

## Assessment 1 – Using Secondary Data

Museum Project: Hurri-Robo

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### **Abstract**

Science museum exhibit plays an important role in the learning process of children as well as adults. The education aspect of a science museum influences everyone to explore, experience, imagine, and learn from what they see, touch, hear, and feel. Science center exhibit enhances the out-of-school learning in science education. A good exhibit engages, motivate, and attract families and educators to come back for more. The experience of the exhibit can bring an exciting feeling and curiosity to everybody. This paper describes the use of robotics technologies to create an exciting new science museum exhibit that both families and schools can enjoy. The new exhibit technology called Hurri-Robo encourages youth to explore, locate, and learn about natural disaster, such as hurricane, in New Jersey. The goal is to stimulate the learning process using robotics technology.

### **Introduction**

Hurricane is a tropical cyclone that develop over tropical waters and produces a severe storm. On October 29<sup>th</sup> 2012, Hurricane Sandy hit the Northeast part of the United States knocking out powers and affecting the life of many New Jersey (NJ) and New York (NY) Residents. The damage cost New Jersey an estimated \$30 billion including 2.4 million in power outage (Freedman, 2012; Tennyson *et al*, 2016; and Lieberman-Cribbin *et al.*, 2017). Many Businesses, homes, and schools were destroyed and closed during the process. Hurricane Sandy was first a tropical storm that experienced a change before it reached New Jersey. The new exhibit was created to learn more about natural disaster in NJ, focusing mainly on hurricanes, by using robotic technology called Hurri-Robo to engage and interact with individuals. The focus of the

exhibit was to know the history of hurricanes; also using Hurri- Robo (See picture below) to calculate and measure the distance the hurricane might or might not hit NJ.

### **Purpose**

The purpose of this paper was to describe an exhibition about hurricane by using a robotic technology called Hurri-Robo to enhance the development of the science museum. This new exhibit will be engaging, entertaining, educational, motivating, and encouraging to all groups of people with diverse cultures, age, race, gender, education needs, special needs, and language barriers. It is important for science exhibits to accommodate the needs of everybody. The exhibit will be versatile and interactive. Allen *et al.* (2004) stated an interactive exhibit stimulates engagement and can be memorable. When the exhibit is memorable, people will want to come back for more. People have to be able to express their thought and feeling about an exhibit they visited months ago. In addition, students will learn about science and the new technology created by bright scientists and engineers. Schools can provide field trip to enhance the out-of-school learning in science education. Feinstein *et al* (2014), Sasson (2014), and Schwan *et al* (2014) stated that activities that occur outside the school environment, such as museums and zoos, provide valuable opportunities for students to learn more about science and become scientists.

Hurri-Robo's robotic activities will motivate students to learn how to measure and calculate the distance between the cores of the hurricane to the earth so that it will not hit shore. Rusk et al (2008) and Lacey (2016) study shows that using robotic technology and concepts engaged youth with various interests and hands-on learning styles. Also, Brose *et al.* (2010) reports that people with different type of disability can benefits from such robot based on sense, touch, sound, and

motion. In addition, robotics has different types of programmable gears that accomplish activities based on feedbacks from sensors. Robotics has become common in educational activities around the world; its incorporation in education improves' students critical-thinking and problem solving skills. Rusk *et al.* (2008) reports that hand-on activities in this new exhibit will help build students' curiosity and attitude toward science, math, and technology.

On July 21<sup>st</sup> 2017, New Jersey City University's Education Technology students visited Liberty Science Center (LSC). Dr. Liza Reich Rawson, Head of Exhibition Development and Design at Liberty Science Center, spoke to the students about the purpose and mission of LSC and how to plan an exhibit. LSC's mission was to get everybody excited about science and technology. According to Dr. Rawson, an exhibit needs a lot of thinking, evaluating, planning, and understanding the story behind the exhibit. In addition, the planning process was to see what the exhibit was about, who is it for, how is it going to be done, and the financial aspect. The story behind Hurri-Robo was based on the event of 2012 and how students and families can learn from such natural disaster.

### **Description**

The exhibit will have a screen to show graphic image of how the hurricane is moving toward NJ. On the screen, participants can select the language they preferred and listened to an overview history of hurricane. The screen will be touch screen. It will allow participants to use a ruler provided by Hurri-Robo to measure and calculate the distance. Once the participants finished measuring the distance, Hurri-Robo will such questions, "How fast is the hurricane approaching the NJ? Calculate and the distance between the cores of the hurricane, Statue of Liberty, and NJ? How long do you have to prepare for safety?" The measurement and calculation will help

participants understand the slope of the line. The goal was for the participants not hit to shore. In case the hurricane hit the shore of NJ, participants must find out how much time does the residents have to prepare for safety. When the participants get the question wrong, Hurri-Robo's red alarm make a police siren noise and the hurricane on the screen will start moving toward New Jersey. When the question is correct, the robot will turn itself around, and the hurricane will move away from the state. The sound and movement of the robot allows people with disabilities visualized and touch the robot to understand what is happening.

According to RobotWorx (2017), new industrial robotics cost from \$50,000 to \$80,000 with controllers and teach pendants. Once the application is added, the robot system costs from \$100,000 to \$150,000. Families, students, and schools will experience happiness and joy when they play with Hurri-Robo. They will learn how hurricane build up from a tropical storm to a cyclone. They will understand the movement of hurricane and learn about the science and math around this natural disaster.

### **Conclusion**

Hurri-Robo is an exciting new exhibit that will engage, encourage, and educate all group of people. The education aspect of the exhibit will help everyone to explore, experience, imagine, and learn from what they see, touch, hear, and feel. This science center exhibit will enhances the out-of-school learning in science education.

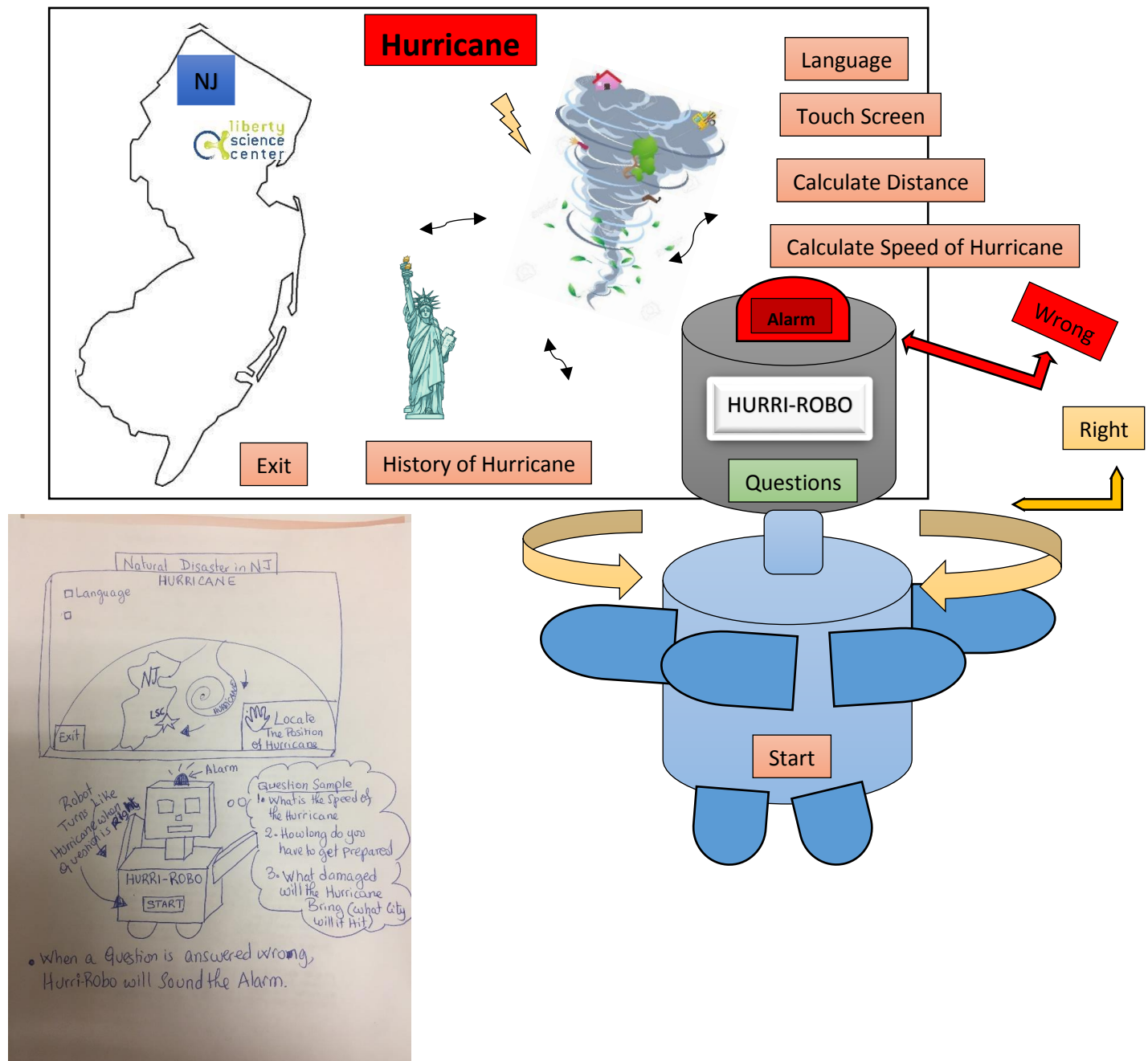


Figure: Hurri-Robo

**Hurri-Robo** is a technology robotic that ask questions. Hurri-Robo turns when the question is right and sound the alarm when it is wrong. The Screen is a Touch Screen to measure and calculate distance of the Hurricane before it hit shore.

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