

# **Theory of Change for Attainment Raising Initiatives**

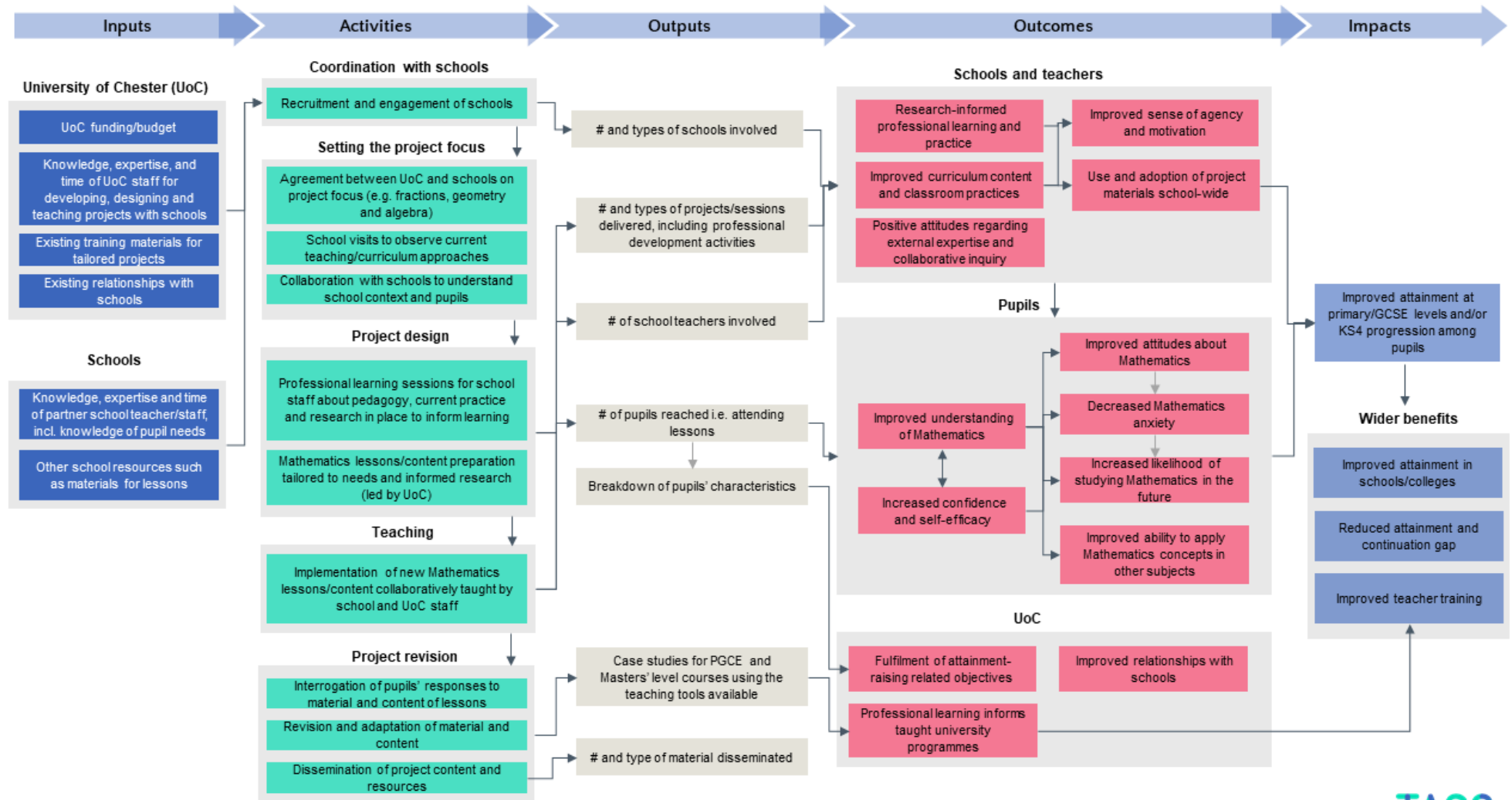
## **Teacher Research Group**

**April 2023**

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**Theory of Change diagram**



## Why is this intervention being run?

A number of schools in Cheshire experience lower Higher Education (HE) participation, progression, and attainment than national averages. This is, in part, due to contextual factors, such as deprivation and challenges around staffing, which can limit capacity and capabilities to effectively address the academic challenges faced by pupils. Other external and more recent challenges, such as the COVID-19 pandemic, have exacerbated school pressures and difficulties in boosting attainment.

This intervention is designed to address attainment challenges. The Teacher Research Group (TRG) model involves University of Chester (UoC) working collaboratively with schools within the Cheshire region to design and develop research-informed content and lessons – mainly focused on Mathematics – for teaching the school curriculum, including pedagogy and teacher development. These lesson plans, which are intended to be accessible and effective for all pupils, aim to develop the cognitive and emotional skills of pupils, thereby improving attainment. Lessons follow a collaborative design, as they are informed by research, teachers' professional knowledge, and an understanding of the existing school context.

## Who is the intervention for?

This programme primarily works with secondary schools within the Cheshire region but is currently expanding to include primary schools. Therefore, the below Theory of Change diagram and narrative covers secondary schools.

## What is this intervention?

Resting on the assumption that accessible and effective curriculum can strengthen pupils' cognitive and emotional skills and improve attainment, this intervention focuses on the design and development of research-informed approaches to teaching the curriculum with a predominant focus on Mathematics concepts for pupils in secondary schools. However, this Theory of Change and narrative could be adapted for similar programmes that focus on subjects other than Mathematics.

## Inputs

For the programme to be successfully delivered, a range of resources (inputs) from the UoC and participating schools are required, including tangible and non-tangible resources.

Funding from UoC is crucial in enabling the initiation and continuation of the programme, predominantly for staff time. At the same time, human resources such as the knowledge, expertise, and time from both the UoC staff and teachers from partner schools are required. These allow for the development, design, and teaching of the projects/lessons, as well as the correct identification of pupil needs. Other inputs required include materials for lessons provided by participating schools and UoC, as well as the existing working relationships between UoC and partner schools.

## Activities

The intervention starts with the recruitment and engagement of schools, led by UoC (see [Assumption 2](#)). Once the schools have been engaged, UoC staff work collaboratively with them to identify pupils' needs and develop the focus of the project, which typically consists of designing approaches to teaching challenging Mathematics concepts such as fraction, trigonometry, and algebra. The process of collaboratively identifying and developing the project's focus also involves visits to schools to observe

current teaching/curriculum approaches, and collaboration with schools to better understand the school context and pupils' needs (see [Assumption 1](#)).

The next stage of the intervention is the project design, which involves developing professional learning sessions for school staff about the TRG, pedagogy, and best practices used to inform learning. Collaboratively, both UoC and school staff design and prepare research-informed Mathematics concepts/content based on pupils' knowledge and experience. This results in lessons that are designed and taught collaboratively by school and UoC staff.

Following the interrogation of pupils' responses to the material and content of the new sessions and material, UoC and school staff continuously review and adapt the materials as required. The content and resources used are then disseminated more widely across the school.

### What is this intervention expected to achieve?

This intervention is expected to achieve a range of outcomes and impacts for the UoC, teachers, schools, and pupils involved.

#### Outcomes

##### Outcomes for schools and teachers

Through the collaborative process of lesson design, teachers are expected to **engage in research-informed learning and practice** (see [Assumption 3](#)). This can then lead to **improved curriculum content and classroom practices**, and the **adoption of materials within the school in the longer-term** (see [Assumption 4](#)). Teachers' involvement in the improvement of the curriculum content is anticipated to lead to improved knowledge and skillsets and **improved sense of agency and motivation**.

Further, it is also anticipated that teachers **recognise and appreciate the value of external expertise and collaborative inquiry**. It is also anticipated that teachers will use the evidence from the TRG and their professional judgement to support their decision making.

##### Outcomes for pupils

Pupils are expected to have an **improved understanding of Mathematics**, which can lead to an **improved perception of Mathematics** and **decreased Mathematics anxiety**. Developing an interest in this subject can also prompt pupils to **study Mathematics** in the future, as well as help them **improve their ability to apply mathematical concepts in other subjects**. This intervention is expected to support pupils' **confidence and self-efficacy**, further contributing to the achievement of the aforementioned outcomes.

##### Outcomes for University of Chester

Through the collaborative design and development of research-informed lesson plans, UoC is expected to see both **improved relationships with schools** (see [Assumption 2](#)) and **fulfilment of attainment-raising related objectives**.

#### Impacts

On the assumption that research-informed lesson design and collaborative inquiry are effective in addressing the needs of pupils (see [Assumption 5](#)), this intervention is expected to lead to improved

**attainment at the primary/GCSE levels and/or lead to KS4 progression among pupils.** This supports UoC's fulfilment of attainment-raising related objectives.

By improving attainment of pupils from disadvantaged backgrounds, the programme could **contribute to improving overall attainment at school level** and **reducing the attainment and continuation gap**. However, it is important to note that many factors influence these potential wider benefits, and the programme would likely only be one small contributing factor.

### Who is delivering the intervention?

The intervention is designed and developed collaboratively between UoC staff members and the teachers in partner schools.

### How is this intervention delivered?

This intervention is implemented face-to-face in schools with teachers and pupils.

### Where is the intervention delivered?

This intervention is delivered in schools within the Cheshire area collaborating with UoC.

### How many times will the intervention be delivered? Over how long?

UoC staff is expected to design and develop, on average, 4-6 TRG projects a year.

### Will the intervention be tailored?

The intervention itself addresses specific issues in each school and is designed to take into account each school's unique context and pupils' needs. For this, it is important to have a good understanding of the schools' challenges and barriers, as well as its strengths, capacity, and available resources. Every TRG project and models are tailored in response to a development need in the school, for instance the need to raise attainment in algebra.

### How will implementation be optimised?

The implementation can be optimised and impacts maximised when there is continued trust and collaboration between UoC and schools (see [Assumptions 6 and 7](#)). Fostering these relationships can encourage engagement, both allowing teachers and schools an opportunity to be agents of change, and ensure that they are more receptive to the collaborative enquiry and challenging assumptions suggested by the UoC staff.

### What assumptions underpin the programme?

1. The focus of projects identifies core issues and challenges with consideration to pedagogy and curriculum sequencing (e.g., some concepts should be prioritised so that concepts can build on one another).
2. UoC maintains and sustains a good and trusted relationship with partner schools, which enables the recruitment and participation of schools into the programme.
3. Schools and teachers are receptive to changes informed by research and evidence and are open to challenging existing ways of working through collaboration with a Higher Education Provider.

4. Schools are able to commit and invest time over a longer term to see full benefits.
5. Research-informed lesson design and collaborative inquiry are effective in addressing pupils' needs.
6. Research-informed practice-based projects can have a positive impact on attainment in the context of engaged schools.
7. Schools are able and willing to engage in long-term continuity-based projects rather than one-off short-term ones.

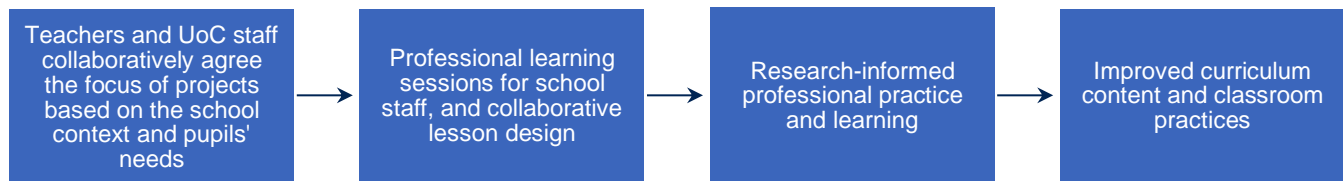
### **What are the key risks to delivery?**

1. Unengaged staff and pupils hinder the achievement of anticipated outcomes.
2. Inability to see immediate results can lead to a lack of school buy-in and lack of senior members on board.
3. Changes in the Department for Education or government priorities can affect the delivery of the programme.
4. Lack of confidence of teachers on the programme might affect its continuity after the collaboration with UoC ends.
5. Ofsted visits and subsequent school grading may change school priorities and curriculum approach/content.
6. Challenges in school context (e.g., changes in pupil characteristics lead to need to reallocate classes and pupils) might delay the implementation of projects.

### **What are the causal pathways?**

Causal pathways explain how the programme activities are expected to lead to the anticipated outcomes and impacts. This section outlines the key causal pathways reflected in the programmes' Theory of Change and presents existing evidence to support them. These causal pathways are based on the assumptions and observations made by the UoC team participating in the design and delivery of the programme, as well as on data collected through their monitoring and evaluation activities, and on the underlying evidence base available. Please note, however, that the evidence presented here is not exhaustive.

## Causal Pathway 1



This causal pathway hypothesises that the collaboration between UoC and school staff to agree and design lesson content will result in research-informed professional practice and learning. This is then expected to lead to improved curriculum and classroom practices. This relies on UoC having a good understanding of the school context, current practice, and pupils' needs, for example a particular challenge they face in Mathematics. It also depends on UoC using appropriate research to inform the lesson design and/or teaching approach, drawing on existing evidence and pedagogy, while school staff also bring their own knowledge and experience. The review process also aims to ensure that the lessons are appropriate and effective for pupils.

This pathway is supported by years of literature and policy supporting research-informed and evidence-based practice, which must be carefully implemented by educators<sup>1</sup>. The approach builds on evidence on collaborative lesson research, a form of professional development which brings teachers and other educators together to research a topic and design a lesson proposal (Takahashi and McDougal, 2016)<sup>2</sup>. Much of the research on the approach is based on case studies though there have been several trials with positive findings<sup>3</sup>. The TRG approach also aligns with the conditions identified by Zeichner (2003) under which school-based teacher research becomes a transformative professional development activity for teachers, including:

- creating a culture of enquiry and respect for teacher knowledge
- encouraging learner-centred instruction
- teachers developing and controlling their own foci for enquiries, and
- engaging in collaborative work and study groups for intellectual challenge and stimulation<sup>4</sup>.

While the above does not necessitate collaboration between schools and Higher Education Providers, a notable study, called the Research in Teacher Education (RITE) project, included five case studies including universities across Europe working with teachers to promote evidence-informed teaching practice. The results are not yet published but initial findings are positive<sup>5</sup>.

<sup>1</sup> See for example: Nelson, J., & Campbell, C. (2017). Evidence-informed practice in education: meanings and applications. *Educational Research*, 59(2), 127-135. Available [here](#); Biesta, G. (2007). Bridging the gap between educational research and educational practice: The need for critical distance. *Educational Research and Evaluation*, 13 (3), 295-301.

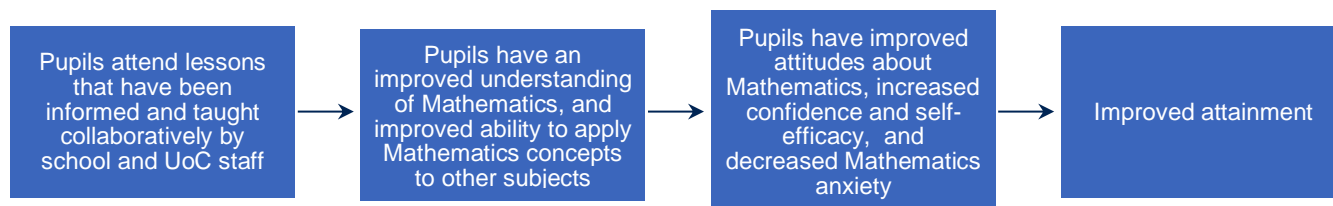
<sup>2</sup> Takahashi A. & McDougal T. (2016). Collaborative lesson research: maximizing the impact of lesson study. *Mathematics Education* 513–526. Available [here](#).

<sup>3</sup> See references available [here](#).

<sup>4</sup> Zeichner (2003.) Teacher Research and Professional Development, *Educational Action Research*, 11 (2).

<sup>5</sup> Available [here](#).

## Causal Pathway 2



Following the first causal pathway, this second pathway hypothesises that pupils will have a number of improved outcomes relating to their Mathematics education. These include improvements to both their understanding and capabilities relating to Mathematics, as well as their attitudes about Mathematics, confidence and self-efficacy. Together, this is expected to lead to improved attainment.

There is evidence that researched-informed professional learning can lead to significant improvements in pupil achievement when learning involved the integration of knowledge and skills; what pupils needed to know and do was used to identify what teachers needed to know and do; and there was sufficient time to learn, among other conditions (Timperley et al., 2007)<sup>6</sup>. Observations from teachers and UoC staff participating in the programme (including findings from pre and post surveys conducted in 2016) also provide support for this pathway. However, this link between research-informed professional learning and/or collaborative lesson research and pupils' outcomes is less well-established due to the varied nature of topics covered. The ICCAMS project is a notable study focused on raising attainment in mathematics<sup>7</sup>. The ICCAMS team developed and evaluated a series of research-informed lessons and professional development activities that enable teachers to integrate formative assessment within the secondary mathematics curriculum. Initial findings were positive and suggested improvements in attainment. Further research would strengthen the understanding of this pathway, including the importance of shorter-term outcomes such as improved attitudes and confidence.

### Data collection opportunities

This section outlines the different data points that are currently being collected by UoC and that can be used to assess the programme's performance against anticipated outputs, outcomes and impacts. It also provides recommendations on future data collection opportunities where gaps have been identified.

### Outputs

UoC currently collects **monitoring information** that can be used to keep track of the programme's outputs. Data collected include the number and types of schools involved in the programme; the number and type of projects/sessions delivered; the number of school teachers involved; the number of pupils researched (e.g., attending lessons); and the number and type of material disseminated. UoC can access school-level data to understand the school type (e.g., percentage of FSM, or Pupil Premium), however it does not have access to the breakdown of pupil characteristics.

<sup>6</sup> Timperley et al. (2007). Professional Learning and Development: a best evidence synthesis iteration. Available [here](#).

<sup>7</sup> See more [here](#).



UoC are also HEAT members. **HEAT** members have access to data and reporting from the HEAT Track, an ongoing longitudinal tracking study whereby outreach participants are tracked through a range of administrative datasets to provide data.

*Recommendations for future data collection:*

*If appropriate to track of pupil characteristics of those pupils attending lessons, UoC could work with schools to access pupil-level data. This is likely to require Data Sharing Agreements with participating schools.*

## Outcomes

UoC collects **qualitative and quantitative information** that can be used to assess progress against anticipated outcomes. UoC and school staff conduct **participant observations** that assess whether the lessons are working well and pupils are engaged. The collaborative lesson design<sup>8</sup> is evaluated through pupils' responses to the designed lesson.

UoC can also access **school assessments** (e.g., mock results), which allow teachers and UoC staff to understand whether pupils have an improved understanding of Mathematics. In 2016, the University also conducted pre- and post- intervention surveys and matched responses to comparison groups to understand the effects of the programme on pupils.

Teachers' feedback is also collected through **questionnaires**. These questionnaires capture teachers' views on the impact of the programme on their professional knowledge, performance of the support and collaborative work, sense of agency, and changes implemented to their departments as a result of the project (e.g., classroom or lessons design). The findings from these questionnaires can be used to assess school and teachers' outcomes, such as effects of the programme on their learning, school curriculum, attitudes towards external expertise and collaborative inquiry, sense of agency and use of project materials<sup>9</sup>.

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<sup>8</sup> See Bakker, A. (2018). What is design research in education? Available [here](#), for further information on the principles of design research.

<sup>9</sup> One of the success criteria is that project design outcomes are implemented into the schools' curriculum.

*Recommendations for future data collection:*

*Conducting short **pre- and post- programme surveys** to assess pupils' confidence, self-efficacy, attitudes towards Mathematics and confidence in their ability to apply Mathematics skills in other subjects. UoC could explore using TASO's Widening Participation Questionnaire (can be requested [here](#)) which consist of questionnaire scales aimed to measure intermediate outcomes associated with Higher Education access and success.*

*In order to assess whether participants' academic performance has improved, UoC could work with schools to access pupil data and track whether their **academic performance** has improved since their participation in the project(s). This is likely to require Data Sharing Agreements with participating schools.*

## Impacts

The assessment of the programme's long-term impacts is often more difficult to incorporate into monitoring and evaluation activities given their long-term nature. As described above, one option would be to set up Data Sharing Arrangements with schools to track participants' academic attainment over time. The assessment of other long-term impacts such as education pathways (e.g., whether they progress to HE) or career development would require longer-term follow-up with participants using primary or secondary data. One option available that UoC already uses is **HEAT**, which allows them to check participants' progression (more described in the box below).

UoC also currently compares academic performance of pupils from previous years with pupils receiving TRG lesson plans to explore any notable differences, for example, in grasping specific mathematical concepts. This is a useful starting point but a future impact evaluation with a more robust counterfactual design<sup>10</sup> is needed to assess the effectiveness of the programme and whether it achieves the intended outcomes and impacts.

*Recommendations for future data collection:*

*HEAT members receive three HEAT Track reports annually which include information on exam attainment at GCSE and A-level or equivalent, as well as HE progression, which can be used to assess the educational pathways participants have chosen after finishing school. HEAT could be used to track outcomes for any pupils that took part in lessons as part of the TRG project(s).*

*Future evaluations should assess whether attainment data can be accessed for schools/pupils who took part in the programme as well as a comparator group who did not.*

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<sup>10</sup> For more information on evaluation methods, please visit TASO's Evaluation Methods guidance, available [here](#)