



Developing educational applications for mobile devices using open source tools and technologies

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Summary

- An app for math centre
- What do we mean by apps?
- Deciding on the topic
- Wish list: Features to include in the app
- Previewing the app
- Our approach
- Issues

An app for math centre

- We were asked to repurpose resources from maths centre to use within a mobile app
- This app would be a proof of concept, to see whether it would be possible to create an app and what it entailed
- The aim was to create a 'template' for future apps

What do we mean by apps?

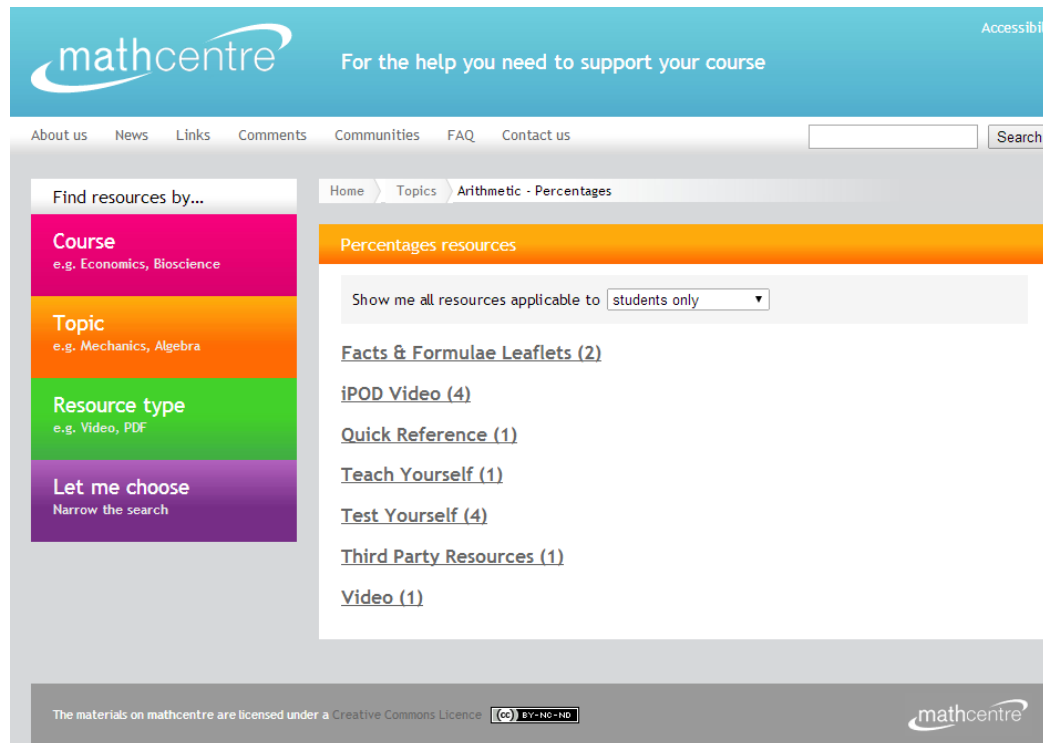
Various definitions, here's two:

- A software application that **runs in** a smartphone, tablet or other portable device.
- an application, typically a small, specialized program **downloaded onto** mobile devices.

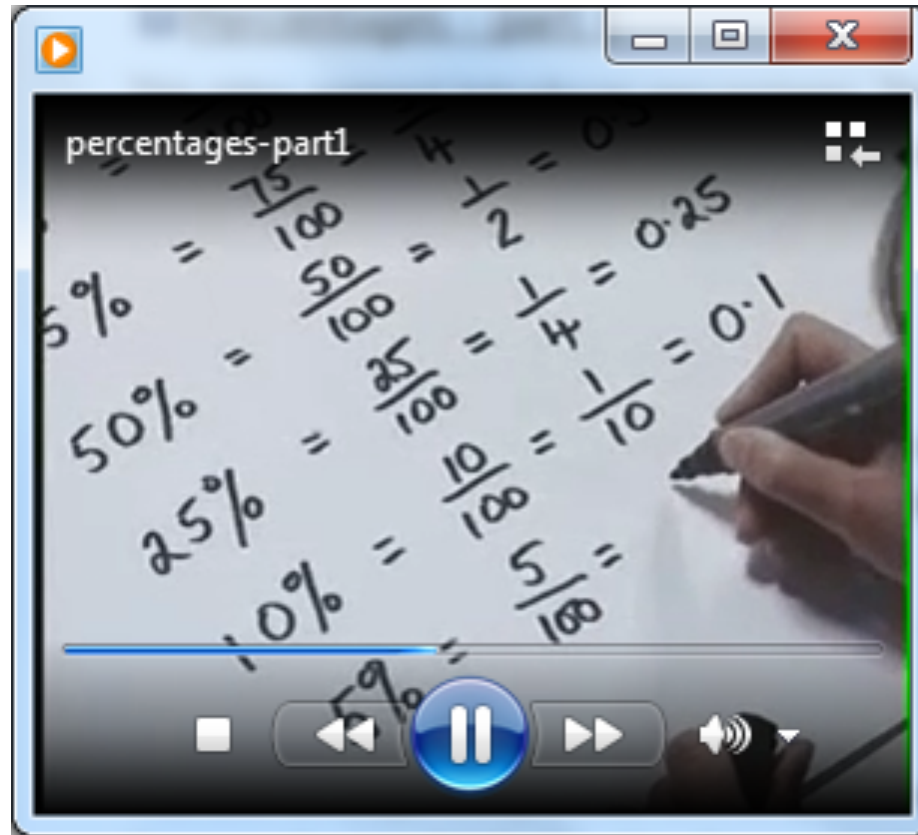
It could be said that apps don't necessarily have to be installed on the phone to be considered apps.

Deciding on the topic

- We chose the percentages topic as a starting point.



Deciding on the topic



Deciding on the topic

www.mathcentre.ac.uk/re x

www.mathcentre.ac.uk/resources/tests/swf/Arithmetic/Diagnostics/1-04d.swf

Apps Detecting Mobile Br... Free Hotmail Google Home - Mahara Moderation forms Module Description ... Web Slice Gallery Imported From IE edu Blogs on Mobile Lea... Scoop.it! Dr Alex Copping | U...

Percentages: Diagnostics

Select each question in turn, and type your answer in the box

Question 1	not attempted
Question 2	not attempted
Question 3	not attempted
Question 4	not attempted
Question 5	not attempted

Question 1

A student scored 19 out of 30 in a test.

Express this as a percentage
(to the nearest percent)

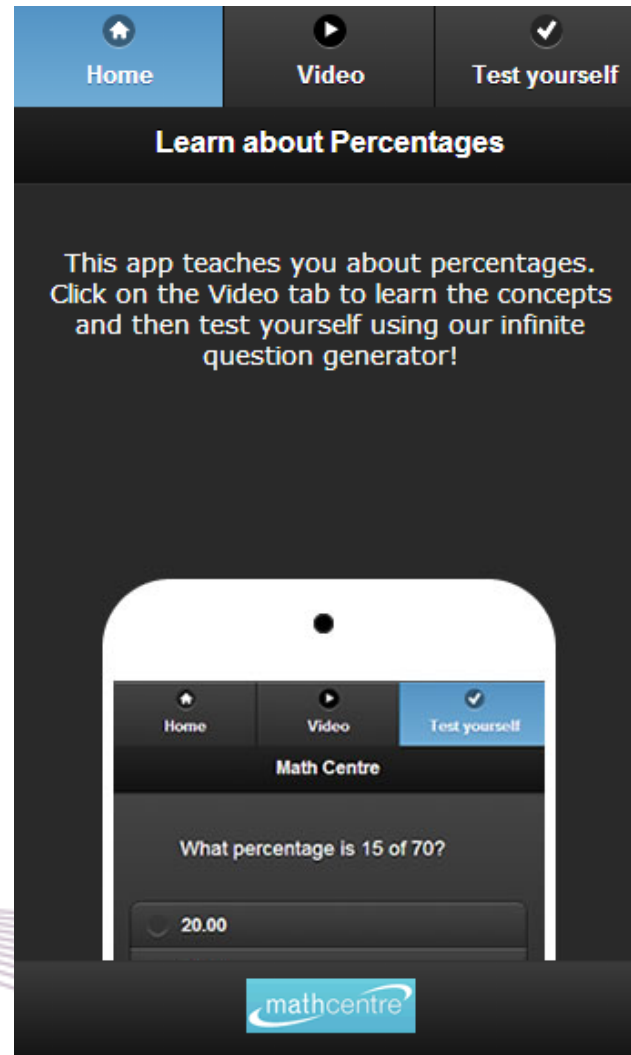
%

submit clear

Wish list

- Re-use resources rather than create from scratch
- Elements of interactivity e.g. assessment with feedback
- Available on a variety of devices
- No data costs for users

The app



Video

The screenshot shows a mobile application interface with a dark theme. At the top, there is a navigation bar with three icons: a home icon, a play button icon (highlighted in blue), and a checkmark icon. Below the icons are the labels 'Home', 'Video', and 'Test yourself'. Underneath the navigation bar is a black banner with the text 'Learn about percentages'. The main content area has a dark grey background with the title 'Percentages' in white. Below the title is a black box containing white text and mathematical expressions. At the bottom of the app is a blue logo for 'mathcentre'.

Home Video Test yourself

Learn about percentages

Percentages

% out of 100 $\div 100$

85% = $\frac{85}{100}$

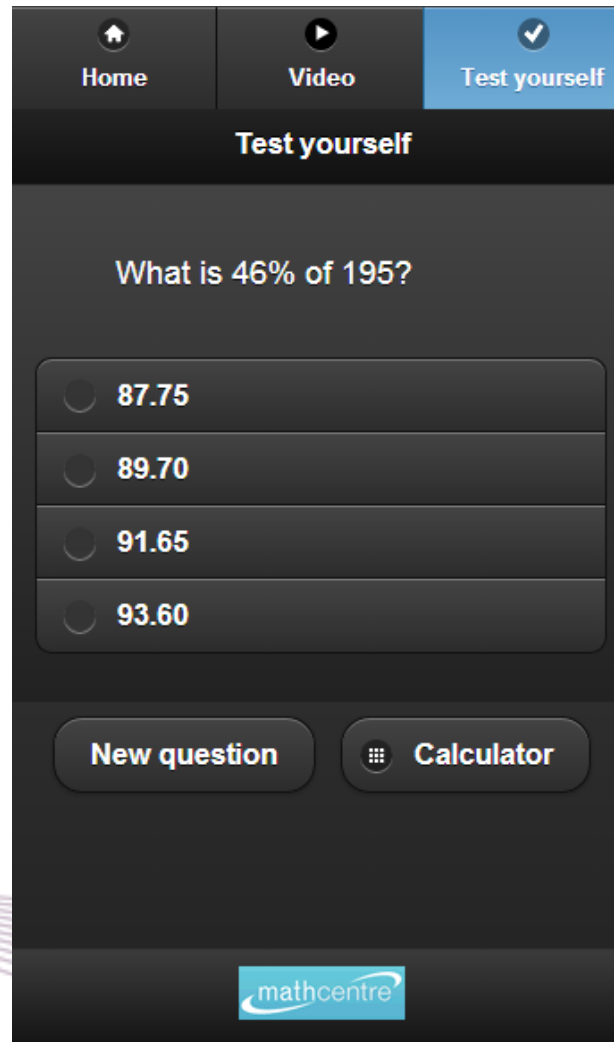
75% = $\frac{75}{100} = \frac{3}{4} = 0.75$

50% = $\frac{50}{100} = \frac{1}{2} = 0.5$

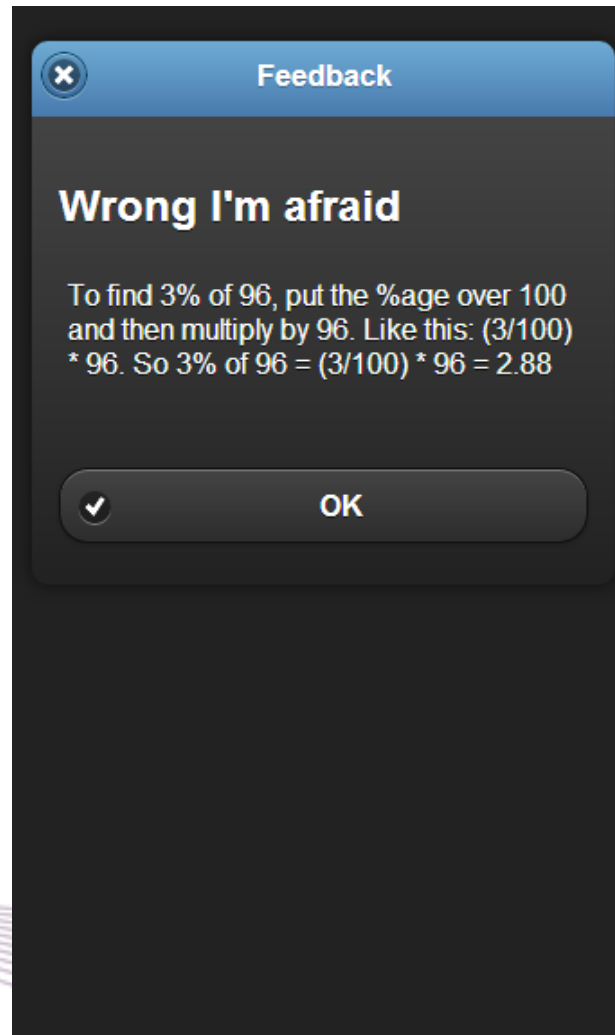
25% = $\frac{25}{100} = \frac{1}{4} = 0.25$

mathcentre

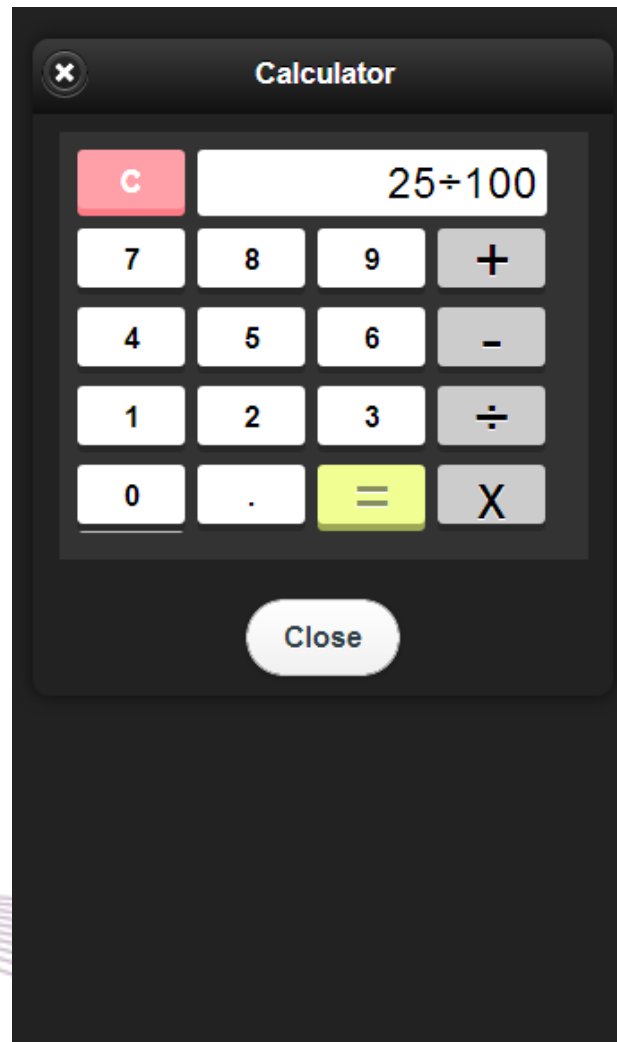
Self testing and feedback



Self testing and feedback



Calculator



Live demo

Our approach

- Built as a set of web pages (HTML)
- Use a JavaScript library (ready made blocks of code) to attach behaviours to various parts of the code
- You can 'run' the app in a browser
- Has the look and feel of a 'native' app

Our approach

- These web pages were converted to 'native' apps using a tool called Intel XDK (free).
- Intel XDK creates a 'wrapper' around a set of webpages so that they can be deployed as native apps on various platforms/devices.

Why this approach?

- Designing 'native' apps i.e. creating an app for IOS (Apple), or WP 8 (Windows) or Android can be done using tools provided by the vendors

BUT

- Different operating systems
- Different development languages
- Platform specific resources required
- All of this has cost implications!

Why this approach?

- We wanted to create a common set of resources that could be delivered across a variety of devices with minimal adjustment.
- Cost effective
- HTML based apps CAN be found in the app stores

Issues

- Many!
 - Video support is problematic
 - Not supported on older phones
 - Video needs to be in the right format
 - Need to sign up for developer licences for the various platforms if you intend to deploy to the app stores

Issues

- Limitations placed by the vendors impact on design and development
 - Android apps have a 50MB size limit, problematic if you are including video
- Still need access to hardware in order to test your apps
 - Emulators are available for the various platforms but they can be slow