Learning by throwing the dice: How serious games can help to understand the complexities of an emergency response and what preparedness should mean.

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ABSTRACT

A principal element in maintaining the right levels of preparedness in pollution response management is passing on lessons learned and international good practices to a new generation of responders. For many trainers, PowerPoint Presentations have become the main tool in delivering the same course every time and these provide consistency between courses over the years. But from a participant's perspective it can be quite challenging to digest such series of presentations, and remembering what has been presented can be even more difficult.

Tabletop exercises are normally highly appreciated as part of a training course, as they provide an environment of interactivity and social exchange. It raises the question whether tabletops can bring participant engagement to the next level and replace some of the passive learning via PowerPoints with active learning. Could tabletops include game-like elements, including the use of dice and cards to make them more playful? Could dice and cards bring in stochastic injects that are also characteristic of real-time responses? Could we think of new types of tabletops where complex matters could be visualised and where scenarios are generated by

throwing a dice? Could participants learn from engaging discussions amongst them, rather than watching PowerPoints?

These were amongst the questions that over the years have led to the development of a series of game-based tabletops that aim to engage participants in the management aspects of wildlife response via methods of "active learning". Games have been developed designed to be played face to face, but also online using interactive and collaborative software platforms.

This paper describes the path towards creation of the WildX tabletop environment, a wildlife emergency response exercise package developed with European Union (EU) funding, and the experience of providing game-based tabletops both in-person and online.

INTRODUCTION

The idea to develop games as a tool to explain the complexities of oiled wildlife response scenarios evolved over the years when designing increasingly advanced tabletops to spice up heavily PowerPoint driven training events . These events were held to introduce stakeholders such as governmental agencies or oil industry personnel to the new field of oiled wildlife response and preparedness, which had gained importance and recognition after having existed in the margin of the mainstream developments in oil spill response and preparedness for decades (Kelway et al., 2014). Today oiled wildlife response is fully integrated into the jointly agreed and published standards of good practices for oil industry (IPIECA/IOGP, 2014; 2017). In an increasing number of countries the care of pollution-impacted wildlife has been formalised in national oil spill response plans and/or dedicated wildlife response plans. In such countries, training and exercise programmes are implemented to develop resources such as wildlife

responders with professional skills, fit-for-purpose facilities and stockpiles of equipment that allow a quick and adequate response that is fully integrated into the wider oil spill response management system.

But there is still a lot of mission work to be carried out in other countries where the need to have adequate wildlife response resources in place has not fully landed. Also the oil industry is relatively slow in implementing the good practices that have been collectively adopted.

One of the underlying factors for relatively slow structural investments into wildlife response capabilities is that the complexity of a wildlife response is gravely underestimated. Incidents with complex wildlife impacts are infrequently reported and the educational trajectories of oil spill response personnel are normally biased towards the engineering aspects of oil pollution prevention and cleanup. It is often overlooked that the effectiveness of at sea response can be quite limited as optimal environmental circumstances are needed and the oil characteristics should be such that they allow the strategies and equipment to work. Meanwhile sensitivity mapping is often focuses on designated nature reserves in the coastal area, and little effort is normally taken to identify high concentrations of marine fauna in the near and offshore areas, outside of formally designated reserves. These animals are heavily at risk from surface oil that has not been collected or that spreads in a layer too thin to be considered for mechanical or chemical treatment. This could lead to quite a considerable wildlife impact becoming visible onshore, which could come as rather a surprise to managers leading the oil spill response.

From the perspective of a community of wildlife response experts, there are not a lot of opportunities to bring the wildlife risks of an oil spill event to the attention of decision makers in

governmental agencies and the oil industry. Tools have been lacking to visualise the complexity of responding professionally to wildlife, considering the length of shoreline where impacted wildlife could arrive, the required quantity of resources needed to respond on the shoreline, transport of animals to facilities, and carrying out the treatment (euthanasia or stabilisation, cleaning, rehabilitation and release) using those facilities.

This leaves plan writers and decision makers often believing that they can prepare for a professional wildlife response just by listing the names and telephone numbers of Tier-3 wildlife response groups as an annex to a small wildlife paragraph in the oil spill response plan. On paper the question seems to be tackled, but in reality they will be limited in what they can help local parties achieve when mobilised, as there is no identified critical mass of trained and exercised resources in-country they could work with.

To deliver training and exercises, PowerPoint presentations can still be a useful tool to explain certain topics to a group of people. However, the lack of visualisation and static nature of PowerPoint presentations make it difficult to demonstrate the challenges of wildlife response. With this in mind, the idea to try to develop a series of tabletops that could do the job was born. This resulted in the use of some early trial tabletops over the years and eventually the game-based WildX package that was developed as part of an EU co-funded project.

METHODS

In the course of more than 15 years many wildlife response training events organised by the authors of this paper included tabletops in which some aspects of wildlife response planning and preparedness were practiced. A fictitious country “Fantasia” was created with a number of

wildlife characteristics, and workshop participants were divided into groups to develop a wildlife response strategy. In the evaluations of the training events, the tabletop session always received the highest scores of appreciation. As trainers we could observe that in those sessions the participants developed a sense of "ownership" over the theory that had been presented during the PowerPoint lectures.

In 2019, when organising a three-day workshop in Cyprus for oil industry participants on the basis of "active learning" (i.e. no PowerPoints to be shown, interactive sessions only), the Fantasia exercise was further extended to allow for incident planning, still based on some simple sets of information added to the original Fantasia setup, and some playful elements such as the use of dices to define a scenario. The appreciation of this methodology and the depth of discussions it facilitated, quickly created an "ownership" amongst the workshop participants over the insights they jointly developed during the exercise. This motivated the participants to develop a set of recommendations from the workshop that today are the basis of a more structural programme of engagement of companies into the topic of wildlife response, and the basis of the so called Community of Practice that was initiated in Cyprus (Davi et al, 2024).

One of the main lessons from the Cyprus workshop was that the approach of "active learning" is powerful. It can create a state of ownership with participants, bind them together to a joint purpose for change and put them into a state of creativity to define logical and achievable steps towards change. Participants' feedback highlighted the role of the playful Fantasia exercise in setting the scene for a better understanding of the problem. The interesting underlaying factor in playing the tabletop was that participants were instructed to inform each other, and a few wildlife experts were also present to answer the concrete technical questions that nobody else

could. This activated the collective knowledge that participants brought to the table, and resulted in trust, exchange of experiences and a discovery of different perspectives that deepened insight into the subject matter. It also activated a curiosity to learn more, and questions asked were often spot-on, to a much greater depth than the questions asked after a well designed theoretical PowerPoint that tends to overwhelm the audience.

The learned lessons from Cyprus from a workshop design point of view inspired taking the idea of a playful tabletop setup to a next level, where other game elements could be added to the effect that a scenario would be created by participants playing the game. The development of such a tabletop exercise environment was included as a work stream of the EU co-funded project EURopean Oiled Wildlife Assistance -2 (EUROWA-2) that ran from January 2021 to May 2023. A preliminary version of the tabletop was tested in the Netherlands where it appeared to work well and the lessons learned informed the further development of the different modular games of the portfolio, which in the end was branded WildX for further use in Europe.

RESULTS/DISCUSSION

This section describes the WildX portfolio and experiences from using it in workshops, to provide examples of what serious games can look like, their attributes, and which educational effect they have on participants' understanding.

WildX is a tabletop exercise portfolio based on a fictitious multi-country setting, with maps at different scales which will allow for playful simulation of marine pollution incident scenarios that would require integrated management of associated wildlife impacts. The portfolio currently includes 7 different game settings which allow participants to explore various realistic

response challenges and discuss operational management options while achieving the different exercise objectives.

The exercises of the WildX portfolio are scenario-driven and follow a discussion-based methodology (IPIECA, 2023c; EUROWA, 2023). With game attributes such as dice and card decks, each game in the portfolio aims to stimulate creative free-thinking and active learning, while participants jointly study and discuss the scenarios, using their collective knowledge. In the WildX tabletops participants work as a team while solving the presented challenges and developing joint "ownership" of the results of their discussions. The games focus on the nature of wildlife aspects in a marine pollution scenario and visualise how they become apparent. They invite participants to discuss the various options for a response, and while debating, develop new insights about their own role, that of other stakeholders, and the relationships between all roles.

The current WildX portfolio covers the following domains within wildlife response:

- International Response
  - Cross-border collaboration/mutual assistance
  - International mobilisation of expertise (EUROWA Network)
  - Assessing wildlife response resources
- Wildlife Management
  - Importance of integrated wildlife response management
  - Multi-stakeholder aspects of management
- Wildlife impacts
  - Animal welfare

- Public and citizens' reactions and involvement
- Communication strategies

- Wildlife operations
  - Response Strategies: onshore/offshore
  - Shoreline operations and rehabilitation facilities
- Wildlife preparedness
  - Risk assessment, planning, resources, roles and responsibilities
  - Importance of training and exercising

WildX is modular, so each game can be used individually, or in combination for a longer event. It allows an event organiser to choose between focussing on one or two domains or to go through the complete set of tabletops. Figure 1 shows an overview of the current WildX game package.

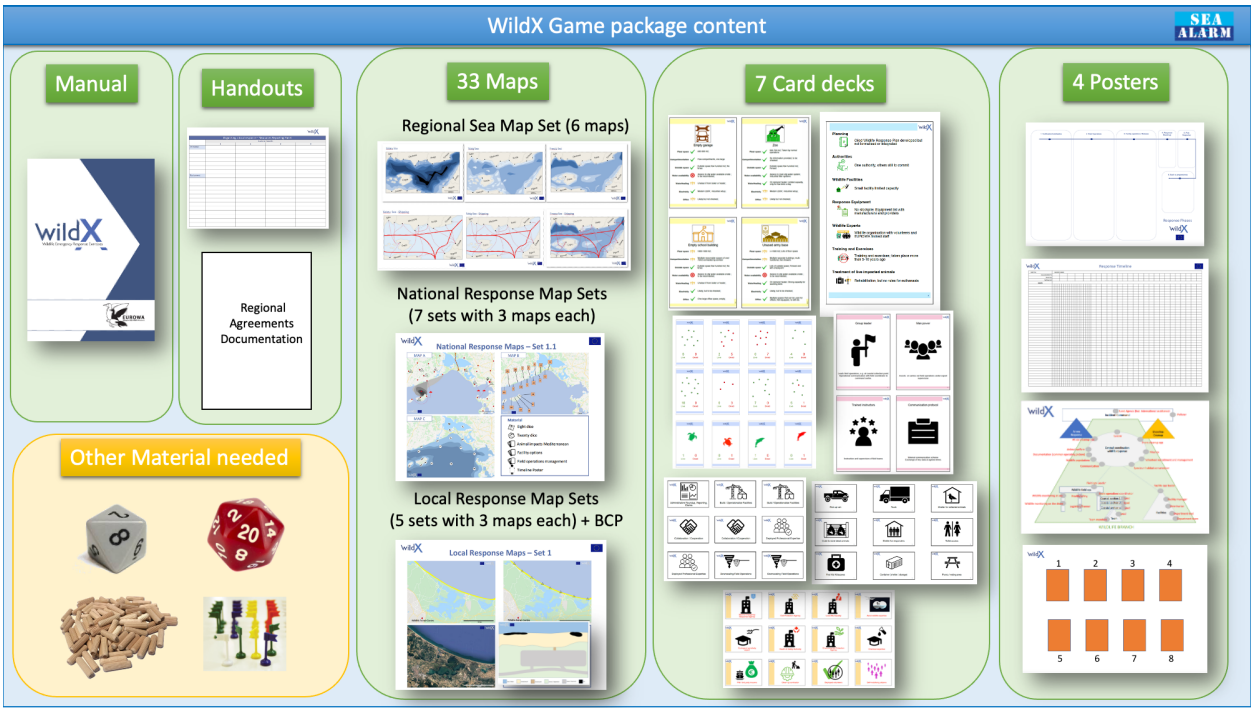

Figure 1- WildX game package content.

The whole WildX portfolio was presented and played at a workshop in Brussels in May 2023, which was also the closing event of the EUROWA-2 project. Representatives were invited from country authorities, including maritime authorities and wildlife authorities as well as representatives from the EUROWA network. The workshop included all of the WildX games which were played in 5 sessions of 1-1,5 hours. The games were perceived as very useful in providing an in-depth insight into the many aspects of dealing with wildlife impacts and innovative for their attractive approach. It helped participants to understand the issues at all levels from local to national and international, and also to realise that the systems in their home country would not be able to cope with challenges that the games visualised. In their feedback the participants agreed that the strength of a serious game in this format is that it visualises the issues, and that it creates a key understanding of the need for planning and logistics in support of the operational activities to deal with wildlife challenges in the field and in facilities. It demonstrates that wildlife response needs to be fully integrated in a country's wider emergency response system as it strongly depends on local expertise, local resources, and a coordinated decision making structure. Players do not need to be wildlife experts, or to know the details of wildlife treatment protocols in order to fully grasp these messages – but the presence of wildlife experts has an important added value to the overall experience and understanding of wildlife response concepts that the games incorporate.

Figure 2 WildX Material being played during the workshop in the Netherlands

Figure 3 WildX Material used during the workshop in Brussels.

The portfolio of WildX maps can be replaced by country specific maps, so that the simulated wildlife impacts can be directly reflect the reality of coastal areas that invited participants are familiar with. This has been tested in The Netherlands, in various regional workshops with local and national authorities. In a workshop in the northern part of the country, maps of the Dutch Wadden Sea (the most sensitive natural area of the country) were used, and given features of the anonymous WildX maps. A Rijkswaterstaat oil spill projection modelling programme was used to simulate oil trajectory following an oil spill incident north of the Wadden islands. The WildX playing cards and posters were used to simulate the impacts on birds in the area and the arrival of animals at different locations on the maps. The invited authority representatives were subsequently provided with cards that reflected bodies and actors from their own emergency response system, but also various actors (citizens, Non-Governmental Organisations or NGOs, media) that could make their appearance in the affected area. The visualisation of all these factors in the context of the complex physio-geography, polluted coasts

and polluted animals helped the representatives to more easily see the challenges of such a scenario, and realise the gaps in their preparedness (not only related to oiled wildlife). In this way the games assisted the participants in realising that the response to an oiled wildlife scenario cannot be left to NGOs or citizens, and that all authorities have a role to play. The feedback from different workshops held was that participants found the methodology innovative and extremely useful for understanding the subject matter.

CONCLUSIONS

The method of "active learning" (Bonwell and Eison, 1991) is about how people learn rather than what they learn. In the context of the this paper, the development of tabletops with game elements such as maps, cards, dice, flags, etc., aims to create an environment of interactivity where participants have to collaborate and explore each other's knowledge and experience. By design, the games provide multiple injects for discussion and tell a story of their own which is enriched by the input from participants around the table. This creates an experience of group learning, in which also aspects of fun and laughter play essential roles, which is stimulated by the game elements of throwing dice and drawing cards from a deck.

The games do not completely replace a theoretical PowerPoint, but they provide an overall framework and context in which the knowledge from the PowerPoints naturally fits. By playing the games, participants develop a curiosity for more in depth backgrounds of the scenario and the theory of wildlife response. The interactive social process that these in-depth insights emerge through are a tool where the lessons learned are better remembered. Together the participants can develop a common insight that could become a joint conclusion from the event,

and could lead to some concrete follow-up actions that the participants together define, and which some of them might even adopt as a personal task.

A key element of presenting a wildlife pollution scenario in the form of a playful tabletop with game elements, is that participants do grasp that the challenges are too wide and too complex to be left to a small group of people who are supposed to organise the whole response on their own. It demonstrates that a wildlife response can only be delivered as part of an overall incident management structure in which multiple authorities have to play a role. And it cannot be done without elements of planning, logistics and operational management, and, importantly, clear objectives as to what should be achieved.

Such messages can be conveyed by a PowerPoint during a workshop, but the impact of these messages are much stronger if participants self discover them in a group process at the conclusion of an engaging and playful event.

A last important aspect of developing serious game packages such as WildX and others described, is that participants should feel that they are not manipulated. The fact that scenarios can be self-generated also allows players to have the option to bring an inject from the games into discussion. Such an intervention does not undermine the games, but enriches the insights that participants gain from them. In the end, all the maps and cards that the games offer for playing are fully clear, and can be individually scrutinised by the participants. In the end they use the materials to build their own specific scenario and via their discussions they create a storyline that they all agree to. This also contributes to the fact that they will feel an ownership to the outcomes of their discussions, and the conclusions they draw together.

Overall, the useful of playful serious games has proven a valuable tool to engage, inspire and teach the participants about the complexity of oiled wildlife response. The concept could be expanded to a broader range of incident scenarios to cover more topics than only oiled wildlife response, thereby contributing to a better overall emergency response.

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