

Following our meeting, I have concentrated on the Interfaces with USB connection, rather than those using the GPIO pins of the Pi. However, the latter can carry existing Expansions providing Serial (RS232) and User Port sockets to suit the older Interfaces. Alternatively a USB to Serial adaptor could be used. (http://www.dataharvest.co.uk/faq_pages/pdf/faq_6.pdf). Serial connection was widely used in the RISC OS era and User Port in the Beeb era. I have included some older Interfaces, since there may be a significant number still possessed - and even in use - by schools, especially those less fortunate than St Johns'.

I believe that more serious data logging - say at Secondary and above - would need a Real Time Clock (RTC), which the Pi lacks as standard. However, there are several Expansions with an RTC that can be mounted on the GPIO pins. GPIO Expansions providing Serial, User Port and RTC are in my earlier spreadsheet (attached for completeness). The most up-to-date list of Expansions and Interfaces - both GPIO and USB - is at: http://elinux.org/RPi_Expansion_Boards There is also the DrDAQ USB, as mentioned here: <http://www.designspark.com/content/using-drdaq-raspberry-pi>

The sales director of Data Harvest has written 'Data Logging: A History', which gives a longitudinal survey of their interfaces and apps. (<http://www.technology-in-education.co.uk/features/datalogging-a-history/>). The Flowol web site shows the many Interfaces - current and older - that the paid-for Flowol app supports. (<http://www.flowol.com>).

The suppliers such as Commotion Group, Data Harvest, Deltronics and Pico Technology seem to make their money from the sales of the Interfaces and an ever-wider range of sensors and other associated hardware. They then provide most of the apps 'free', even for site licences, but only for Windows. This gives rise to and perpetuates the problem that Graham identified, of schools being forced into endless upgrades of Intel-based hardware and Windows operating systems - 'Wintel' PCs. It also breeds a most undesirable dependency culture. Yet the Pi has quite enough processor and graphics power and memory to run such apps and is far simpler and much more 'open'. So it should be possible for schools to save vast sums of money on the purchase of PCs and OSeS, and on 'support' of the same, while continuing to use the well-proven Interfaces and sensors etc.

To enable the Pi to displace the 'Wintel' PCs from the teaching of Measurement and Control - and potentially much more, such as Maths and Science - say four drivers (highlighted in light green) must be written so that programs written in Scratch and Python running on the Pi can control the various Interfaces - both current USB and older Serial. Tony is investigating the former for the Data Harvest FlowGo Interface (highlighted in yellow). It would also be necessary to 'port' say seven apps (highlighted in bright green), such as EasySense for the Data Harvest FlowGo and PicoLog and PicoScope for the DrDAQ, from Windows to Linux. Although Graham regards flowsheets as passe, Data Harvest Go Control and Flowol may also be candidates for porting from Windows to Linux, to run on the Pi.

This thinking and searching has resulted in a new spreadsheet (attached). It is intended as a start that you can add to and correct. I do not expect any insuperable technical obstacles, since there are plenty of software 'tools' for such purposes. Moreover, there should be no commercial objection from the - mostly British - suppliers to making the 'source code' of such apps available for this purpose, since they have no direct interest in the supply of 'Wintel' PCs. Indeed, as Pi's are likely to cost only one tenth as much, and to outnumber 'Wintel' PCs in schools, they should benefit from increased sales of Interfaces and sensors etc and the UK should benefit from such equipment being more widely available - and more widely used - in schools.

The original drivers and apps were certainly not written 'for free', so a way must be found to pay for writing the drivers and porting the apps to the Pi. With the prospect of additional sales of their current hardware products, most suppliers should be prepared to contribute financially. The incremental work to support the older Interfaces and sensors etc., could be funded by groups of the schools with such assets, many of which may be unused, perhaps jointly at county level.

Switching to the Pi would also enable pupils and teachers to extend their studies to include the Pi itself, since it is a low cost and open platform, where the 'Wintel' PC is a high cost and largely closed platform. These are exactly the outcomes hoped for by the initiators and endorsers of the Raspberry Pi. Here is a notable endorsement of the Pi from the real world of industry: <http://www.designspark.com/content/pi-perspectives-dr-jeremy-bennett-embecosm>

Pursuing such an agenda would be consistent with the newly revised educational and industrial policy of the Government. It would also greatly improve the job prospects and job satisfaction of vast numbers of pupils. Such better employment of our best resource - the young - would enable them to earn a higher standard of living for themselves and all UK citizens.