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CYBERSECURITY AND VIDEO GAMES

Many video games can support the teaching of cybersecurity

Neil Rickus and Andy Robertson explore how video games can enable pupils to develop their understanding of cybersecurity

In previous issues of Hello World, I [Neil] have examined how retro video games can be used to teach aspects of the computing curriculum, along with discussing how game-based learning can help pupils develop their understanding of computing concepts. Many commercial video games can also support the teaching of computing-related content, including cybersecurity, with a range of benefits often cited, such as developing teamwork, stimulating creativity, promoting critical thinking, and improving decision-making. In this article, we will first introduce how to use video games in the classroom, before Andy introduces using video games to develop cybersecurity understanding. Finally, we will discuss how video games can be used as case studies in the teaching of cybersecurity, and offer up some useful resources.

Using video games in the classroom

A number of factors need to be considered to ensure video games support teaching and learning in the classroom. As with all educational technology, usage needs to be part of a well-planned sequence of learning, with clear objectives and outcomes identified. The use of video games might therefore form only a small part of a lesson, to address a particular issue or concept, rather than being the focus of the whole session. For example, the game *Beholder*, outlined later in this article, could be used for starting discussions related to consent for taking photographs and videos.

In the classroom, you can use these games like an interactive text. You can play them together as a class and then pause to discuss. However, unlike a text, your

experience and decisions in the games are different each time. Students are not only observing what's happening, but are also implicated in the action. This caters to a wide range of different learners, and also opens up new ways for the class to collaborate and investigate issues. For example, the impact of your decisions on others can be clearly seen when making choices within the *Headliners* game discussed later in the article.

Each game selected should be accessible to all pupils, with appropriate adaptations being made where required. The structure of the session should be carefully considered, too, including the need to promote safe and healthy gaming habits such as regular breaks, exercise, and time away from the screen. It is also beneficial to brief members of the school community on



the use of video games in the classroom, as well as allocating sufficient time to examine a game's technical requirements and resolve any issues.

The range and variety of games available can be daunting, with many titles unsuitable for children or inappropriate for use in schools. It is therefore important to try these games out yourself before using them in a classroom setting. It's also good to stay away from online games, and keep an eye on the age rating. There are resources

IT IS VITAL TO TRY THE GAMES OUT YOURSELF FIRST

available to support you in selecting appropriate games and facilitating positive experiences for learners (see the 'Useful resources' box for some suggestions). Find the right game and it can become a real highlight of the day for children, and offer a way to engage and evolve learning for a wide range of learning styles.

Cybersecurity games

Last year, I [Andy] wrote one such resource, *Taming Gaming* (helloworld.cc/taming). This is aimed at parents and guardians who may be worried about what video games are doing to their children, including the impact of violence, potential addiction, and data security. It addresses these fears by going back to scientific studies (distinguishing between correlation and causation was a common theme) and providing tips and tools to help parents gain the confidence to engage in this area of their children's life. Here are some of my suggestions for appropriate games that can help develop students' understanding of aspects of cybersecurity:

Headliners (helloworld.cc/headliners) is a great example for older children. It's a game about controlling a city through the newspaper you publish. It offers a first-hand illustration of what motivates

USEFUL RESOURCES

Since 2009, European Schoolnet has published the *Games in Schools* handbook, which explores the opportunities and challenges of integrating video games into the classroom. Their 2020 version of the guide explores the educational benefits of commercial video games, along with the most popular lesson plans selected by their MOOC (massive open online course) participants (helloworld.cc/gameplans). It also provides additional guidance on commercial video games and the links they provide to other subjects. For example, the popular Just Dance series of games could be linked to both PE and examining algorithms within computing, while Pokémon Go could be used to discuss topics related to geography, citizenship, and critical thinking.

Digital Schoolhouse (digitalschoolhouse.org.uk) also has a wide range of resources linking video games to learning in school, including projects related to Mario Kart™ 8 Deluxe on the Nintendo Switch.

Taming Gaming (discussed in the main body of the article) is supported by a freely accessible Family Video Game Database that offers a detailed account of specific games children play (taminggaming.com). A parent can look the game up to find out what to be aware of, and also to find suggestions of age-appropriate games if a title is too old for their child. The database covers over 1600 games and is visited by up to 20,000 parents every day. It offers one page on all the popular games, as well as curated lists of games that offer unusual ways to play together as a family. The lists on the database can be filtered by age group and you can also add a filter for which platform the games require.



■ The Family Video Game Database covers over 1600 games and 20,000 parents use it every day

headlines and how important it is to keep your data secure. **Bad News** (helloworld.cc/badnews) is a similar game with a focus on profit rather than control.

Other games on the Family Video Game Database highlight how surveillance and data protection overlap. **Orwell** (helloworld.cc/orwell) is a narrative game in which you play a fictional researcher using a surveillance

program called Orwell. Through a series of episodes you are tasked with using Orwell to help solve mysteries such as the bombing of a public plaza. To do this, you trawl websites and documents in the game for clues.

Nuts (helloworld.cc/nuts) takes the surveillance theme in a more light-hearted direction, but still paints a fascinating picture of corporate power and responsibility. ▶



Some cybersecurity games highlight how surveillance and data protection overlap

▶ Beholder (helloworld.cc/beholder) is an interesting game about security for older teenagers. It's a detective game in which you spy on tenants in a building, discover their secrets, and report violations of laws to the authorities. As the game unfolds and you see more of the controlling totalitarian state, an uneasy tension develops between your conscience and your mission. How the game ends depends on your choices.

Video games as case studies

Finally, along with using video games to support learning about cybersecurity in the classroom, I [Neil] recommend using as case studies some of the high-profile cybersecurity-related incidents that have taken place over the past few years involving gaming organisations. For example, in 2011, the PlayStation Network was hacked, which compromised the data of 77 million users (helloworld.cc/playstation), while Distributed Denial of Service (DDoS) attacks have been known to take online gaming services offline. Other cybersecurity breaches have seen video game source code and development tools posted on internet discussion forums. For example, the Nintendo Gigaleak (helloworld.cc/gigaleak) in 2020 saw a vast amount of data relating to the development of titles for various Nintendo consoles released over the past 30 years.

This included unreleased titles, graphical assets, and the source code for a number of releases of popular video games.

By using video game case studies to provide a basis for lesson content, pupils are able to study cybersecurity through examining a topic they are familiar with and often have a detailed understanding of. For students aged 14–16, the case studies could facilitate discussions around

methods of preventing cybersecurity-related problems, and for older pupils, opportunities exist to use them to examine the moral, ethical, legal, and cultural issues related to computing.

Have you been using video games in the classroom? What are your favourite cybersecurity-related titles? Get in touch via Twitter with [@computingchamps](https://twitter.com/computingchamps) (Neil) and [@GeekDadGamer](https://twitter.com/GeekDadGamer) (Andy). [\(HW\)](#)



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