



DHI CASE STORY

EXPOSURE SCENARIOS TRAINING

Persuasive design e-learning to help industries comply with REACH

European Union (EU) regulations require the communication of chemical information throughout the supply chain – from the manufacturer and importer to downstream users. This complex information may be presented in exposure scenarios (ES's)—an annex to a safety data sheet. In order to ensure that information in an ES is correctly communicated, the EU's Lifelong Learning Programme has developed an e-learning resource for industries that produce and sell chemical mixtures. We developed this software resource, which supports interactive learning. Our resource assists vocational learners with understanding EU regulations for exposure scenarios as they relate to handling chemicals. The results of our work may be used in the future to help improve the software itself and to develop new interactive learning resources.

EXPOSURE SCENARIOS

The European Union's (EU's) regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) requires that information on chemicals be communicated throughout the supply chain. The exposure scenario (ES) is an important element in fulfilling the REACH communication requirement for hazardous chemicals. It describes the safe use of a given substance (on its own or in a mixture) during its life cycle. It also specifies to the manufacturer, importer and downstream user, the operational conditions of use and risk management measures that ensure adequate control of risks to humans and the environment.

SUMMARY

CLIENT

European Union's (EU's) Lifelong Learning Programme

CHALLENGE

Difficulty communicating information contained in exposure scenarios (ES's) as required by EU regulations related to chemicals

SOLUTION

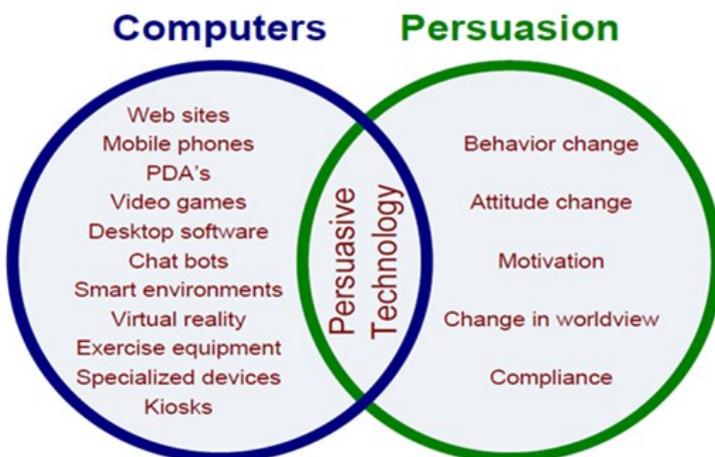
An interactive e-learning course to help participants better understand challenging topics related to chemicals legislation, strategy and handling

VALUE

High-quality, tailored and engaging learning

LOCATION

European Union



Persuasive Technology—the cross-field between persuasion and interactive computer technologies © BJ Fogg (2003)

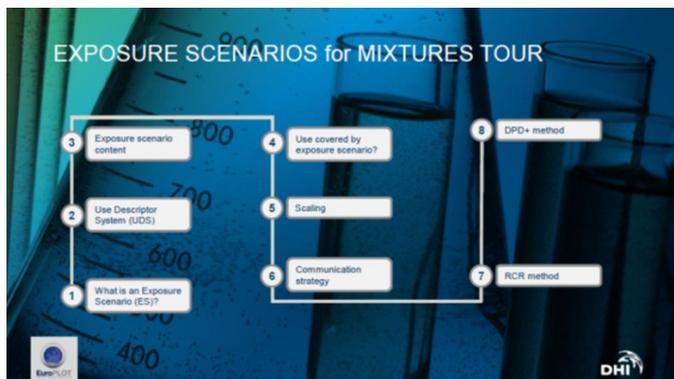
Delivered as an annex to safety data sheets, the ES is based on the chemical safety assessment made by a manufacturer or an importer of the chemical.

The companies that produce the chemical mixtures (the formulator) have to ensure that all relevant information in an ES delivered to them is communicated further down the supply chain. They must also determine how to communicate this information. Ensuring that this complex information is correctly communicated can be a challenge. Every downstream user of chemicals (a formulating industry or an end-user of chemicals) must understand and implement the ES's delivered to them from their suppliers.

PERSUASIVE LEARNING FOR THE FORMULATING INDUSTRY

The project Persuasive Learning Objects and Technologies (EuroPLOT)* – part of the EU's Lifelong Learning Programme – developed an e-learning resource for ES's. It teaches formulating industries how to handle ES's for chemical mixtures according to REACH. Based on persuasive design, it uses interactive computer technology to change attitude or behaviour without using coercion or deception.

A learning object is a modular resource (normally digital and web-based) that can be used to support learning activities. The e-learning resource is made up of eight sessions, each of which consists of several persuasive learning objects. The design of persuasive e-learning is a relatively new area that has yet to be widely applied to training for industries and businesses. As such, employees from industries, consultancies, and branch organisations (including Danish Industry, the European Chemical Industry Council and Norwegian Industry) were invited to test it.



Front page of the e-learning course with access to the eight sessions on ES's for chemical mixtures

As a EuroPLOT project partner, we developed training resources to help vocational learners understand REACH regulations for ES's as they relate to handling chemicals. Supported by the software PLOTMaker (developed during the EuroPLOT project), we applied several of the persuasive

principles to our learning objects. The participant is guided through the sessions of the course via a step-by-step learning journey.

TESTING THE E-LEARNING RESOURCE

Normally, employees at formulating industries learn the content in ES's and how to handle several ES's for a chemical mixture by reading technical guidance material, as well as by participating in face-to-face workshops and seminars. However, in these workshops, most of the instruction time is spent on the poorest performing participants, when covering a topic that is very complicated. Compared to traditional teaching-based learning, participants who used the e-learning resource could:

- go at their own pace, jumping back and forth, as needed
- test themselves without the risk of being embarrassed
- choose when to go in-depth with an issue

With our e-learning resource, we utilised a variety of interactive methods to make the information engaging and relevant to the participant, including:

- simplified illustrations to present new terms and core knowledge, which helped reduce the amount of guidance text that the participants had to read
- interviews of colleagues from other formulating companies in which they express their opinion on a topic
- self-assessments, which allowed participants to learn through interaction
- simulations, which comprised going through the same steps that health and safety specialists in the formulating industry have to perform when they receive real ES's
- interactive animation in the quizzes, which allowed participants to experience the results of an unexpected effects, such as a simulated explosion when the participant chose the wrong answer

We utilised two approaches to test the effectiveness of our e-learning resource: focus group interviews and online evaluations using electronic questionnaires. The results will be used to improve the way this e-learning resource and future resources are made. The results may also be used in the future to improve e-learning software.

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