Universal Orchestra
Teacher briefing notes

What's the experiment?

How does the web enable real-time collaboration?

This exhibit contains eight different musical instruments for your students to play. They can work with people in the gallery to make some music or they can work with people online. No matter how your students do it, they can work together in real time and see what happens!

Learning outcome

Understand that mass collaboration is a powerful use of the web that has benefited many people around the world.

Lab Tag activity

Using your Lab Tag you can collect a video of your orchestra as well as a recording of the song you've created.

Glossary

Packet – One unit of data that's small enough to be routed through a computer network. A file, such as a web page, could be made up of many packets.

Real time – Your computer is working in real time if it responds to instructions immediately. In the case of simulation, real time means everything takes the same amount of time as it would in real life.

Web socket – A technology that enables very fast communication in both directions between two or more computers over a single internet connection.

Server – A server is a computer program that serves the requests of other programs. On the web a server hosts websites and responds to requests for access to them.

Latency – The amount of time between a piece of information being requested by your computer and it being delivered.

What does it show us?

Mass collaboration is the name of the game for this experiment. By working together with people in the Museum and people online you could come up with a great piece of music.

Modern technology means that you can work together with people anywhere without moving from your computer. Not only can you communicate with people from all over the world, but you can also work together on projects such as the orchestra you can see in the gallery.

When you do anything on the internet you make a request and wait for a response from a server. In order to have real-time collaboration between you and a friend or colleague, computers can use web sockets. Web sockets open up a two-way channel between your computer and the server, which means data can be sent both backwards and forwards almost instantaneously.

The data is sent almost instantaneously, but there can sometimes be a delay or latency. You may notice while playing your instruments in the gallery that some of them take a bit longer to play than others. This is because it takes a while for the information to travel from the other side of the world to the Museum. You've probably noticed this before with things such as video calls or when you watch the news and a correspondent in another country takes a while to answer a question.

Regardless of these difficulties, the possibilities really are endless with mass collaboration using the web.

What could we discuss?

- What types of mass collaboration have you been involved in? Forums, Wikipedia, etc.
- Think of different projects that could be done using real-time mass collaboration.
- What kind of problems can latency cause?
- Play the latency game show. Ask your partner a question, but receive no reply. Ask a second question, but your partner must then give the answer to the first question. Ask a third question, and your partner must then give the answer to your second question. And so on... The game continues until latency becomes too much of a problem.

Museum web links

sciencemuseum.org.uk/weblab

The on-gallery animation which introduces the topic of web sockets can be found here.