

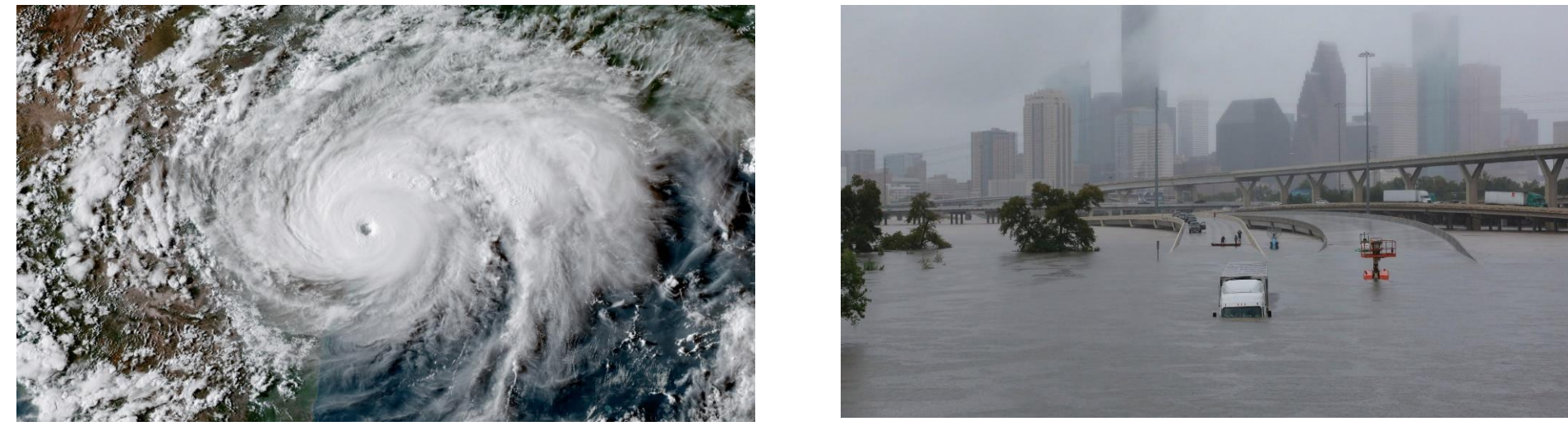
Online Local Environment Hazards Education for Young Adults Using a Social Media Platform



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Introduction



Img 1 (left): Hurricane Harvey courtesy NOAA (NESDIS). Img 2 (right) Flooding in Houston, TX by Richard Carson.

Natural hazards education has been found to reduce disaster impacts at individual and community levels¹. During disasters, people choose to act depending on how they perceive a hazard or risk, their risk perception².

Often-omitted from studies is the severity to which children experience disasters, including changes in risk perception. In addition, curriculum in most secondary schools does not cover local natural hazards or their impacts in sufficient depth³.

This study aims to develop a formal child-centric hazard and disaster educational program while investigating how the program influences risk perceptions of local natural hazards. Local college students are the preliminary subjects to ensure the program's quality and efficacy.

Methodology

The study area is College Station, TX. Two introductory Geography courses were selected at Texas A&M University for testing; one that briefly covers natural hazards and disasters, and one that does not.

The program is deployed on two online platforms:

- eCampus - learning management system currently used by Texas A&M. Interface is similar to an e-book and allows for back-tracking.
- KidGab - child-friendly social media site created by Dr. Stephanie Valentine and Dr. Tracy Hammond of Texas A&M's Sketch Recognition Lab. Users interact with content to complete modules and earn digital badges.

and consists of:

- Risk perception survey administered at the beginning and end of the program
- 5 lesson modules on natural hazards, disasters, and Hurricane Harvey
- A pre and post-test to assess the efficacy of each module
- 1-2 applied activities per module

Content is currently designed for a high-school audience of the senior level. However, program content can be modified to fit a younger audience.

Implementation & Results

KidGab interactive images (below) link to surveys hosted on Qualtrics, while eCampus is completely self-contained.

How well informed are you about the potential impacts of a natural hazard event (i.e. hurricane, tornado, wildfire, flooding)?

Uninformed Not well informed Neither informed nor uninformed Well informed Very well informed

Tornadoes: spinning columns of air that have reached the ground, usually as part of a larger severe storm system and are most common during the spring and summer. Most of north Texas lies in "Tornado Alley", a region within the Central U.S. where tornadoes are most common. "Tornado Alley" encompasses nearly all of the Central Plains states. Tornadoes occur there more often than anywhere else on Earth. This happens because of two geographic factors; topography and air masses (click [here](#) to see the formation of a tornado). Recall from the previous lesson that the topography for this region is generally flat, so the air can move quickly and relatively unobstructed by features such as mountains or hilly areas. This is also why you typically won't find tornadoes in cities. When warm and moist air masses (which have low pressure) come up from the Gulf and the cold and dry (which have high pressure) down from Canada, they meet in the "Tornado Alley" region and cause storms that can spawn tornadoes. However, tornadoes can occur anywhere outside of this specialized region and are very localized events.

Figure 3: The components that contribute to Tornado Alley. Source: Dan Craggs

Fig 1: Survey questions and reading content on the KidGab interface

status: not earned

TAKE THE PRE SURVEY

TAKE THE PRETEST!

REVIEW THE CONTENT!

TAKE THE POSTTEST!

Fig 2 (above left): KidGab online content and rewards page.

Fig 3 (above right): KidGab module content and badge completion status.

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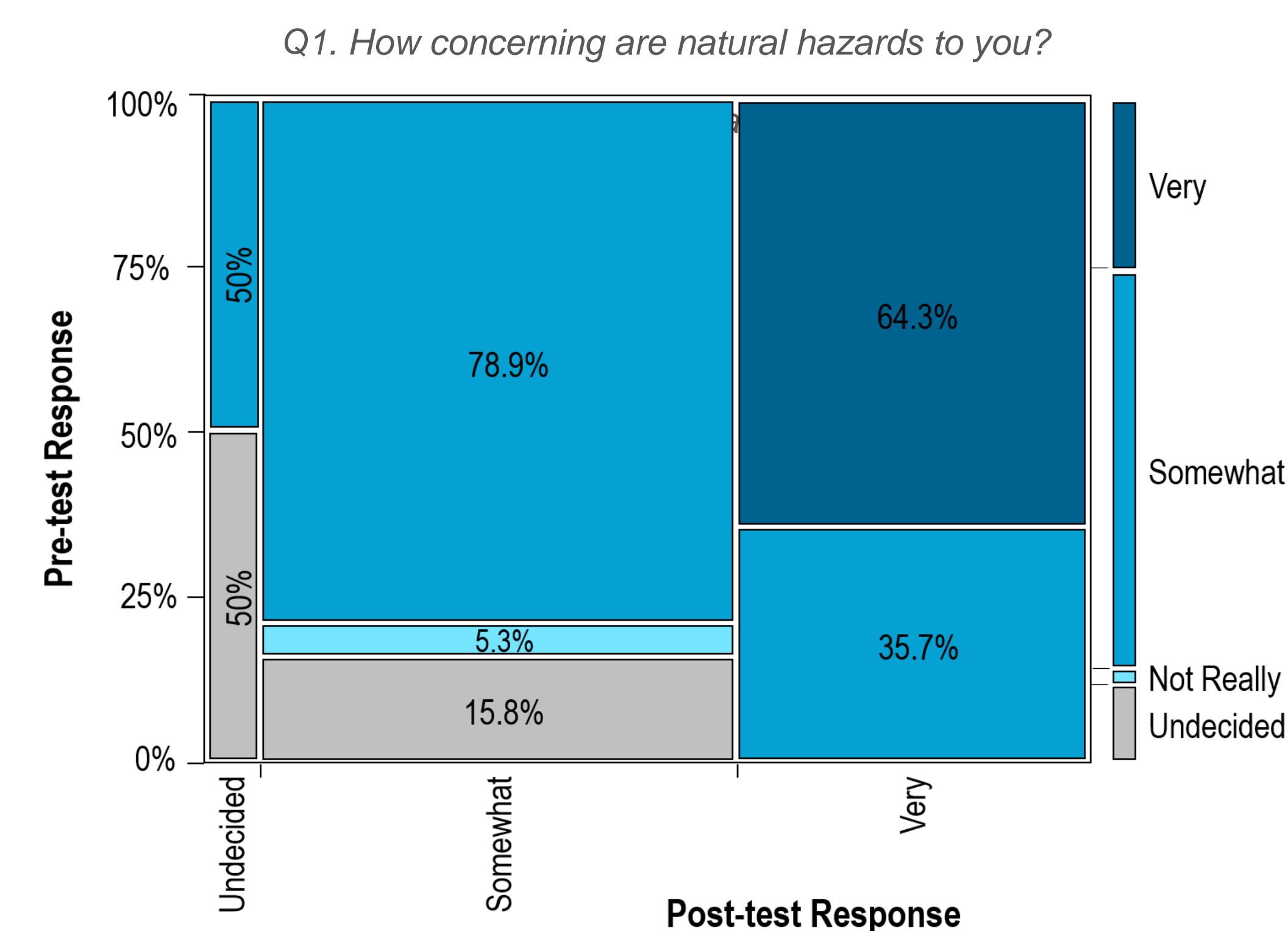
Image 1: A girl surveys damage left behind by a disaster.

Before we explore disasters, we must first expand upon the previous lesson and look at how a hazard differs from another common yet important term: risk. The terms "hazard" and "risk" are often used interchangeably to describe an event that can happen and has the potential to affect oneself or others. However, risk is its own concept and differs greatly from a hazard (there are even [websites](#) solely dedicated to this distinction). As previously defined, a natural hazard is when a natural event has the potential to affect humans and the environment at a specific place and time. A risk is the likelihood (or chance) that the natural hazard event will occur. Basically, "hazard" is identifying the event itself and as something that can happen, but not whether or not it will, whereas "risk" identifies the likelihood that the hazard will happen and have an effect on people at that specific place and time (see [this video](#)).

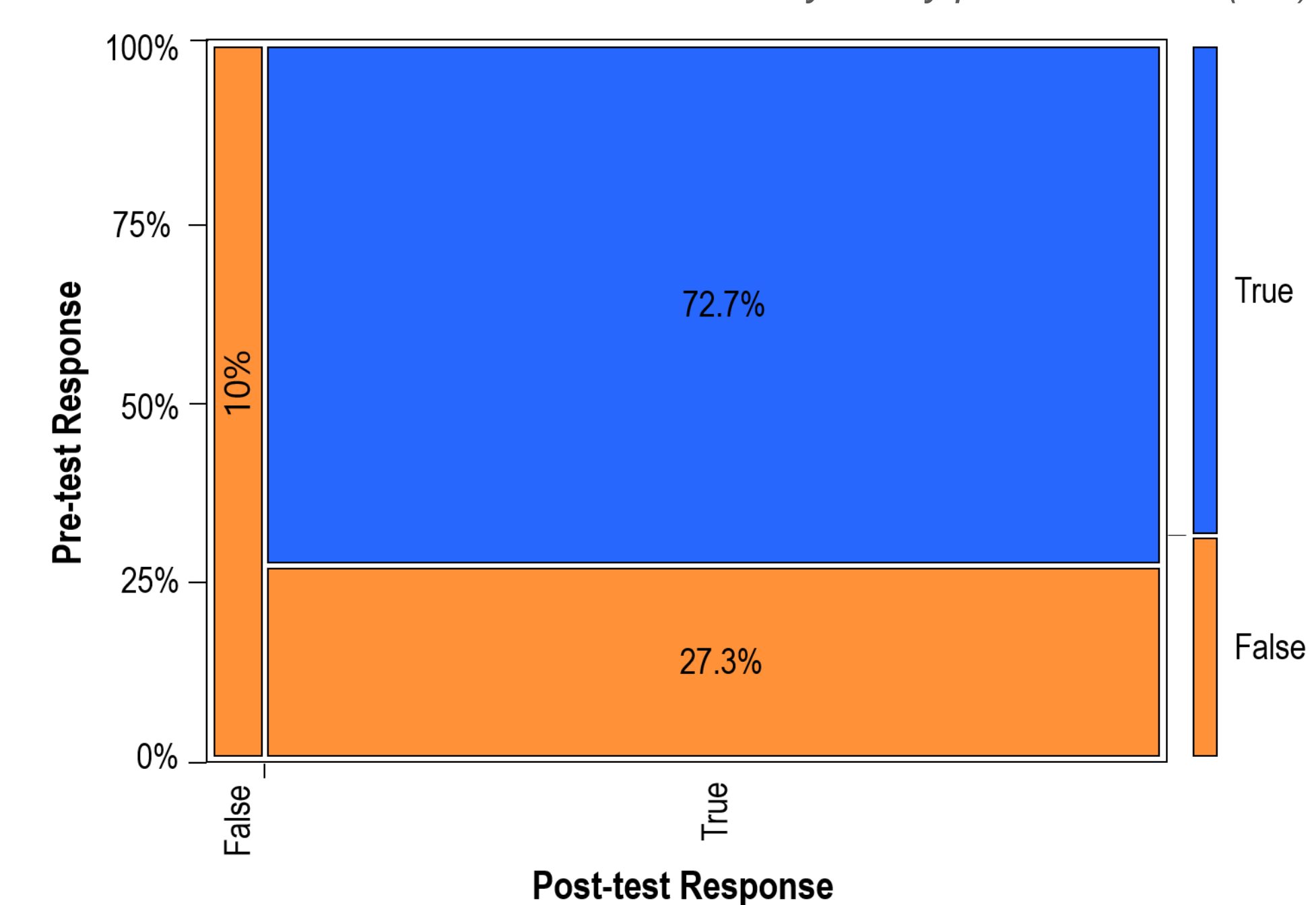
Fig 4: eCampus module reading for Disasters.

Results from a Fall '18 test population using eCampus and learning module 1. Module 1 defined natural hazards and how physical geography influences distributions of hazards in Texas. It offers examples involving the local region. Questions for the pre-test were presented the same in the post-test.

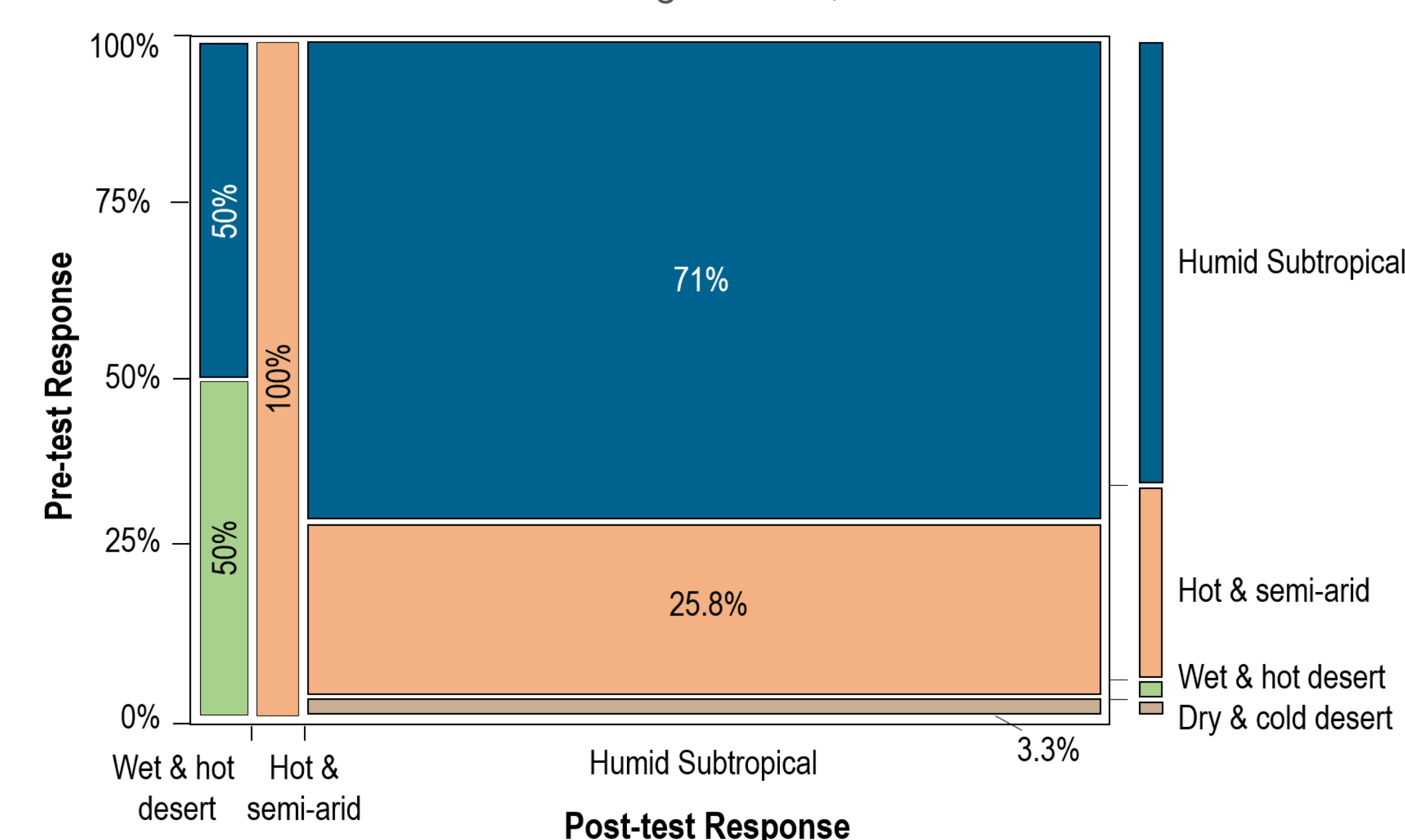
Below: Mosaic plots for 3 out of 11 statistically significant ($p \leq 0.05$) question results. Question 1 pertains to risk perception and questions 2 and 3 assess subject matter proficiency.



Q2. At least one natural hazard exists locally at any point and time. (T/F)



Q3. What type of climate exists around Texas A&M University in College Station, TX?



Discussion



Img 3: 5th graders learning about disasters in Mesquite, Texas. Photo by Ana Cervantes | National Geographic Education Blog

"natural hazards are occurring a lot more often than I think they are" – participant comment

Preliminary testing indicate that the module may have had an influence on the students' risk perception and subject matter proficiency.

- Question 1 indicates students experienced a change in risk perception, as 14.29% of the students shifted from Somewhat to Very. This indicates students increased their awareness of local hazard risks.
- Questions 2 and 3 demonstrate that subject matter proficiency on natural hazards was improved. 25.7% of students changed their answers from incorrect to correct in the post-test survey. This indicates the module was effective at establishing baseline knowledge.

These outcomes show that the module did have a statistically significant impact on risk perception and subject matter proficiency.

Conclusions

Initial results indicate the program had an influence on risk perception and subject matter proficiency. A feedback survey about student experience suggests there is room for improvement. Most feedback was positive, but participants frequently mention a need for more interactive lessons by adding videos and variable pre and post questions (see below).

"I liked how it was informative and didn't have unnecessary information"

"too short, maybe add videos for more educational knowledge."

"...I feel different questions should have been asked so that the reader would have to had read the reading and understand the information in it."

"I think that maybe more pictures/maps could be added."

The full program has incorporated these elements and is currently being tested with a larger population on both platforms.

References

1. Fothergill, A. and L. Peek. 2017. *Kids, Creativity, and Katrina*. Contexts 16(2):65-67.
2. Slovic, P. 1987. *Perception of risk*. Science, 236(4799):280-285.
3. Texas Education Agency. 2010. Chapter 112. Texas Essential Knowledge and Skills for Science Subchapter C. High School. *Texas Essential Knowledge and Skills*. <http://ritter.tea.state.tx.us/rules/tac/chapter112/ch112c.html#112.36>