Levelling the educational playing field for programming in STEM

Mark Everitt and Ben Davies

#digifest20
 Levelling the educational playing field for programming in STEM

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1. Context
A usual path to computational physics…

As noted by the authors – this resource is neither a book on good programming practice – nor is it a “software library”
The problem 2 – more than coding

This one was not actually caused by software – those images were all copyright protected – but you get the idea!

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2. The idea

More efficient teaching of basic computational skills and good practice
Why Swift

• A good first language, it’s used in schools
• Loads of free learning resources
• Modern – clean and expressive/easy to read

• struct are data types and behave like int, double etc.
• Fast and powerful
• Open source and cross platform – in demand
• Safe
3. What we did

Sessions and behind the scenes
• A textual analysis of feedback from the beginning of the first iPad training session showed the students found the module: difficult, challenging, hard, struggled with the basics
First contact

• We ran formal training session as well as drop-in sessions.
• Apple’s *Learn to Code 1 & 2* playgrounds
• A bespoke *Complex Numbers* playground
Post exposure feedback

• The iPads really have **helped improve my understanding** of coding and it has made it quite **enjoyable**

• Having used the iPads I find some **enjoyment** in coding and **seeing the outcome visually** such as it is with the iPads they’re a **fun way of learning**

• The way the questions were structured were **simple** to follow and the difficulty bar raises at a **decent rate**

• It made me consider how to **structure and approach coding** to be tidier and easier to follow

• Very **simple** language
iPads were further available for **self-study** in our physics learning support service.

Used on **40 distinct occasions** by around five of the weakest students.

Of particular note is that the deaf students made very heavy use of the iPads even completing their coursework **submission on the device**.
4. Observations and conclusions
Levelling the playing field & Improved accessibility
• Apple Playground’s deployed as a mitigation can have a very beneficial effect not only on student performance but also attitudes towards technical programming.

• The capacity for a playgrounds approach to STEM programming exceeded our initial expectations, especially with regards to widening participation and engagement.
• We have resources to share on
  • iPad Playgrounds
  • Administering iPads

• Please contact m.j.everitt@lboro.ac.uk or b.i.davies@lboro.ac.uk if you are interested