Escape room

Sensor Escape

Overview

Age group	12+
No. of participants	Max 24
No. of facilitators	1 teacher plus 3 faciltators
Subject matter	Internet of Things (IoT)
Keywords	Smart health, smart homes, embedded devices
Playing time	1 hour
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In a few words

Students will be exposed to the technological infrastructure which is the Internet of Things. The activity will demonstrate the role of sensors, in gathering data through embedded devices which contribute to this network of Information. An understanding of the process and code required to program these components will be introduced, the benefit of which will be utilised in the overall escape room experience.

Learning outcomes

After completing this escape room students will be able to

1. Explain the concept of the Internet of Things.
2. Identify key aspects of connected devices/technologies.
3. Work collaboratively to define creative solutions for embedded devices.
4. Create code to solve basic IoT problems.

Use scenario

The year is 2030. There are 500 billion devices connected to the internet. ‘Each device includes sensors that collect data, interact with the environment and communicate over a network. The Internet of Things (IoT) is the network of these connected devices’[1].

LISCO, the international organisation for the IoT infrastructure has been compromised. A bomb will destroy LISCO HQ Cyber Security Centre. You have been brought to the LISCO

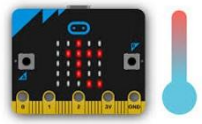
Cyber Security Center to prevent the demise of the worlwide IoT network and secure the increasingly digitized and connected world. Your mission .....should you choose to accept it is .... to crack the codes to defuse the bomb! The countdown is on ....

This escape room is suitable for a class group investigating computer science concepts. Through the coding of a number of embedded devices, participants will investigate core IoT and Computer Science concepts. They will work in teams of 3 sharing a common goal. IoT topics such as smart homes and health will underpin the activities for this escape room giving students exposure to the fundamentals of IoT and it's significance in the world today.

Gameflow



Phase 1 - Introduction




Phase 2 – Discovery

Phase 3 – BOOM!!

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Phase	*Duration*	*Description*	*Materials*
1	10 minutes	**Introduction.** Mission impossible themed video introducing the ER scenario. **Team creation.** Colour coded security pass to determine roles within the team. Each team must comprise of one of each role. Teams must decide on a team name and submit a team charter for the ER. **Team brief.** Teams will receive the team brief. The brief will outline the overall scenario covering the categories of smart health and smart homes.	Introductory video Colour coded security pass Team brief

2	40 minutes	**Discovery.** Teams move around campus to discover the rooms associated with each category outlined. Their challenge is to retrieve a code from each room. **Smart Home.** Teams will reach the centre for temperature control and will receive their instructions to code a micro:bit to show the temperature in the room. They will then convert this temperature to fahrenheit. **Smart Health.** Teams will reach the centre for health control and will receive their instructions. This scenario will involve a pre-coded micro:bit. They will need to work out how to get the micro:bit to display a particular number related to a smart health activity.	Campus map Smart home challenge envelope containing instruction sheet, microbit, computer and link to relevant software Smart health challenge envelope containing instruction sheet and microbit
3	10’	**Defuse the Bomb.** Return to HQ with two 2 digit codes which together will defuse the bomb**.**	Computer with coded bomb scenario Teams will enter their code to attemp to defuse the bomb

Escape room set-up

Room 1 - Centre for Security at LISCO HQ
Escape room materials Introductory video, security passes, team brief.
Room equipment Computer and projector.
Room set-up Security pass handed to participants as they enter the room. Video ready to play. After video hand out team briefs.
Room reboot Clear out any remaining materials. Reset video. Ensure team brief packs and security passes are ready for next group.

Room 2 – Temperature Control Centre at LISCO HQ
Escape room materials Temperatue Control Instruction pack per team.
Room equipment Computer lab Embedded device such as microbit and usb cable per team.
Room set-up 8 computers signed in and appropriate software with embedded device and USB cable at each computer.
Room reboot Remove all projects from the software on the computer. Ensure instruction packs are ready for next group. Reset microbit with welcome message.

Room 3 – Health Control Centre at LISCO HQ
Escape room materials Health Control Instruction pack per team.
Room equipment Computer lab. Embedded device such as microbit and usb cable per team.
Room set-up 8 computers signed in and appropriate software with embedded device and USB cable at each computer.
Room reboot Remove all projects from the software on the computer. Ensure instruction packs are ready for next group. Reset microbit with welcome message.

Room 4 – Bomb Room
Escape room materials Computer with countdown showing and a facility to enter a 4 digit code. If the code is correct the countdown ends and the bomb is defused.
Room equipment Computer lab with appropriate software installed.
Room set-up 8 computers signed in and appropriate software.
Room reboot Reset program installed on each machine to restart the countdown.

Note: for each group of 24 the room setup will take approximately one hour and the room reboot will take a similar amount of time.

Escape room in action

Starting the escape room

The teachers welcomes the group and introduces the concept of an escape room. They will introduce the facilitators and describes their role in the activity. They bring the group to Room 1 to begin. Participants will be encouraged to ask questons along the way, however they will be made aware that only limited information is available surrounding the designated activities.

Playing the escape room

A facilitator will be positioned in each of Rooms 2,3 and 4 but will only give information as required. Participants will endeavour to code the necessary projects to complete the task and retrieve a 2 digit code in each of Rooms 2 and 3 before finally determining the correct order of digits to defuse the bomb in Room 4.
Coding activities may prove challenging for particpants and facilitators may guide participants to achieve the desired outcome.

Debriefing

A 30 minute debrief session should be conducted getting participants to reflect on the following

- Their overall experience of the activity
- Their understanding of IoT
- Their appreciation for embedded devices and the sensors available
- Their experience of coding for embedded devices
- Team reflection on all activities undertaken

References:

1. https://www.cisco.com/c/dam/en/us/products/collateral/se/internet-of-things/at-a-glance-c45-731471.pdf