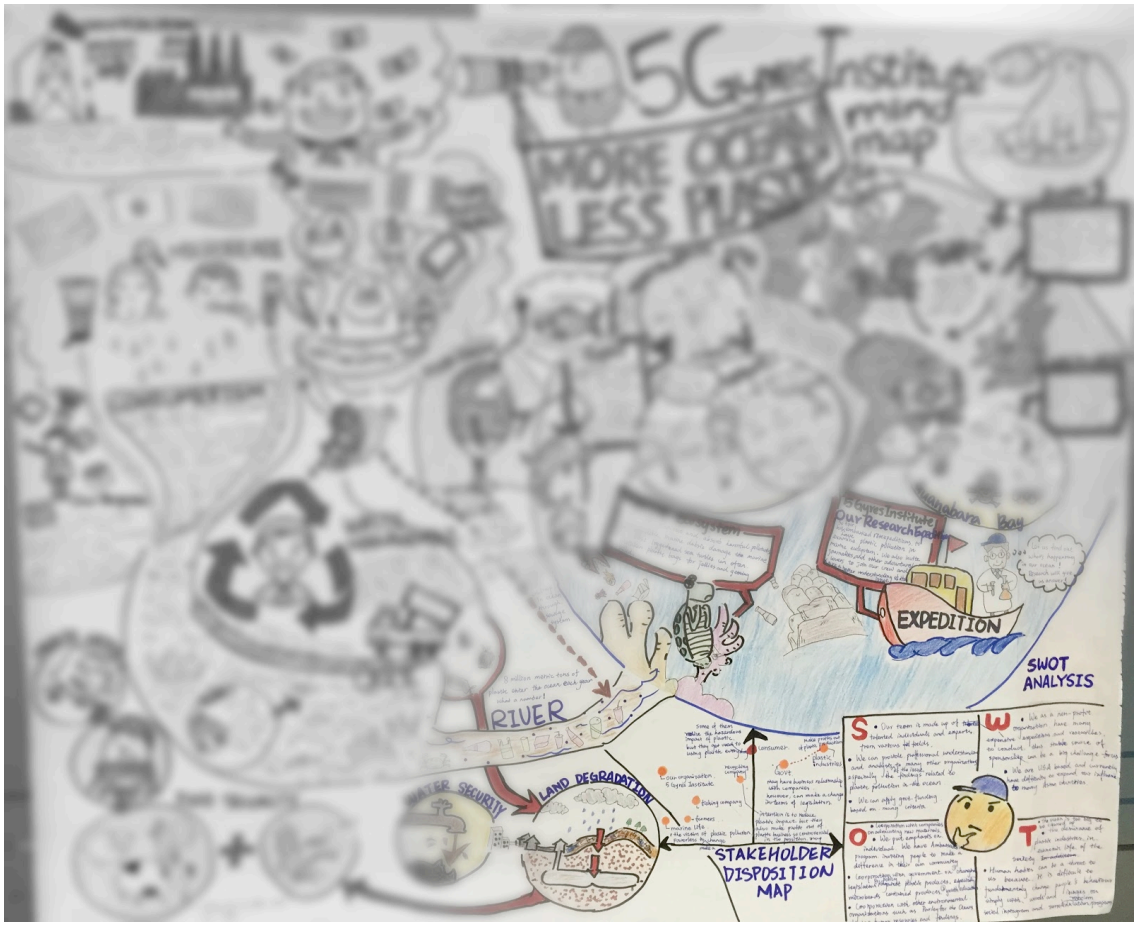

Figure 8: *Mind Map Poster illustrating the response of the 5 Gyres Institute Stakeholder to the plastic pollution 'wicked problem' raised in The Plastic Age? Role Play in September 2016*

To direct the reader's attention to the bottom right, the rest of the poster has been intentionally blurred.

3. Effectiveness of visual representation of major issues

As illustrated above, the Mind Map Poster is divided into two parts, the left-hand side analyses the wicked problem so as to contextualize the stakeholder response, while the right showcases the stakeholder view and scope of action.

Colour is used consistently to distinguish between positive and negative aspects, for example, plastic packaging floats in bright red heart bubbles while plastic trash in Hawaii looks dark grey. Arrows point to a chain of causes and effects such as the cycle of plastic waste though nature; and positioning on the page highlights forces and impacts, i.e. industrialization driving consumerism, which in turn puts pressure on the natural environment with devastating social and environmental impacts.

Also contributing to the clarity of the message is the consistency of the symbolics and thoughtful integration of textual evidence to substantiate the visual message. It is important to note that the images and words do not overlap and repeat the same information but are complementary. This is further evidence of masterful visual literacy.

Learner Testimonials

The following testimonials extracted from the 2016 *The Plastic Age?* Role Play participants' Debriefing Reports reinforce from the learners' perspective some of the learning design achievements illustrated above. Student permission has been given for using these materials.

> *"The Role Play has been the most exciting and unique assessment that somehow doesn't feel like an assessment. It engaged a large group of students sharing information and communicating with each other on the Internet and face to face - just like in the real world. I have never experienced this before." CHEN Siwie, 2016 representing the 5 Gyres Institute & one of the authors of the Poster Poster analysed in this paper.*

> *"The most frustrating stage for us has been creating the Mind Map Poster. We abandoned many drafts before finalizing the most satisfying one. It almost seemed impossible to achieve a quality mind map poster at first. Accepting the challenge, we reviewed the video of introductory scenario as well as the comments our team made in Vialogues several times and summarized the forces and impacts of plastic pollution in order to capture the main information for our mind map. This proved to be very effective later. In addition, we've learnt that combining the components of issues with visual literacy involved decision on images, positions, sizes and colours to illustrate an integrated and logical mind map. We were very surprised at our creativity when we finished the task. Moreover, we found that the mind map poster was such a direct, powerful and interesting tool to reveal the complexity of the wicked problem." The 5 Gyres Institute Team, the authors of the Poster Poster analysed in this paper.*

"One of the most notable experiences I've had during the Role Play was designing the mind map poster. Trying to visually represent concepts made me look at them in a different way. Without words, every other element such as shape, colour and size couldn't be overlooked. I had to think of ways to use them to get the maximum effect. I had to think about what MBA Polymer would put on the paper, what they would want the eyes of the viewer to focus on and what impression they wanted to give about the issue and their company's role. It was challenging to try and both give an honest picture of the issue and keep in mind what parts of that image MBA Polymer liked people to see. It was significant for me because it made me think a lot about the balance between the honest truth and the truth someone with bias wants to show others. It taught me to recognize bias." Shima Golmohamadi representing MBA Polymer

Figure 9: *Testimonials extracted from the 2016* The Plastic Age? *Role Play participants' Debriefing Reports*

Limitations

Some of the limitations of this educational approach are related to the learners' abilities to express their ideas visually in the absence of advanced technological support. Those who are not confident with their drawing skills may find the task extremely demanding especially at the early stages of preparing the poster due to insufficient familiarity with the assessment criteria. This can create a sense of frustration in some teams and even demotivate some learners at the start of the task. Some learners need more time to adapt than others but ultimately all participate actively and appreciate the challenge as an enriching learning experience.

It is not only learners but also educators that need to adjust to this teaching/learning approach. They need to allocate more time to clarifying the marking criteria and most importantly reassuring students that the mastery of drawing skills and sketching is not the key to success in this Role Play task but the relevance and complexity of the visual message conveyed.

To overcome the afore-mentioned challenges, educators can introduce the assessment criteria at the beginning stages of the task and explain each component providing some examples of previous posters especially the ones that are more aesthetically pleasing and demonstrate above-average drawing skills but do not entirely meet the marking criteria in terms of the complexity of the message delivered. This can be done as a complementary classroom activity prior to the stage in which team members are asked to produce their Mind Map Posters. This can not only alleviate the amount of frustration learners might face but also can assist in directing their attention to the criteria and reduce any chance of diverging from the focus of the task.

Conclusion

The preparation of the Mind Map Poster is a turning point in the Role Play learning process for most learners especially because of the restriction on the use of electronically mediated technology. This is the stage when team members are compelled to physically come together to discuss, question, analyse, synthesize information and distil their understanding. It is during these very interactions that

learning is crystallised. The fact that learners are compelled to express their learning in a visual form away from the filter and support of ICT software, genuinely pushes them out of their comfort zone in a way that stimulates their critical and creative thinking. The Role Play procedural framework ensures versatile support through the provision of guiding content references as well as a variety of analytical tools and complex visual literacy skills. While electronically-mediated technologies are prohibited for the actual Mind Map Poster task, this is employed extensively as a scaffold for the preparation leading up to this task. Hence, the success of this learning experience is thoroughly dependent on the fine-tuned integration of the electronically-mediated technology with stripped-down original expression.

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