

Maths Hubs
Evaluator in Residence
2022/23

Evidence and reporting
summary
Hub: NW1

Evaluator in Residence Summary	
Maths Hub	NW1
Strategic Goal	Post-16
Research question(s)	What are the traits of Work Groups that are successful at recruiting and retaining participants and building a self-sustaining learning community? What models can empower Work Group participants to collect better evidence about the impact on their students?

Context

NW1 Maths Hub works across Greater Manchester in Bury, Rochdale, Oldham, Manchester and Stockport. At post-16, they have consistently run Work Groups in A Level Pedagogy, Core Maths Pedagogy and GCSE Resit for many years, along with a Transition from KS4 to KS5 Research and Innovation Work Group for the past two years. These groups are supported by four Work Group Leads and the Post-16 Lead, in conjunction with the Maths Hub Lead.

The areas of focus were selected because, both locally and nationally, recruiting and retaining participants to create strong professional learning cultures is challenging in the post-16 landscape, and assessing the impact on students – the main aim of why we work with teachers – is notoriously difficult.

Activity and data collection

The data collection was divided into two parts, according to the two research questions. The initial meeting gave an opportunity to agree the work that would be completed between the hub and the EiRs for the rest of the year, but it also allowed the EiRs to begin informally gathering evidence to address the first research question about what makes for a successful, self-sustaining post-16 community. Following this visit, online interviews were conducted, with the aim of determining key factors that helped to make the post-16 community so successful. Transcripts of these interviews were analysed, with key themes discussed below.

The student survey provides a starting point for collecting longitudinal data around student attitudes, allowing measurements to be taken at the start and end of the year, or with some other frequency/duration. Additional questions were posed about the learning activities that students undertook, to gain an insight into the pedagogy being used by teachers. This process involved adapting a validated research survey for Core Maths and generalising it to encompass all post-16 maths courses. The survey garnered 174 responses, and key findings are discussed below. Most responses were from Sixth Form colleges rather than FE colleges, with very few from Core Maths students and none from GCSE Resit students.

We intended to validate the survey results by arranging for the EiRs to visit the classrooms of students who had completed the survey. However, due to geographical and scheduling constraints, this was not possible.

Significant themes

Themes (findings and process)	Possible implications
First research question	
<p>NW1 is clearly an essential part of the maths education community in North West England, particularly in its work recruiting and retaining participants for Work Groups (WGs), and in developing a self-sustaining community for professional development. At the heart of this work are the local leaders of maths education (LLMEs), both from the AMSP (Advanced Mathematics Support Programme) and NW1 Maths Hub itself. Their established networks in both these areas strengthen their ability to drive recruitment efforts.</p> <p>The network established by NW1 Maths Hub plays a significant role in enabling successful WG sessions. This network is closely connected to other Maths Hubs in regions where geographic overlap exists, ensuring that there is often a more consistent and unified approach to professional development across different hubs. The network also facilitates the exchange of ideas and resources, which contributes to the continuous improvement and evolution of the WGs.</p> <p>The Work Group Leads (WGLs) of NW1 make considerable efforts to retain participants, a task that is essential for building a sustainable community of ongoing professional development. They do this by tailoring the content of sessions to meet the specific needs of participants, ensuring that the value and relevance of the WGs is clear. In addition, they utilise digital tools such as Basecamp to maintain contact with participants between sessions. However, WGLs note that retaining participants is a challenge due to</p>	

the increasing pressures faced by post-16 teachers. Demanding workloads, changes to classroom practice following Covid, and other factors, can make it difficult for teachers to commit to ongoing participation. To alleviate these pressures, the operational team at NW1 Maths Hub provides essential support, ensuring that everything is set up for the WGLs. This allows WGLs to focus on their primary role of leading the WGs and provides a smoother experience for the participants, which in turn can help with retention.

NW1 Maths Hub also hosts community events, like the annual post-16 conference, in partnership with the AMSP. These events involve all Maths Hubs in the region and provide a valuable opportunity for sharing, learning, and networking.

Second research question

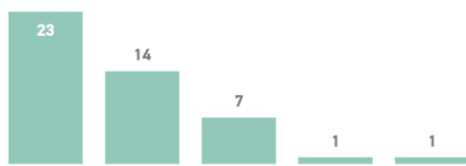
From the 174 responses, for each of the statements below, we assigned a value of 1 to the strongest agreement and a value of 5 to the strongest disagreement.

Phrase	Average Score
"I can get good results in maths"	1.87
"Mathematics is important to me"	1.88
"I am interested in learning new things in maths"	1.93
"I can learn maths even if it is hard"	2.01
"Maths is important for my future career"	2.09
"Learning maths is enjoyable for me"	2.15
"I have a mathematical mind"	2.15
"Most people can learn to be good at maths"	2.25
"I like using maths I am familiar with, rather than new maths topics"	2.30
"Maths is useful for making decisions in daily life"	2.37
"There are people in my close family who like maths"	2.68
"Compared to my classmates, I am good at maths"	2.71
"I would prefer my future studies to include a lot of maths"	2.75
"My parents / carers like maths"	2.80
"I look forward to studying more mathematics when I leave school"	2.93
"I often need help with maths"	2.98
"I never want to take another mathematics course"	3.41
"I would like to be a mathematician"	3.82

The survey results indicated notable shifts in attitudes among students, based on whether they took their GCSEs in 2021 or 2022, corresponding to the impact of the first Covid lockdown on students in Year 10 or Year 9, respectively.

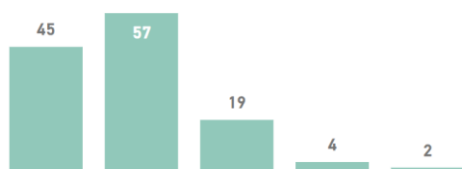
As an example, the following graph depicts the responses of students who first took their GCSE exams in 2021. The strongest agreement results are shown to the left, with the strongest disagreement on the right. As shown, this cohort strongly agreed that they could get good results in Maths.

"I can get good results in Maths"



In contrast, students who first took their GCSE in 2022 agreed less overall with the statement.:

"I can get good results in Maths"



The survey revealed clear attitudinal differences between students who identified as male and students who identified as female. As one example, take the two charts below.

The table below presents the statements that resulted in the highest degree of polarisation. Statements ranked at the top received stronger relative agreement from the 2021 cohort, while statements ranked at the bottom garnered stronger relative agreement from the 2022 cohort.

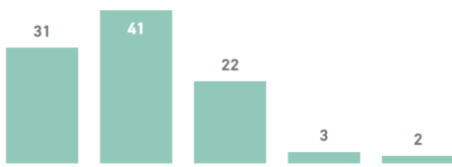
Phrase	2021	2022	Difference (2021 - 2022)
"Compared to my classmates, I am good at maths"	2.54	2.78	-0.23
"Maths is useful for making decisions in daily life"	2.26	2.42	-0.16
"I can get good results in maths"	1.76	1.91	-0.14
"I never want to take another mathematics course"	3.35	3.43	-0.08
"Maths is important for my future career"	2.07	2.09	-0.03
"Mathematics is important to me"	1.89	1.87	0.02
"I would like to be a mathematician"	3.85	3.82	0.03
"I am interested in learning new things in maths"	1.96	1.92	0.04
"I look forward to studying more mathematics when I leave school"	2.96	2.92	0.04
"I like using maths I am familiar with, rather than new maths topics"	2.35	2.29	0.06
"I often need help with maths"	3.04	2.96	0.08
"I have a mathematical mind"	2.22	2.13	0.09
"I can learn maths even if it is hard"	2.09	1.98	0.11
"I would prefer my future studies to include a lot of maths"	2.85	2.71	0.13
"My parents / carers like maths"	2.96	2.75	0.21
"Learning maths is enjoyable for me"	2.33	2.09	0.24
"There are people in my close family who like maths"	2.87	2.62	0.25
"Most people can learn to be good at maths"	2.46	2.18	0.28

Based on the results of the student survey and related work in the post-16 area that was completed by the EiRs in previous years, we believe that these results would likely be reflected well if the survey were to be distributed to a wider pool of post-16 students.

In the table below, statements towards the top had stronger relative agreement from female students and statements towards the bottom had the stronger relative agreement from male students. Overall, four responses were not included in this

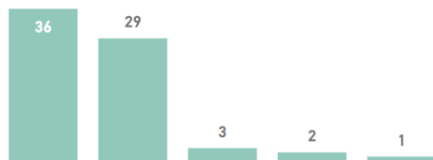
The first chart is for female students, who broadly agree that they can get good results in Maths:

"I can get good results in maths"



Compare this chart to that for male students, who agree more with the statement:

"I can get good results in maths"



analysis for students who identified as non-binary or preferred not to give their gender.

Phrase	Female	Male	Difference (Female - Male)
"I never want to take another mathematics course"	3.25	3.65	-0.40
"I like using maths I am familiar with, rather than new maths topics"	2.18	2.49	-0.31
"I often need help with maths"	2.89	3.13	-0.24
"There are people in my close family who like maths"	2.67	2.65	0.03
"I am interested in learning new things in maths"	1.96	1.90	0.06
"Learning maths is enjoyable for me"	2.15	2.08	0.07
"Maths is useful for making decisions in daily life"	2.39	2.30	0.10
"My parents / carers like maths"	2.85	2.70	0.15
"I can learn maths even if it is hard"	2.08	1.87	0.21
"Most people can learn to be good at maths"	2.34	2.08	0.26
"Mathematics is important to me"	1.99	1.70	0.29
"I would like to be a mathematician"	3.96	3.59	0.37
"I can get good results in maths"	2.03	1.63	0.40
"I have a mathematical mind"	2.32	1.92	0.41
"Compared to my classmates, I am good at maths"	2.88	2.46	0.41
"I would prefer my future studies to include a lot of maths"	2.90	2.47	0.43
"I look forward to studying more mathematics when I leave school"	3.09	2.66	0.43
"Maths is important for my future career"	2.29	1.82	0.48

Additional research may shed light on these results and offer explanations for the observed patterns. Certainly, a larger sample size might yield more conclusive results.

The open-ended questions in the survey gathered some interesting responses about the transition from GCSE to post-16 Maths. Students noted an increase in difficulty and teaching pace in their post-16 studies, posing a significant challenge for some. However, the majority confirmed their mathematical abilities had been enhanced through this period. Factors contributing to this development include engaging advanced content, an enriched level of challenge, and teachers' in-depth subject knowledge. The receptivity of teachers to student feedback also plays a role in the learning process. The additional number of lessons per week offered more practice, and the smaller class sizes, compared to their previous schools, resulted in a more effective learning environment.

Despite the positives, a minority of students expressed concerns about the high volume of content, the rapid pace of teaching, the need for significant independent study, and too much teacher-led instruction. They suggested a desire for more collaborative problem-solving and open discussions in class.

One of the open-ended questions asked students to give their views about online teaching. Most responses indicated a preference for in-person learning, primarily due to the direct interaction it allows with teachers and classmates. Students said they found it easier to engage and receive instant feedback, enhancing their overall learning experience. However, some also found in-person learning challenging due to difficulties in engaging with the teacher and the necessity of self-directed learning.

On the other hand, some students favoured online learning because of its flexibility and the opportunity it gave to work at their own pace. The online setting relieved them of the pressure to keep up with the class pace and to respond instantly to questions. Additionally, students shared their experiences with online learning platforms like Hegarty and Mathswatch, and some noted technical difficulties as an obstacle.

Conclusion

NW1 Maths Hub specialises in recruiting LLMEs, and navigates challenges faced by post-16 educators to retain participants. WGLs tailor sessions, use tools like Basecamp, and are assisted by the NW1 operational team. Regional events like the post-16 conference further foster community and recruitment.

Our initial findings demonstrate distinct disparities in the attitudes of post-16 students towards their maths studies, primarily based on the 2021/22 GCSE entry and, more notably, the gender identification of the respondents. Although our survey sample is limited, the results are intriguing and warrant further exploration on a larger scale. The open-ended responses highlighted the increased difficulty and pace in the transition from GCSE to post-16 Maths. Despite challenges, most students reported improved abilities due to engaging content, challenging tasks, and teachers' expertise. However, some expressed concerns about the large content volume, swift teaching pace, and emphasis on independent study.

It is crucial that any wider version of the survey should address the limitations of our current responses. Specifically, efforts should be made to include participants from all institution types – schools, FE colleges, and Sixth Form colleges – and encompass the whole range of post-16 maths qualifications. By addressing these drawbacks, we can ensure a more representative and comprehensive understanding of the attitudes towards maths among post-16 students.