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A large, high-resolution image of the Earth as seen from space, showing the curvature of the planet and the blue oceans. The image is centered in the background of the slide.

**The Whole College  
Approach: evidence of  
impact and inspiration**

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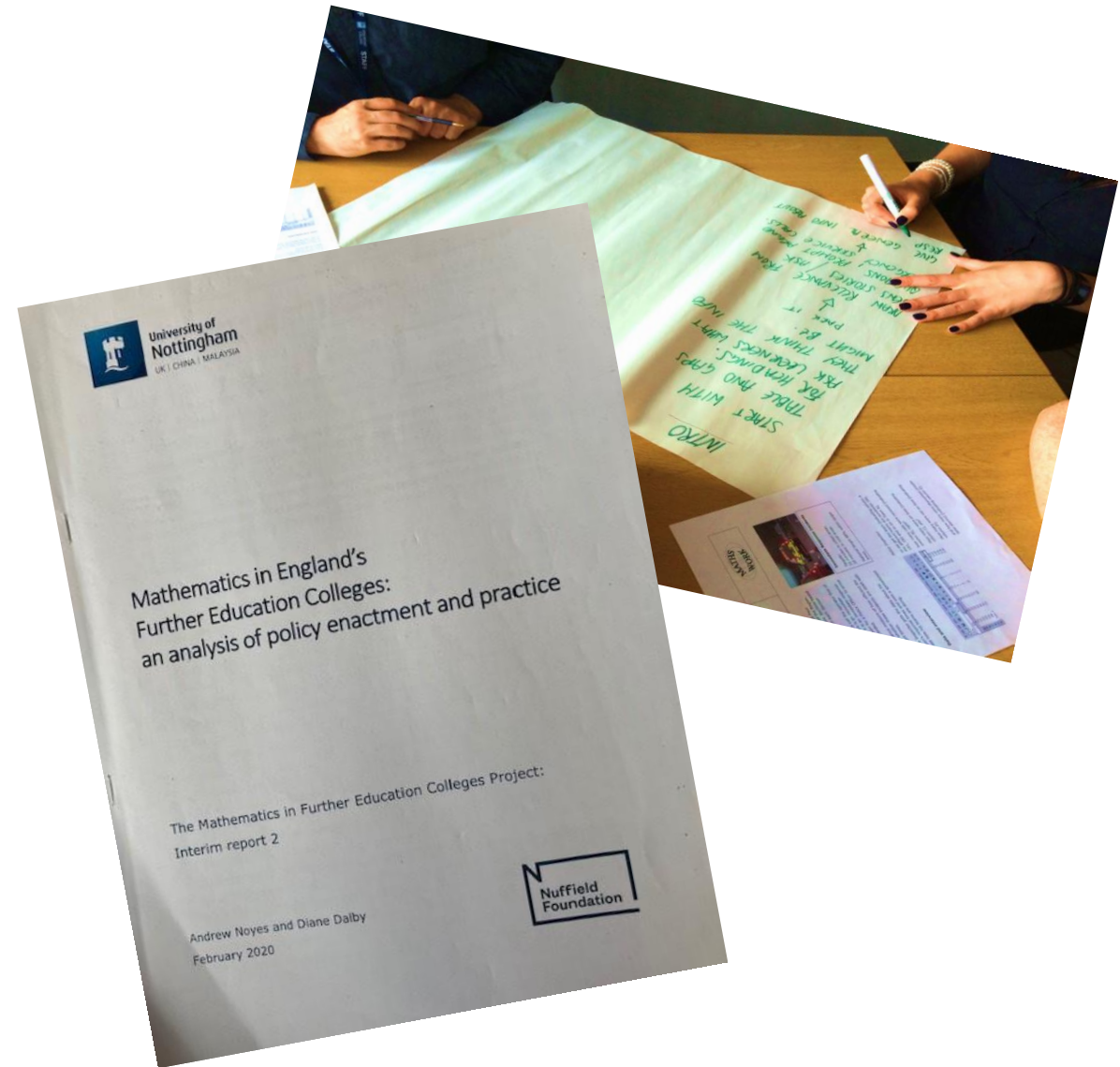
# Mathematics in FE colleges

A survey of teachers of mathematics in England's Further Education Colleges (Interim report 1)

Mathematics in England's Further Education Colleges: an analysis of policy enactment and practice (Interim report 2)

Students' Perspectives on Mathematics in Further Education Colleges (Interim report 3)

Mathematics in further education: student progress over time (Interim report 4)



<https://www.nottingham.ac.uk/research/groups/crme/documents/mifec/final-report.pdf>



# Whole College Approach project

## Aims

To achieve an improvement in the **understanding, planning and implementation** of Whole College Approaches for mathematics in large FE colleges.

## Objectives

- To translate the MiFEC and other related WOA research into practice;
- To build sector knowledge about WCAs;
- To develop, pilot and research the use of WCA **self-assessment tools**;
- To develop, pilot and research **mechanisms** to support practitioners in the development and use of a WCA;
- To produce stand-alone **resources** for improvement in a WCA to mathematics;
- To produce **case studies** of the implementation of a WCA in the FE college context.



# Project participation

**2021 - 22**

**10 Centres**

10 college  
intervention  
projects



**2022 - 23**

**10 Centres**

10 college  
continuation  
projects

**6 new colleges**

6 new college  
intervention  
projects

WCA **programme**: guidance, SA tools, 'critical friend', etc.

WCA college **interventions**:  
Problem, analysis, planning, implementation, review.

WCA **evaluation**: interviews, focus groups, case studies, etc.





# A Whole College Approach

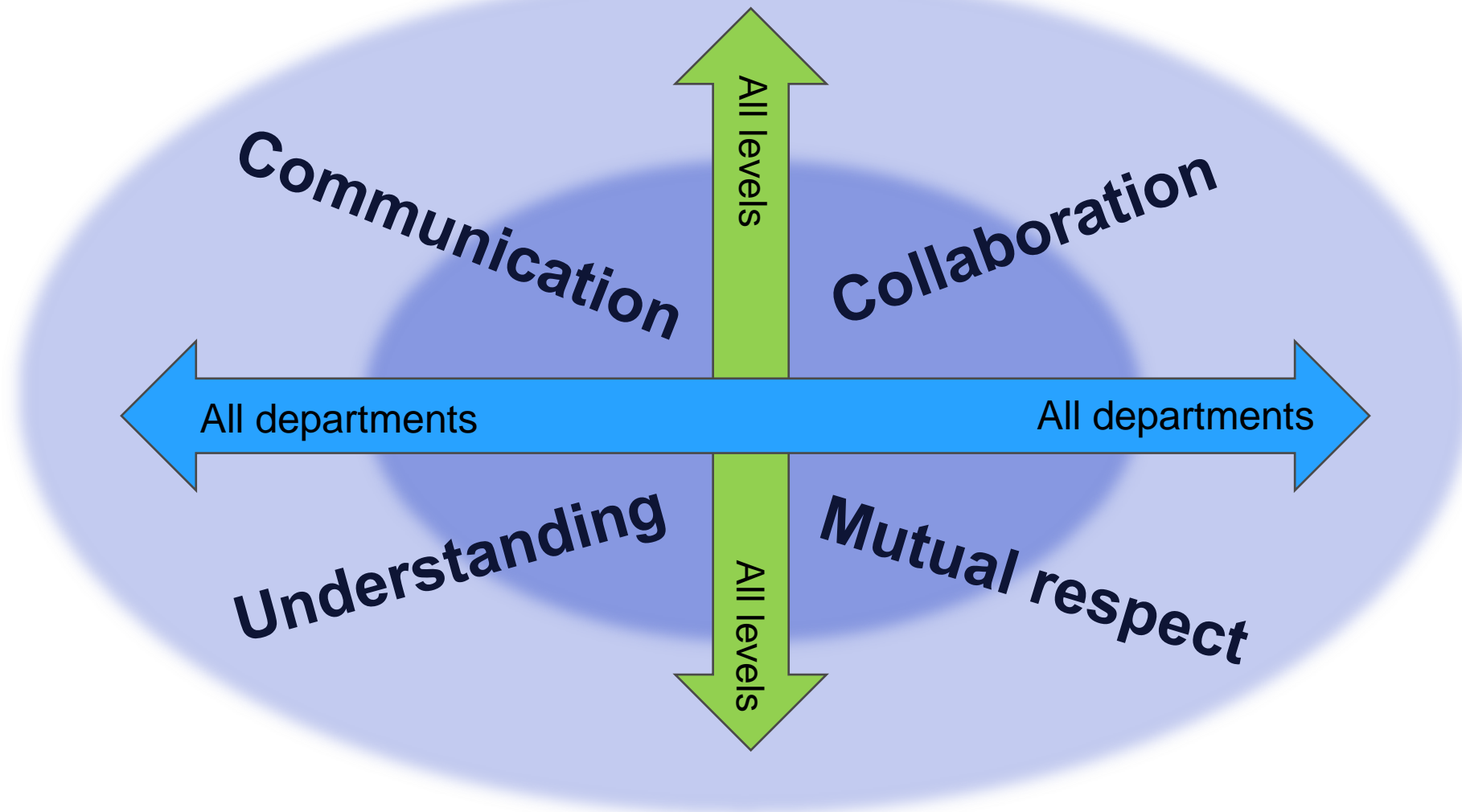
In a Whole College Approach, improving students' mathematics skills becomes a **shared responsibility**, supported by all staff through their **active engagement** in a **collaborative effort**.

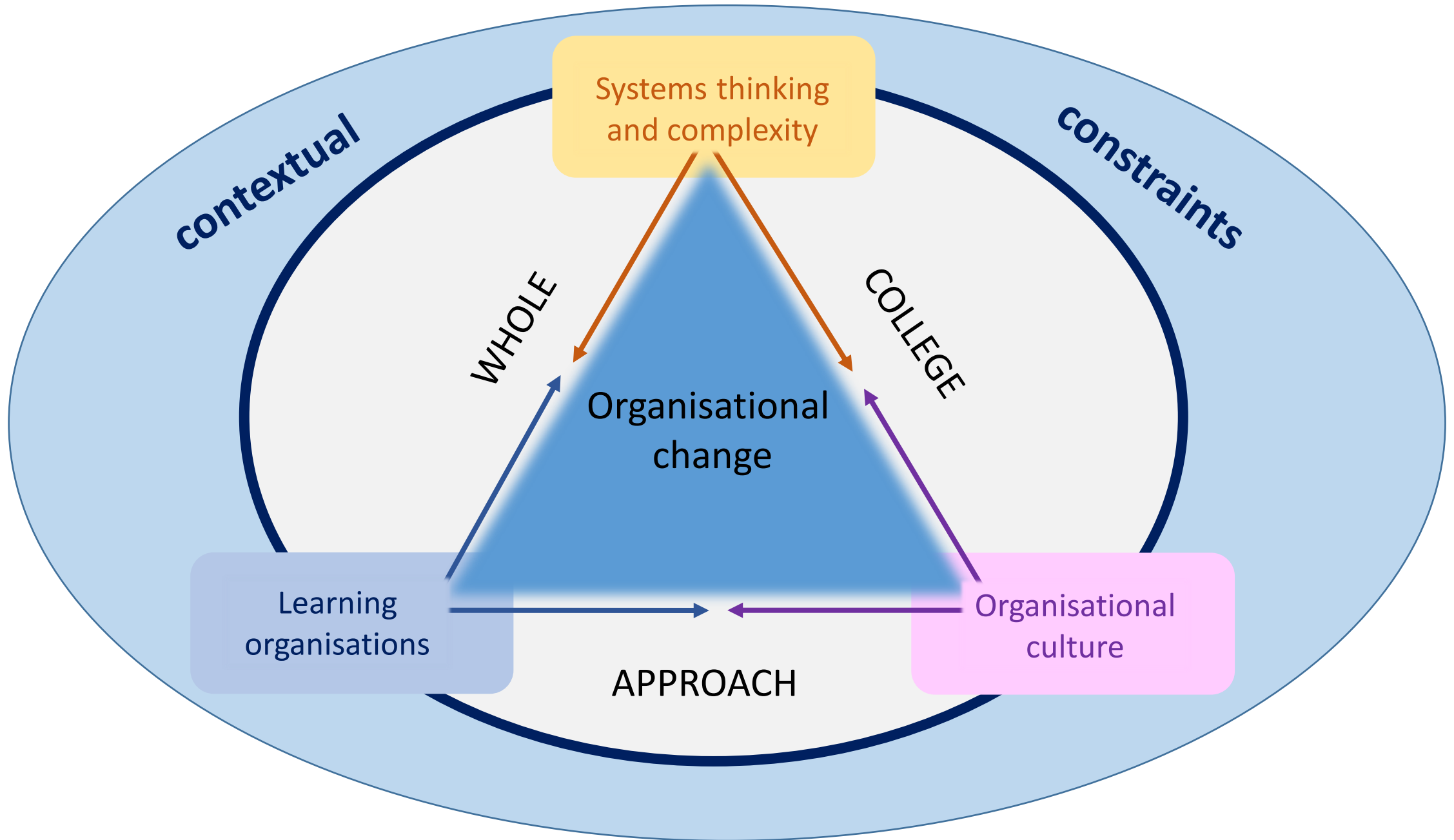


Fragmentation → Coordination → Collaboration → Active participation



# Shared responsibility





Systems thinking  
and complexity

contextual

constraints

WHOLE

COLLEGE

Organisational  
change

Learning  
organisations

Organisational  
culture

APPROACH





# Organisational change, soft systems and complexity

## **Complexity**

A linear sequence of actions is inappropriate because it does not capture the complexity of the process required or the human systems involved (Pollack & Pollack, 2014; Checkland 2000). Planned organisation change processes (e.g. Kotter's 8 stage process) are therefore unlikely to be effective.

## **A holistic approach**

Need to think holistically and reflect on how the separate parts make up the whole (Checkland 2000).

## **Interactive systems**

“Interactions are the central dimension of complex human systems” (Hawkins & James, 2018, p.731). People may belong to several systems; they change as a result of interactions and new system properties emerge.



# Organisational change, soft systems and complexity

## **Multi-level collaboration**

An approach that engages people at different levels of the organisation and does not rely on a 'top down' approach from senior leaders (Pollack & Pollack, 2014; Monat & Ganon, 2015). It's important to use social processes to create collective meaning (Kondra & Hurst, 2008)

## **Reflective inquiry**

A process that involves organised exploration, inquiry and conscious and continual reflection (Checkland, 2000) using feedback from within the system in decision-making (Hawkins & Jones, 2018).



# Organisational culture and learning organisations

## **Engaging with people and culture**

Successful change requires leaders who “engage mindfully with the school’s culture and community, and who will involve the teachers integrally and meaningfully as team members in the implementation process” (MacMillan, 2000, p.52)

## **Multiple perspectives**

... the ideas of others will lead to alterations for the better in the direction of change and sometimes the others’ realities will expose the problems of implementation that must be addressed” (Fullan, 1991, p.96)

## **Organisational learning**

Educational change is a learning experience for everyone (Fullan, 1992), and is fostered by a culture of inquiry, innovation and exploration (Kools and Stoll, 2016)



# CHIME framework

<b>Contextual</b>	Context matters. A WCA to mathematics must take into account the particular features of the college, in addition to external factors (national and local) that frame the implementation of mathematics policy and practice in FE.
<b>Holistic</b>	Colleges operate as complex systems of people and processes with the whole being both <i>more than the sum of the parts</i> . Understanding the big picture, and the relationships between the parts and the whole, is key to a WCA to mathematics.
<b>Interconnected</b>	There are many connections in a college system. Causes and effects are not always simple and change can be unpredictable. Planned WCA improvements can fail if the interactions between processes (and people) are not well understood.
<b>Multidimensional</b>	WCA problems have multiple dimensions, and these are perceived and understood from different points and angles of view. Valuing such diversity can aid understanding and the planning of improvement for mathematics.
<b>Evaluative</b>	Understanding and improving a WCA for mathematics requires effective data generation and information exchange. It is important to develop a culture of self-assessment, critical inquiry, iterative evidence-building and collective analysis.



# Programme summary

Colleges were expected to:

- form an appropriate cross-college **WCA team** to collaborate and lead their intervention;
- explore a self-identified **problem** or area for improvement;
- work with the **self-assessment** tasks, other resources, guidance and feedback provided by their external consultant (UoN);
- develop a **WCA action plan** to address the problem;
- participate in meetings with their external consultant to **review** progress, evaluate impact and develop further plans.



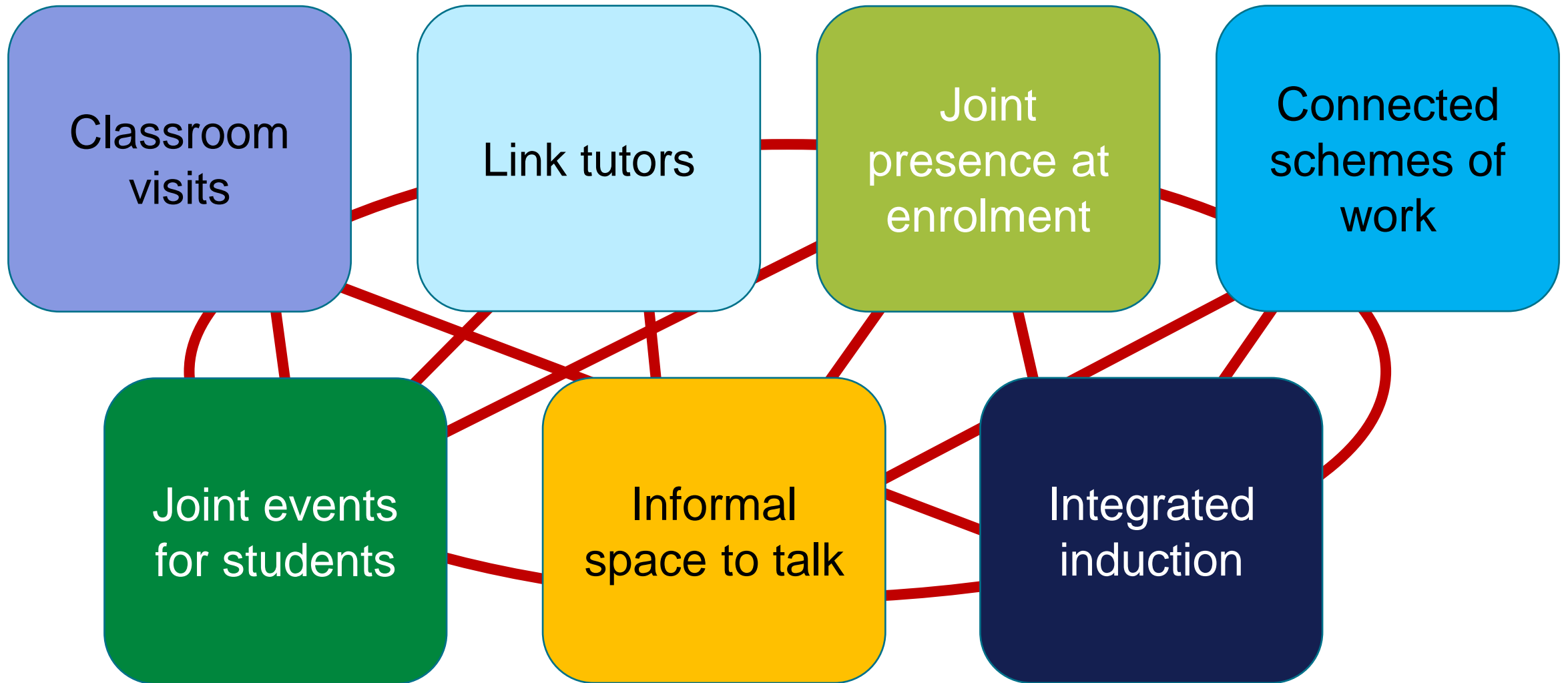
# Research methods

- A mixed methods approach designed to generate both quantitative and qualitative data at intervals throughout the programme
- College case studies (16 in total; 4 in depth)
- Data from surveys, focus groups with WCA leads (2), individual interviews with college WCA team members (27), college reports, and field notes
- Interviews were transcribed and analysed using NVivo using an iterative process of coding to identify themes that were then used to carry out a cross-case analysis
- The research aimed to explore to what extent, and how, the WCA project concepts, tools and approaches support improvement processes for mathematics in FE colleges, and how these might be improved





# College interventions: examples





# College cases: examples (1)

**It's a complex problem – so you can't expect an 'easy' answer!**

The college faced some common issues with maths (student motivation and attendance) but needed to use the perspectives of both maths and vocational staff to uncover the real problem and plan appropriate actions.

**Two sides of the coin: sorting the system and changing the culture**

The college needed to improve the systems (data reports) but this led to more communication between maths and vocational staff and a different culture.

**Breaking out of the 'silos' – the power of interdepartmental collaborative communities**

Staff needed to form new collaborative groups to deal with maths issues, but barriers were also broken down for students when they engaged with maths collaboratively in a different environment.

**Increasing the visibility of maths – for staff and students**

The visibility of maths and maths staff was important. Maths staff needed to become more central and have a higher profile, whilst maths needed to be more prominent in vocational learning.



## College cases: examples (2)

**Maths – it's everyone's business.**

Creating spaces for new communities of practice to develop was important but found they needed to do this in different ways for different departments.

**It's all about attendance – or is it?**

The initial aim was to improve attendance, but the college found that improving communication was the key.

**Maths and vocational learning – interweaving instead of 'bolting on'**

Visiting each other's classrooms opened up opportunities to support each other with the development of students' maths skills.

**Time to talk - hard to find but definitely worth the effort!**

Maths became integrated into study programmes in various ways. It worked because it was a collaborative effort but to do this staff needed a regular space to talk informally.



# The importance of the WCA team

The **constitution** of the college WCA team – getting the ‘right’ people in the team – led to better progress. Colleges benefited from the active involvement of a fully committed member of their Senior Leadership Team (Sirkin, Keenan & Jackson, 2005).

A **culture** of trust and mutual respect encouraged collaboration. The self-assessment tasks supported colleges to develop this culture.

Some teams developed into effective inter-departmental **communities of practice** where teachers’ identities changed (Wenger, 1999). New roles and relationships encouraged ownership, changes in attitude and in behaviour (Beer, Eisenstat & Spector, 1990).

**Consistency** in team membership made it easier to design and implement interventions.



# Building foundations

The self-assessment tasks achieved the intended aims of:

- guiding and supporting the WCA team through the different stages of the WCA programme;
- developing a collaborative culture in the WCA team;
- facilitating reflective, multidimensional discussions that led to shared meaning-making.

In Year 2, the opportunity to use the self-assessment tasks in face-to-face situations (which was not possible in Year 1 due to Covid restrictions), made it easier to develop relationships between team members and achieve these aims.



# Readiness to change

Some colleges found it more difficult to get started than others. Self-assessment task 2 gave an indicator of the college **WCA starting position**, but this did not explain variations in the rate of progress.

Progress was affected by a cultural phenomenon that we identify as a **readiness to change**. By this we mean a combination of the value of change to the individuals or groups that will be affected, and the organisational capability, in terms of capacity and motivation (Weiner, 2009).





# Developing communication and collaboration

Increased communication and collaboration led to:

- Bridging divisions between mathematics and vocational learning
- More effective curriculum and administrative connections between vocational and mathematics departments
- Changes in students' perceptions of mathematics as an 'add on' to their study programme
- More effective processes, e.g. monitoring attendance
- Stronger relationships between mathematics and vocational staff and increased mutual support
- Better relationships between students and mathematics teachers
- Changes in staff roles and professional identities
- Increased empowerment to improve students' experiences of learning mathematics



# Multidimensional aspects

Through the Discovery Phase, colleges developed a better understanding of the problem by **sharing different perspectives** in open and honest conversations. Through these discussions, most colleges found that the area or problem they needed to prioritise was not the same as the one they initially identified.

Colleges found that using the WCA process to addressing one problem often led to **improvements in other areas**.

Colleges found it was important to consider both **systems and people** in their projects and aim for long-term cultural change.



## It takes time

Colleges needed **time** to develop collaboration and plan an appropriate intervention together but found it difficult to see this in the initial stages.

This is a common issue in FE colleges, which may be due to:

- Incorrect assumptions that long projects fail (Sirkin, Keenan & Jackson, 2005)
- Uncertainty in the FE sector, which tends to encourage mimetic behaviour (Kondra & Hurst, 2008) in the search for 'quick wins'.
- A lack of understanding that “Small changes can produce big results – but the areas of highest leverage are often the least obvious” (Senge, 2006, p.63).



# External support

“The professional, friendly and supportive facilitation by the representatives from the University of Nottingham has been instrumental in the success of this initiative” (Assistant Principal, Case study D)

“The external support was critical in guiding us through the early planning stages and helping us to focus on the problem. The self-assessment tasks helped us to understand how our departments fit within the college structure and where the potential problems might be. The ongoing support and guidance gave us the motivation to meet targets and was also helpful to have a critical friend with an outside perspective who can share experiences of other colleges” (Head of Maths, Case study S).



# There are challenges

**Staff changes** were disruptive, especially when these affected WCA team membership or other key staff involved in the intervention. It took time to adjust and re-establish relationships.

Large **organisational changes** (e.g. generic college systems, restructuring, mergers) often resulted in a loss of momentum and sometimes an adjustment to action plans.



# Impact – examples from case studies

## Staff

- New ways of working – more efficient, more effective
- Improved communication across departments
- Increased interaction and collaboration to tackle issues
- Positive changes in culture, attitudes and identities
- More authentic vocational contexts for maths

## Students

- Changes in attitude towards maths and maths teachers
- Increased curriculum connections and perceptions of the relevance of maths
- Improvements in student attendance at lessons
- Higher rates of attendance for maths examinations



Phase	Activity	Mode	Length	Date	Content
Pre-programme training	Introductory session for senior leaders	Online	1hr	Term 1	Overview of WCA programme & commitment
	Training for WCA leads	Online	2hrs	Term 1	Overview of WCA programme, role of WCA lead & sample tasks
Discovery phase	Meeting 1 with college team	F2F	3hrs	Term 1	Exploring the issues: <ul style="list-style-type: none"> <li>Self-assessment tasks 1-3</li> </ul>
	College team completes summary of self-assessment				
	Meeting 2 with college team	F2F	2hrs	Term 2	Analysing the problem: <ul style="list-style-type: none"> <li>Feedback on self-assessment</li> <li>Self-assessment task 4</li> </ul>
	College completes a draft WCA action plan				
	Networking event with other colleges	Online	2hrs	Term 2	Sharing ideas: <ul style="list-style-type: none"> <li>Presentations of draft plans</li> <li>Peer review</li> </ul>
Planning and Intervention	Meeting 3 with college team	F2F	2hrs	Term 2	Action planning: <ul style="list-style-type: none"> <li>Feedback on draft action plan</li> <li>Evaluation and impact discussion</li> </ul>
Intervention	Meeting 4 with college team	F2F	2hrs	Term 3	Review: <ul style="list-style-type: none"> <li>Review of progress</li> <li>Plans for continuation</li> </ul>
Review and continuing intervention	Meeting 5 with college team	F2F	2hrs	Term 4	Scaling: <ul style="list-style-type: none"> <li>Scaling out across the college</li> <li>Planning for sustainability</li> </ul>
	College completes a final report				



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**Any questions?**

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