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Increasing competence and confidence in algebra and multiplicative structures

Submission date 19/03/2017	**Recruitment status** No longer recruiting	[_] Prospectively registered [X] Protocol
Registration date 17/05/2018	**Overall study status** Completed	[X] Statistical analysis plan [X] Results
Last Edited 04/11/2025	**Condition category** Other	[_] Individual participant data

Plain English summary of protocol

Current plain English summary as of 12/11/2018:
Background and study aims
Increasing Competence and Confidence in Algebra and Multiplicative Structures (ICCAMS) is a programme designed to teach two mathematical areas that are a key part of the Key Stage 3 curriculum, but which cause particular problems to students – algebra and multiplicative reasoning (e.g., percentages and proportions). The programme is comprised of 40 evidence-informed lessons and extensive teacher professional development. The lessons are designed to help teachers use formative assessment in maths, helping teachers to identify the problems pupils struggle with and how to address them. Activities are set in contexts that pupils can engage with, are collaborative, and use visual representations to help deepen understanding. The aim of this study is to see whether ICCAMS-trained teaching practice improves students' learning outcomes in Year 8, as compared to 'business as usual' teaching practice.

Who can participate?
Students who are in Year 7 at the beginning of the 2016/17 school year

What does the study involve?
Participating schools are randomly allocated into two groups. In the intervention group schools, two Year 7 Maths teachers are trained attend, deliver the ICCAMS lessons to their pupils, and support other Year 7 teachers in using the lessons. In the second year, the same group of pupils – now in Year 8 – continue to be taught the lessons, and the same two teachers continue to receive training and support. The control schools continue with "business as usual". To measure the attainment of the pupils, their Year 6 Key Stage 2 maths results are collected at the start of the study and they sit a maths test at the end of the second year (summer 2018).

What are the possible benefits and risks of participating?
Students in the intervention groups may benefit through improvements to their attainment in and attitudes to mathematics. There are no anticipated risks beyond what would normally take place during mathematics teaching and learning.

Where is the study run from?
1. The University of Manchester (UK)

2. Durham University (UK)
3. University College London Institute of Education (UK) (transferred from the University of Nottingham effective 1st September 2017)

When is the study starting and how long is it expected to run for?
August 2015 to March 2019

Who is funding the study?
Education Endowment Foundation (UK)

Who is the main contact?
Dr Maria Pampaka

Previous plain English summary:
Background and study aims
Increasing Competence and Confidence in Algebra and Multiplicative Structures (ICCAMS) is a programme designed to teach two mathematical areas that are a key part of the Key Stage 3 curriculum, but which cause particular problems to students – algebra and multiplicative reasoning (e.g., percentages and proportions). The programme is comprised of 40 evidence-informed lessons and extensive teacher professional development. The lessons are designed to help teachers use formative assessment in maths, helping teachers to identify the problems pupils struggle with and how to address them. Activities are set in contexts that pupils can engage with, are collaborative, and use visual representations to help deepen understanding. The aim of this study is to see whether ICCAMS-trained teaching practice improves students' learning outcomes in Year 8, as compared to 'business as usual' teaching practice.

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Contact information

Type(s)
Scientific

Contact name
Dr Maria Pampaka

ORCID ID
https://orcid.org/0000-0001-5481-1560

Contact details
B4.1 Ellen Wilkinson Building
The University of Manchester
Manchester
United Kingdom
M13 9PL

Additional identifiers

Protocol serial number
N/A

Study information

Scientific Title
Independent evaluation of Project ICCAMS Maths (Increasing Competence and Confidence in Algebra and Multiplicative Structures): a two-arm 2-year cluster randomised controlled trial

Acronym
ICCAMS Maths

Study objectives
The ICCAMS-trained teaching practice improves students' learning outcomes in Year 8, as compared to 'business as usual' teaching practice

Ethics approval required
Old ethics approval format

Ethics approval(s)
Pilot stage: University of Manchester Research Ethics Committee 6, 14/6/2016, ref:16348
Main trial: University of Manchester Research Ethics Committee 1, 09/09/2016, ref: 16405
Phase 1: University of Nottingham School of Education Ethics Committee, 08/10/2015, ref: 2015

/938/MO
Phase 1 and Phase 2: Durham University School of Education Ethics Sub-Committee, 11/12/2015, ref: 2245

Study design
2-year cluster-randomised trial

Primary study design
Interventional

Study type(s)
Other

Health condition(s) or problem(s) studied
Mathematics teaching

Interventions
Randomisation was based on randomly dividing the 109 recruited schools into the Intervention or Experimental (E) and Control (C) groups roughly 50:50 so that each of the five regions has roughly half E and half C numbers, and so that within each region the split is balanced based on the percentages of FSM and average GCSE attainment.

ICCAMS is designed to teach two mathematical areas that are a key part of the Key Stage 3 curriculum, but which cause particular problems to students – algebra and multiplicative reasoning (e.g., percentages and proportions). The programme is comprised of 40 evidence-informed lessons, 20 associated mini-assessment activities and extensive teacher professional development. The lessons are designed to help teachers use formative assessment in mathematics, helping teachers to identify the problems pupils struggle with and how to address them. Activities are set in contexts that pupils can engage with, are collaborative, and use visual representations to help deepen understanding. Two mathematics teachers will be trained, and will be expected to provide cascade training for other mathematics teachers in Key Stage 3 to embed the approach in their school.
The control schools will continue with "business as usual”: teaching mathematics using their normal approaches.

Intervention Type
Other

Primary outcome(s)
The standardised scores (i.e. Rasch scores which are in a logit scale) on a slightly revised version of the Mathematics Assessment for Learning and Teaching (MALT) test for Year 8 (MALT13). Revisions include the removal of two items and the addition of four algebra related items to strengthen this dimension (the measures have been checked with pilot data). This assessment is a test of general maths but also includes some conceptual elements of maths and will be complemented with the four extra items to strengthen the secondary dimensions listed below (and in particular algebra). Attainment will be measured at the end of Year 8, with the MALT test (paper – 45 minutes). Administration of the tests will be directly invigilated by the evaluator team and implemented under exam conditions in schools in June/July 2018.

Key secondary outcome(s))

1. An attainment sub-scale on MALT of “multiplicative reasoning”, measured with the post test at the end of Year 8
2. An attainment sub-scale on MALT of “algebra”, measured with the post test at the end of Year 8
Both of these are likely to be more sensitive to the intervention, and have been validated during the pilot stage
3. Student attitudes measured using a survey of dispositions towards mathematics at baseline (start of Year 7) and post-test (end of Year 8)

Completion date
31/03/2019

Eligibility

Key inclusion criteria
Eligible schools:
1. Mainstream state secondary schools in England.
2. More than two class intake for Year 7
3. From the following regions in England: East Anglia and Cambridgeshire, the East Midlands, London, the South West and Yorkshire

All students in Year 7 at the beginning of the 2016/17 school year are the target cohort

Participant type(s)
Other

Healthy volunteers allowed
No

Age group
Mixed

Sex
All

Total final enrolment
20800

Key exclusion criteria
Schools for which the Headteachers did not sign the agreement with project teams

Date of first enrolment
01/03/2016

Date of final enrolment
30/06/2016

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
The University of Manchester
Ellen Wilkinson Building
Oxford Road
Manchester
United Kingdom
M13 9PL

Study participating centre
Durham University
United Kingdom
DH1 3UZ

Study participating centre
University of Nottingham
United Kingdom
NG7 2RD

Study participating centre
University College London (UCL)
United Kingdom
WC1H 0AL

Sponsor information

Organisation
The University of Manchester

ROR
https://ror.org/027m9bs27

Funder(s)

Funder type
Charity

Funder Name
Education Endowment Foundation

Alternative Name(s)
EducEndowFoundn, Education Endowment Foundation | London, EEF

Funding Body Type
Private sector organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
Data will be archived through EEF's data contractors Fischer Family Trust Education (FFT) - contact: Laura.James@fft.org.uk.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Funder report results			04/11/2025	No	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Protocol (other)			04/11/2025	No	No
Statistical Analysis Plan			04/11/2025	No	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes