A heady brew: designing filtered mathematics education research documents (Espressos) for teachers

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CAMBRIDGE Mathematics ESPRESSO
RESEARCH, FILTERED BY CAMBRIDGE MATHEMATICS

Introduction

Cambridge Mathematics

Cambridge Mathematics is a collaborative organisation at the University of Cambridge, bringing together the expertise of the Faculty of Mathematics, the Faculty of Education, Cambridge Assessment, and Cambridge University Press to create and support a framework for mathematics education for all students aged 3 – 19. We are developing a flexible and interconnected digital Framework to help reimagine mathematics education 3-19. Our design process is transparent, collaborative and research- and evidence-informed.

We think mathematics learning 3-19 can be more connected and coherent and we are providing a structure to make this happen.
We are working with specialists in mathematics education all over the world and expect to have an initial version ready by 2020. The framework emphasises connections between mathematical ideas that support students in building mathematical understanding, using a structure based in the activity design work of the Shell Group at the University of Nottingham.

During our work on the Framework, immersing ourselves in the latest and most seminal mathematics education research, we wanted to create documents for teachers that would help make some of these important ideas accessible and applicable to the classroom.

The brief: design principles and constraints

We set up a list of design criteria (and limitations in scope) for these documents, which reflected many of the aspects of the Framework itself:

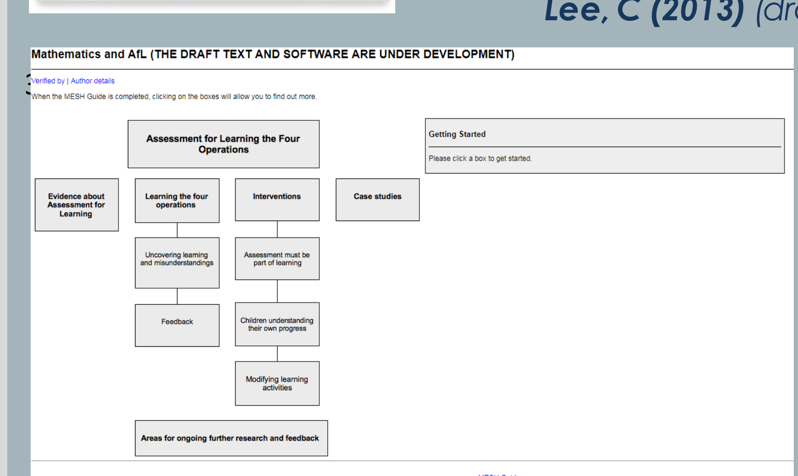
- based on as objective as possible a review of the current research literature, while acknowledging limitations of person-power, time and inevitable bias
- restricted to a two-page document
- containing an attractive and accessible well-constructed mathematical diagram
- fully referenced, with hyperlinks to original research
- carefully focused on one significant question at a time; not attempting to tackle questions too broad or nebulous
- using clear and unambiguous language; defining terms where appropriate
- using the research to clearly outline classroom implications where possible, but without oversimplifying or extrapolating beyond the scope of the research
- visually designed with a focus on aesthetics, clarity and usability for teachers and head of department/subject leaders in mathematics; requiring no object mediation to be appropriate and helpful to those not necessarily previously familiar with research content and language

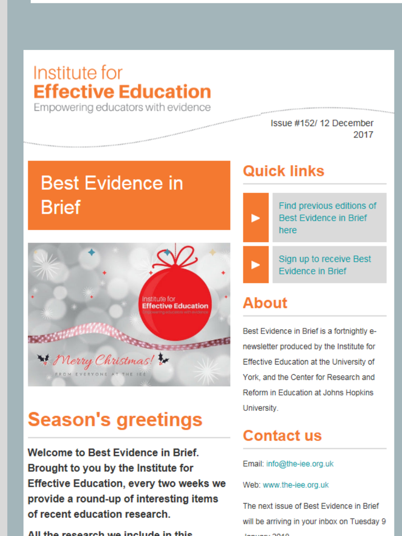
Examples

The following are some of the documents produced by others that exemplify some (but not all) of our design principles for Espressos:

Recent Research in Mathematics Education 5-16
Askew, M. & William, D. (1995)
Great Britain: Office for Standards in Education

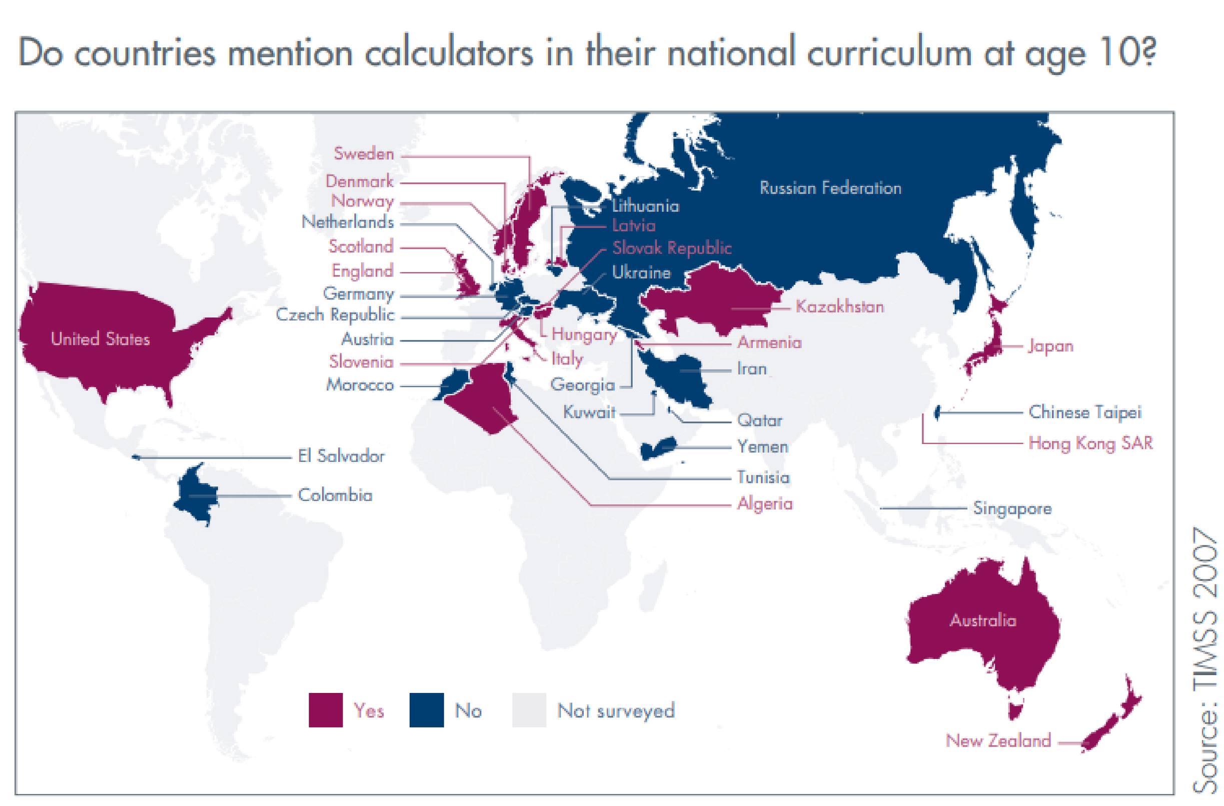
MESH guides (www.meshguides.org
For example, ***Mathematics and AFL***
Lee, C (2013) *(draft)*

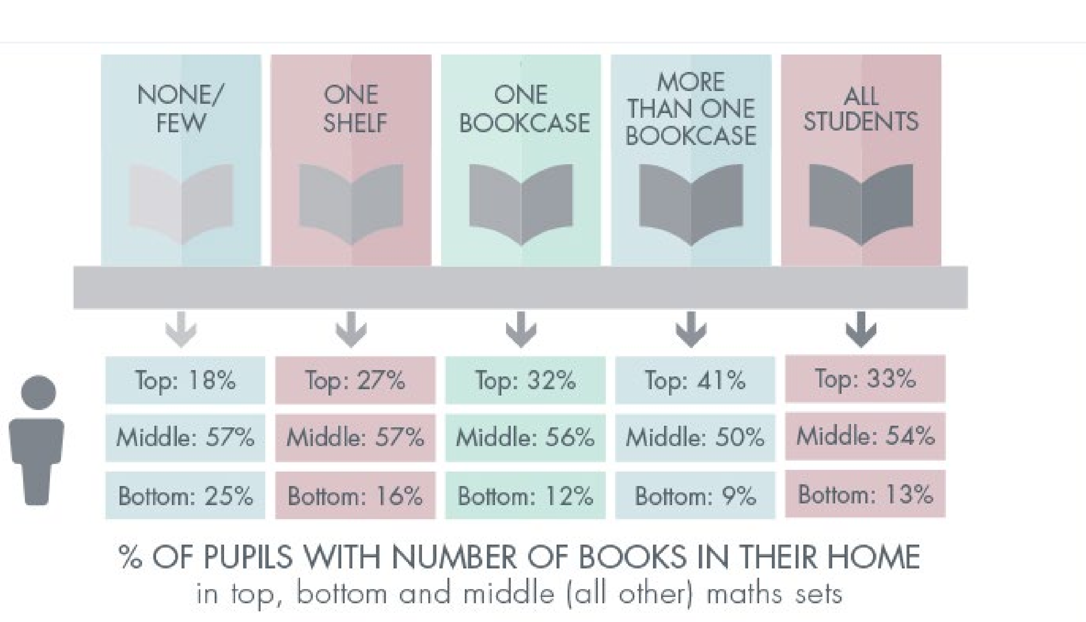




Best Evidence in Brief
(fortnightly from 2011)
Newsletter
Institute for Effective Education

See **www.cambridgemaths.org/espresso** for more information





CAMBRIDGE Mathematics

Design processes

Collaborative effort

Cambridge Mathematics Espressos are written and edited on an approximately monthly schedule with all members of the Cambridge Mathematics team contributing to the final edited version.

Processes include:
- Finding a topic area that we have been researching as part of the framework development that might be of interest and use to teachers and agreeing a focused research question/talking point
- Finding suitable data concepts for the infographic (related to question) and send to the designer
- Reading around the subject –keyword search, discussion with team and known research experts around key papers
- Finding two or three interesting short quotes related to the research question
- Writing first draft of numbered elements along with implications with footnotes referring to papers
- Sending draft to colleagues to read and feedback; discuss content and structure in dedicated meeting
- Sending versions of infographic to colleagues and discuss which is best/any amendments
- Producing a second draft of full text with references and proof-reading)
- Sending text to designer to produce final version and making small corrections and amendments where necessary to fit design
- Adding hyperlinks to designed version and checking
- Uploading to Cambridge Maths site and promoting on social media and through other channels (eg newsletter, guest blogs, articles)

User feedback

Presenting at mathematics education and teacher conferences on this topic has led to several [pieces of important user-generated feedback, including:
- Moving the 'In summary' box to the beginning of the document
- Changing the citation style from bracketed references to endnotes
- Ensuring as many original research documents as possible are not inaccessible to teachers without institutional access
- Ensuring each Espresso has a comments section on our website where users can ask for further information or make a query

We have also discussed these document informally with a number of researchers whose work is included therein, and received some useful and positive feedback.

Questions and next steps

Feedback from organisations such as the National Centre for Excellence in the Teaching of Mathematics and the Mathematical Association and Twitter engagement suggest the Espressos are being well received and that teachers are using them for CPD in mathematics.

Next steps include:
- a systemic review of downloads/read of Espressos and analysis of the data
- A mechanism for more detailed feedback after users have opened the document (questionnaire)

We would like to consider the questions:
- Who is reading Espressos?
- How are they using them?
- How could we further ensure they are seen by mathematics teachers?
- How can we ensure the research questions chosen are useful to the community of users?

University researchers are beginning to show an interest in collaboration with Cambridge Mathematics on these documents and work has begun on these special edition 'Espresso Doppios'.

References

- Centre for Research in Mathematics Education, 2015. *Framework for Designing Classroom Activities*. Shell Centre, University of Nottingham
- Best Evidence in Brief: fortnightly newsletter from the Institute for Effective Education (http://www.beib.org.uk/, accessed 10/12/17)
- Lee, C (2013) (draft) MESH guides (www.meshguides.org, accessed 10/12/17)
- Askew, M. & William, D. (1995) *Recent Research in Mathematics Education 5-16*, Great Britain: Office for Standards in Education