

Practice Activities in e-Learning: Teaching Impact-based Forecast and Warning Services

Tsvetomir Ross-Lazarov, Amy Stevermer
The COMET Program / UCP, UCAR

Benefits of e-Learning

The first point to remember is that well-designed e-learning is a good investment. Once it has been developed, it can be made accessible to any learner groups, and is available at any time.

Positive e-learning experiences can result in learners being able to perform their jobs better, which ultimately allows them to contribute more effectively to their organization. In this way, the benefits of well-designed e-learning go beyond the individual and extend to achieving the goals of the organization.

Well-designed e-learning invokes thinking and provides learners with meaningful and memorable interactions with the content. The following quote by Michael Allen offers this insight into e-Learning designs that engage learners:

"To learn is an action taken by and occurring within the learner. Instructors cannot learn for their learners, and neither can e-Learning technology even with all its graphics, animations, effects, audio, interactivity, and so on. Learners must be active participants and, in the end, do the learning."

- Michael Allen's Guide to e-Learning, 2016, p.122



Simply replicating the classroom lecture and discussion with a few learners in the online environment is not enough; using the latest fancy technology is not enough either. As creators of online learning, we need to carefully design interactions for our learners that invoke thinking using real-life tasks and scenarios that they are likely to encounter at work.

Examples

We would like to share with you examples of e-learning in which the learners are active participants. The first example is from an online module in which the learners practice the steps for implementing Impact-based Forecast and Warning Services (IBF). The process involves these steps:

1. Determine the current conditions in their weather services.
2. Identify desired outcomes.
3. Determine the gaps between the current conditions and the desired outcomes.
4. Prepare a roadmap of actions with which to address the gaps.

The first task in implementing IBF is to determine the current conditions and capabilities of the National Hydro-meteorological Service (NMS). In the image, a virtual coach is guiding the learners through a set of questions to accomplish that task. The learners need to use their computer to review previous forecasts, open the folders to review documents with standard operating procedures and read media reports to learn how the forecast messages are received by the media and the public. The learners are presented with a workspace in which they can do all this by clicking on the computer, folders and newspaper. Then they can answer the question from the coach.



Well done!
Now consider the next question.

How well did the products communicate the threat?

- Not very well. The meteorological forecast identified the threat of heavy rains and strong winds. It mentioned two possible tracks and used scientific terminology to explain the rainfall processes. The hydrological forecast identified the threat of flash flooding along rivers but not in urban areas.
- Pretty well. The meteorological forecast pointed to the threat of heavy rains and strong winds. It used everyday language to explain the possible tracks and the precipitation processes. The hydrological forecast identified the threat of flash flooding along rivers and in urban areas.

Another task is the preparation of a Roadmap of actions that will address gaps between the current conditions at the NHS and the desired outcomes. In the interaction below, learners are assembling the roadmap by placing different actions on the Roadmap opposite the gaps that the actions address. In addition, IBF requires a partnership with other organizations and if the learners incorrectly match an action to an existing gap, a partner will leave the partnership because their interests are not addressed.

As learners work with the coach in this online module, they compile their findings similarly to the way that they would in reality. The findings are summarized in the table below. The learners see their findings about the Current Conditions, Desired Outcomes, and the Roadmap of Activities to address the identified gaps.

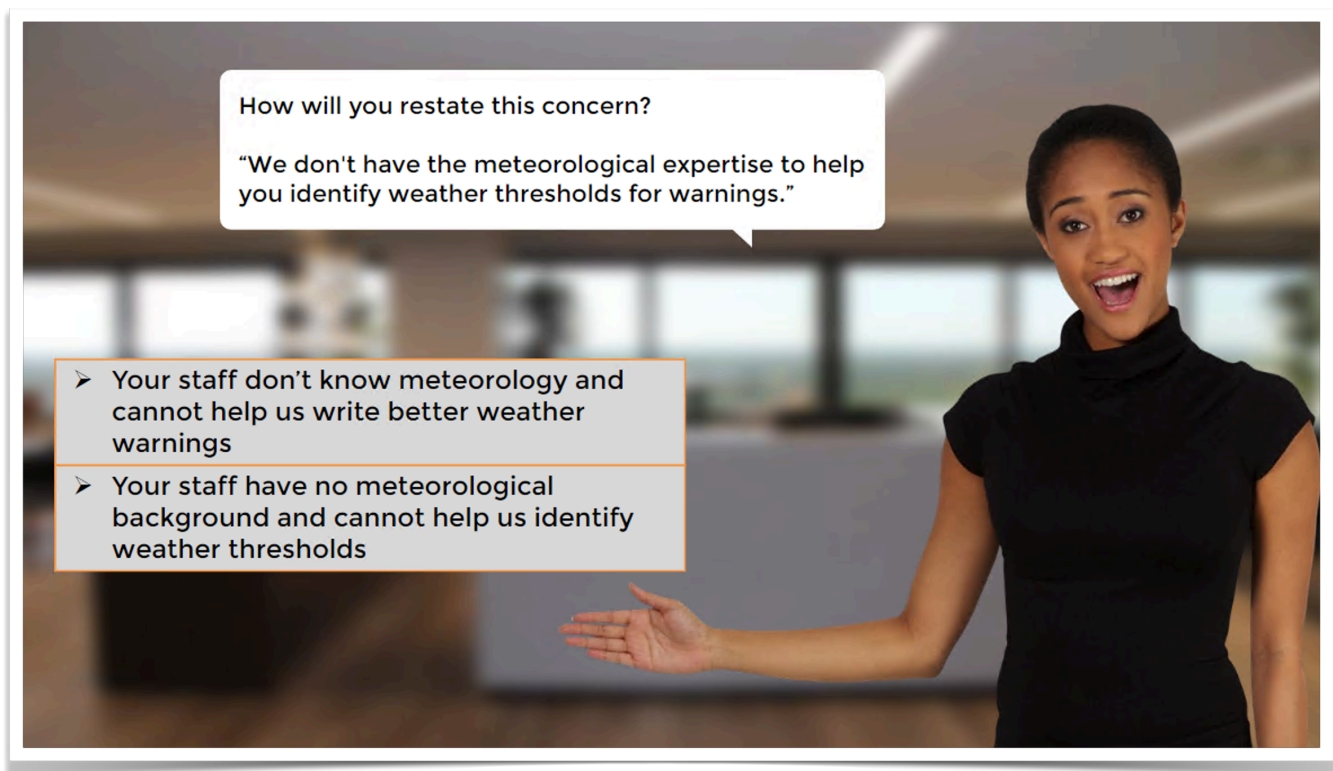
Current Conditions Where you are now?	Desired Outcomes Where would you like to be?	Identified Gaps Difference between desired and current state	Activities Activities to address the gaps
The meteorological and hydrological forecasts were issued on time.	Provide information to people that will help them make informed decisions and take appropriate preparedness actions	Current forecasts do not include impact statements describing what the weather will do	Work with communication experts, media, and emergency managers to prepare impact tables for various hazards
The hydrological forecast did not mention urban flash flooding.		Current forecasts lack actionable information to help people prepare for threats	Work with communication experts to prepare forecast and warning templates for each hazard that say what the weather will do
The forecast did not indicate what impacts people should prepare for with the tropical storm.		Current forecasts use meteorological terms to state what the weather will be	Write impact statements for different levels of threats posed by each weather hazard
A major flood destroyed homes and thousands live in shelters.		Meteorologists do not have the communication skills to create impact statements that are easy to understand	Remove meteorological terminology from forecast and warning messages
			Collaborate with media organizations to test the wording of forecast and warning templates with people from local communities

Building Partnerships Through Communication

In another online lesson, the learners practice communication strategies in order to invite different stakeholders to join the IBF partnership. We invite the learners to speak with the communication coach first to practice two communication strategies. Then, select which potential stakeholder to speak with next and use the strategies to resolve misunderstandings and diffuse situations.



The following images show how the coach gives the learners a communication task and the learners need to select the appropriate response to it.



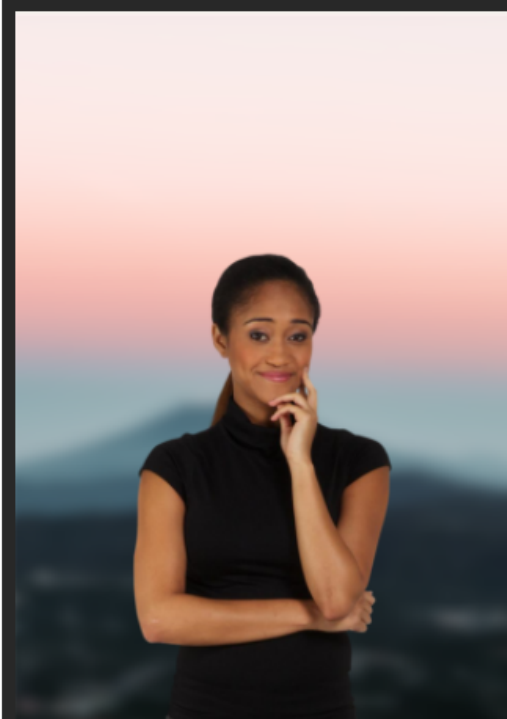
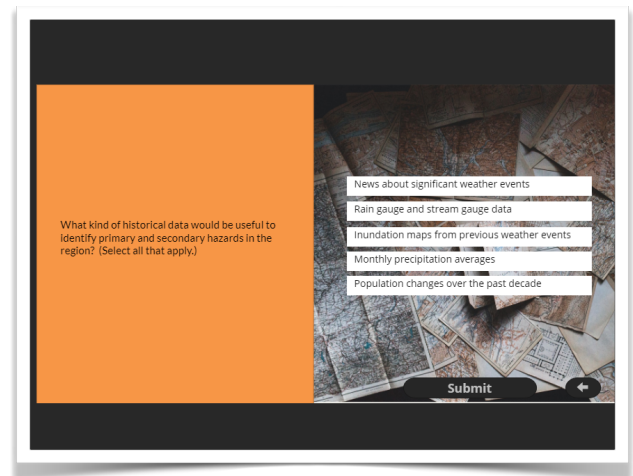
Carefully designed communication simulations like these can assist learners to practice communication strategies effectively even when it is not possible to hold courses in person. [View the full lesson.](#)

Identifying Impacts

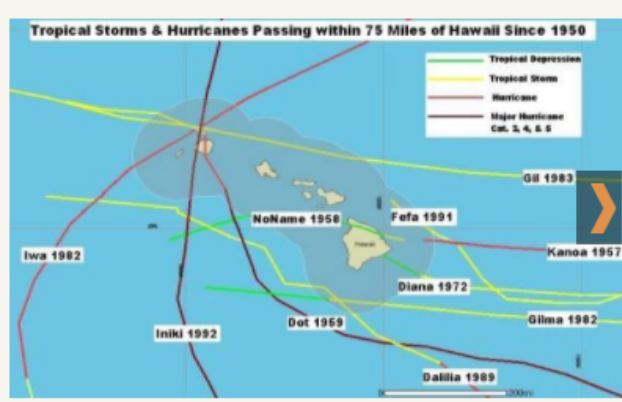
In another lesson in the Impact-based Forecasting series, we want to help learners to be able to evaluate hazards, exposure, and vulnerability, and then apply that knowledge to determine potential impacts.

This is a very nuanced and multi-step process, so in this case, we create a framework where the learner explores concepts and works through a generalized process using online examples through a very question-focused approach.


You'll see in this example that the coach, who was introduced in the previous lessons, is also back to guide them through these steps. Once published, this lesson will represent an important part of the overall impact-based forecasting curriculum.



News about past significant weather events and inundation maps from those events can give you information about possible hazards. Historical rain gauge and stream gauge data can also be useful.



Population changes in the region will help you determine exposure, but do not provide specific hazards information. Likewise, monthly precipitation averages do not directly inform your hazards knowledge.



Well-designed online lessons with practice activities can help learners become “**active** participants, and in the end, **do** the learning.” This type of e-learning makes for an excellent investment that will provide returns over and over to the individuals who take it and the organization in which they work.

References:

Allen, M., *Michael Allen's Guide to e-Learning*, 2016, p.122.

R. Jubach, R. Campbell, *Roadmap for the Development and Implementation of Impact-based Forecasts and Warnings for High Impact Hydrometeorological Events*, Hydrologic Research Center, San Diego, CA.

For more information about practice activities in e-Learning, please contact:

Tsvet Ross-Lazarov, tlazarov@ucar.edu.

Amy Stevermer, asteverm@ucar.edu.