

Chrome dreams

For the last two years, the physics team at SSERC have investigated apps for Android and IOS that enable experimental work to be carried out with mobile devices. When we heard that a number of schools had chosen to issue Chromebooks to students, we took a virtual wander to the Chrome Web Store to see what was available there.

We were dismayed. There were plenty of apps, but they served to confirm our prejudices that devices were mostly being used in schools to do internet research or to create documents or presentations. It is not that these are bad things to do, more that our experience with Android and IOS suggests that portable devices have the potential to do so much more. It was good to see Pasco's Sparkvue, Vernier's Graphical Analysis and the Mu Python editor for the BBC micro:bit, but there was no suitable frequency spectrum analyser, video analysis app or indeed many other apps that might have inspired us to take a closer look. It all changed when we did a bit of research and found that an increasing number of Chromebooks are able to run Android apps. We bought two different models of Viglen Chromebook for evaluation purposes and looked at three ways of running apps:

- Using apps specially designed for the Chromebook from the Chrome Web Store;
- Using Android apps from Google Play Store;
- Using an online platform called Rollapp.

Figure 1 shows one of our Chromebooks running Pasco's Sparkvue app, which is available free from the Chrome Web Store. It is hooked up to a Pasco wireless temperature sensor. We also connected it wirelessly to a Pasco Smart Cart [1] and to a range of Pasco Passport sensors via USB.



Figure 1 - Chromebook running Sparkvue.

Eagle-eyed readers will notice a Bluetooth dongle plugged in at the right-hand side of the machine. This was needed, even though the Chromebook had onboard Bluetooth. Pasport sensors can also be connected wirelessly using an Airlink adaptor, but Pasco point out that their older Airlink 2 Pasport adapter does not work with a Chromebook. We tried anyway and found that they were correct. If you have sensors that connect to Science Workshop interfaces, you can buy analogue and digital adapters to use these too.

Vernier also have a free app that allows their sensors to be used with Chromebooks. It is called Graphical

Analysis. Vernier's USB Go!Link and wireless GoDirect systems worked with this app. Figure 2 shows a wireless radiation monitor. Figure 3 is a screenshot from Graphical Analysis showing background count over time. >>



Figure 2 - Vernier Radiation Monitor.

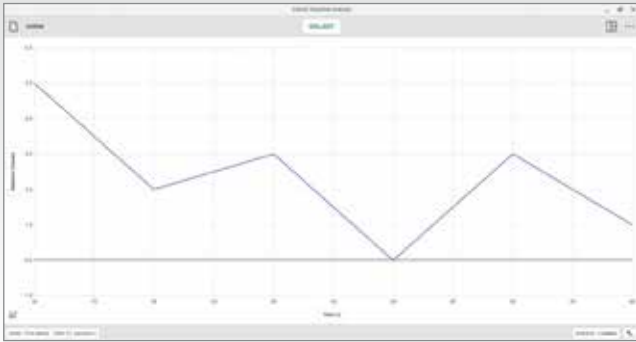


Figure 3 - Some readings of background count shown on Graphical Analysis.

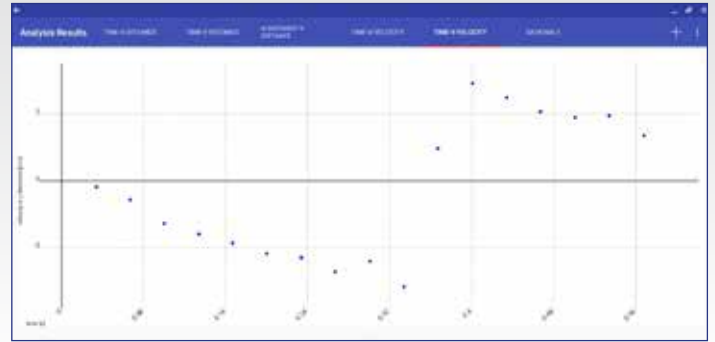


Figure 4 - Y-velocity of a bouncing ball.

In the last two years, Android apps have become available to some Chromebooks, usually following a system update. This facility has to be activated by the user or, for a managed device in a school, by the administrator. Apps may have to be approved or “whitelisted” before you can use them. Some will not work if the device does not have certain features, for example a camera or touch screen.

When we first started investigating apps, we looked for one that would do motion analysis through video. For Android, we discovered Vidanalysis and Trackit! Vidanalysis is free if you accept an advertisement-supported version. It is probably better suited to a Chromebook than tablet provided that you already have a video to analyse, taken using another device. It is easier to mark points with a trackpad than with chunky fingers on a touchscreen. Trackit! Is a similar app. It allows you to change the angle of the axis, a feature missing from Vidanalysis, but we have not worked out how to do this with a trackpad.

Figure 4 is a screenshot from Vidanalysis, showing the behaviour of the Y-velocity of a bouncing ball with time. The graph is generated when the user marks the position of a moving object from frame to frame in a video. Contact SSERC for comprehensive instructions on how to use apps like this.

Over the last decade, the piece of physics freeware that has impressed us more than any other is Tracker. This PC/Mac/Linux package can be used for motion analysis and much more. Tracker (Figure 5) is not available on Android or Chrome but it can run on a Chromebook via an online platform called Rollapp [2]. Rollapp is free unless you want to be able to save files. It requires users to register or to log in via social media or Google. Tracker runs in a browser and, once you have got used to the slightly fiddly way of uploading video files, behaves exactly as we described in Bulletin 225, ten years ago.

According to the Rollapp site, Audacity, another SSERC Physics favourite, is coming to the platform soon.

In Bulletin 226 we tested a Linux-based netbook computer called the Asus EEE which we used with Vernier sensors. We remarked: ‘There are now a number of inexpensive portable computers on the market that bring the age of “one laptop per child” tantalisingly close. A machine that does word processing, spreadsheets, presentations, internet access and interfacing is a useful beast.’ The Asus never really caught on, despite being a useful beast. Perhaps the Chromebook, already established in many schools for other uses, will be the device that brings apps and interfacing to the masses. <<<

References

- [1] See SSERC Bulletin 258.
- [2] www.rollapp.com/app/tracker.

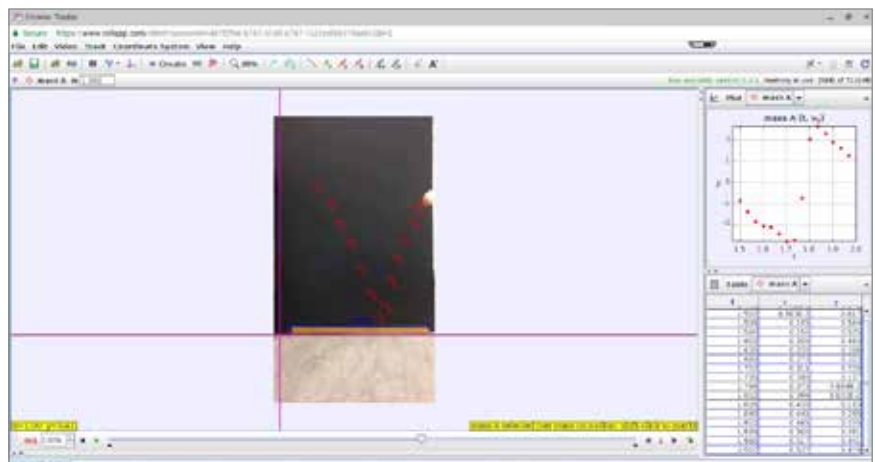


Figure 5 - Tracker on a Chromebook.