The Teaching Labs of the Future Mini-Conference
IT Innovation Centre, IT Services, 5 March 2015

Feedback from Facilitated Discussion Session:

- **To what extent is the Learning Science material future proof?**
  - not entirely: requires modification, technology changing all the time, building support into a development contract
  - Budgeting maintenance costs, requires longer term investment
  - (Other comments about the volume of work required being large, and about how beneficial it is in converting UCAS offers into firms)
- **What elements are unpopular with students**
  - Work students harder than they used to, no hiding, completing much more work
  - Manual handing in becomes unpopular when required eg. For MOMD!
  - More realistic experiences - eg having to work harder to find answers rather than following recipe
  - Completing much more work
- **Where do students complete the virtual labs?**
  - Bristol - start during freshers week, broadband in halls of residence
  - Mostly preparation for labs they're running anyway, changes what you can do with the lab
  - Learning different skills from practical, manual still in lab (feel and smell)
  - Analytical processes already run from a keyboard so not very different doing it virtually
- **Maintain practical time and improve experience, or is practical time reduced?**
  - Making better use of time on the whole
  - Wasn't driven to reduce lab time in Bristol - purpose of preparing them before and assessing them afterwards
  - Employers want students with a generic set of skills, so they can learn again how to do it the way that the company does it - helpful to avoid the recipe following mentality
- **Virtual labs - do they replace or enhance practical sessions?**
  - Depends what the skill is - know what you can't do (touch and smell)
  - 24/7 opening hours of online labs!

General Feedback:

- **Question: From your perspective, what would be the main dos/don’ts for the teaching labs of the future?**
  - Students need to be able to retrieve the dataset from actual/virtual experiment devices to their laptop/tablets etc

- Bring your own device is the way to go not loan machines as they become out of date plus the update costs
- Set entry requirements of tech for students' equipment
- Will need local tech support & funding for virtual & physical labs. This means management need to release funds, instructional designers/technologists etc.
- It was good to see the futurist views of the presentations. However, in contrast IT Services chooses to show pictures of lockers from which students will loan laptops or other equipment to use in the "wet labs". I'm sure that if we think really hard there's a better way of doing this.
- On a cautious note, there was a perfect demonstration of how things fail to live up to claims. The big touch screen was difficult to use and people still continued to claim that it was the best and easy to use and intuitive. Really? I think it better to have good deliverable service rather than disappointing futurist equipment that doesn't quite hit the mark. There's a real sense of being short changed by getting it wrong.
- Do: Have a solution that is easy to use and works 100%. It really needs to be reliable.
- Sounds very useful to have access to other learning materials as well as videos, pre-lab training etc whilst in lab.
- Devices must be spill-proof for all possible solvents, not just water-based materials. Many materials are vulnerable to solvents (eg: acetone, chlorinated solvents, aromatic solvents) and strong acids/bases.
- I like the idea of recording results and processing in a seamless fashion (we have tried to encourage data analysis "as you go" for years) but any e-lab book must be cheat-proof and compatible with industry needs. Physical lab books are also needed because they are used elsewhere too – both skills should be learnt.
- Virtual labs would be beneficial, when used in the way they are at Bristol (as a supplements to lecture notes). They cannot be used to replace areal practical experience. They need that far research work in their future career.
- Virtual labs can work for situations where the outcomes are already known. When a student carries out research, he/she will need the practical skills as well as knowledge and other skills such as analysis.
- Don't think that virtualisation can replace real lab skills, particular in accredited subject. They can provide a great pre-lab preparation & help in post-lab analysis.
- Do budget appropriately to develop & support activities such as a dynamic laboratory manual – Bristol has a superb system but at a seven-figure cost. We should aspire to a similar investment.