Maths4All

www.maths4all.ie

An Evaluation of the Maths4All Project 2022-2024

Taighde Éireann
Research Ireland

DCU
Ollscoil Chathair
Bhaile Átha Cliath
Dublin City University

CASTeL

Maths4All
www.maths4all.ie

This report was prepared by the principal investigator Dr Siún Nic Mhuirí (DCU) and the external evaluator Dr Anastasios Karakolidis, with the support of the project team Dr Aisling Twohill, Dr Mary Kingston, Dr Fionnán Howard, Dr Sandra O'Neill and Córa Gillic.

March 2025

Taighde Éireann
Research Ireland

Science Foundation Ireland sfi For what's next

DCU Ollscoil Chathair Bhaile Átha Cliath Dublin City University

CASTeL Centre for the Advancement of STEM Teaching and Learning

Maths4All
www.maths4all.ie

Contents

List of Tables

List of Figures

Visual Summary

2019
Creation of Maths4All Website

2020
Expansion of Maths4All to include TeachMeets and Webinars

2022
Encompassing PLCs, TeachMeets, webinars and website resources

2022- 2024 Project Aim: To engage teachers in dialogue about mathematics education research, research-informed practice and critical reflections on practice.

21 Professional Learning Communities *Sustained collaboration to improve practice*	411 Teacher Participants 10,275 Students experiencing recommended activities
10 Researcher Webinar *Researchers talk directly to teachers*	789 Teacher Attendees
3 TeachMeets *Peer-peer sharing of practice*	75 Teacher Participants
21 New Website Resources *Research-informed activity plans and records of practice*	2306 New Website Members 365 Students involved in resource creation

Over 90% of respondents rated Maths4All events as 'very good' or 'excellent' and report that events supported them to reflect on their practice and try new activities.

Maths4All really does speak to the spirit of the new curriculum, the playful and engaging learning experiences

Excellent, more of the same, please!

Executive Summary

The Maths4All project, initiated in 2019, has undergone three rounds of funding from Science Foundation Ireland. This report presents an evaluation of project activities during the period 2022-2024. The overarching aim of the current iteration of the Maths4All project was to engage teachers in dialogue about mathematics education research, research-informed practice, and critical reflections on teaching strategies. The project foregrounded professional learning communities (PLCs), where groups of teachers collaborate on an ongoing basis to inquire into their teaching practices and their students' learning with the aim of improving both. In total, 21 PLCs, 3 TeachMeets and 10 Researcher Webinars were facilitated. In addition, 21 new website resources were created.

The evaluation, conducted in collaboration with external evaluator Dr. Anastasios Karakolidis, used a mixed-methods approach. Online surveys were distributed by our partner Clare Education Centre and collected feedback from participants on Researcher Webinars, TeachMeets, and PLCs. Paper-based evaluations were used to capture feedback from in-person early years workshops. Focus groups were conducted to explore the experiences and insights of teachers leading PLCs. Online surveys were also used to gather feedback on the resources developed for the Maths4All website.

Key Findings

The project has shown high levels of engagement, successfully reaching 3581 teachers. 789 teachers attended 10 Researcher webinars, 75 teachers participated in TeachMeets and 411 teachers engaged in 21 professional learning communities.

The growth in website membership is particularly significant, increasing from 1,400 in 2021 to over 3,700 in March 2025. Over 10,000 students were also involved in project activities as a result of teachers' engagement in PLCs or as teachers trialled activities in classrooms as part of website resource development.

Participants reported high levels of satisfaction with project activities. Feedback from surveys showed that over 90% of respondents rated these as "very good" or "excellent", with teachers valuing the collaborative and practical nature of the activities. Importantly, questionnaire data also indicates that project activities encouraged respondents to reflect on their practice and to try new and challenging activities in their classroom, important predictors of changes in practice.

Importantly, the teachers who led PLCs describe their increased confidence in leading professional learning activities and their willingness to do so again in the future. They noted how Maths4All aligned with the thrust of the new primary mathematics curriculum and offered them a network which was valued at this time of curriculum change.

In addition, as evidenced in the numbers reported above, the Maths4All website became a widely used tool for teachers, offering high-quality activity plans and videos. This happened partly because the quality was recognised by Oide, the professional development service for teachers, who recommended the website to teachers in their professional development around the new mathematics curriculum.

Opportunities and constraints of the online format of the majority of project activities were noted. PLC leaders reported that while the online format facilitated attendance, continued efforts are needed to support meaningful discussion in online contexts as participants are used to more passive experiences in online webinars.

The evaluation process highlighted possible enhancements some of which were implemented in real time as the project was rolled. For example, promotion via social media, and the inclusion of particular topics of interest in later project activities. Some challenges arose in the evaluation process due to the variety of activities in this multi-strand project and inconsistencies in how planned evaluations were administered in some cases. Despite this, there is evidence of significant and sustained engagement and impact.

Recommendations include:

(i) Building and sustaining the Maths4All network that has been established through continued engagement and support.
(ii) Further developing the use of PLCs to support high-quality mathematics teaching
(iii) Developing research-informed and research-based engagement projects to further enhance the quality of engagement and evaluation processes
(iv) Continued work to develop a shared understanding of project aims and evaluation processes across partners

Section 1. Project Background and Aims

The Maths4All project, led by Dr Siún Nic Mhuirí of Dublin City University (DCU), received three rounds of funding from Science Foundation Ireland, beginning in 2019. In the first iteration of the project, a group of DCU staff collaborated with practicing teachers to engage 749 teachers/practitioners and 559 children in high-quality mathematics activities. We used records of practice (activity plans, videos) to build a website, Maths4All.ie, which had 706 registered members in April 2020. Although the second iteration of the project was severely disrupted due to Covid-19, it offered opportunities to engage with teachers/practitioners in new ways and online TeachMeets and webinars, hosted in partnership with Clare Education Centre, served to drive registrations to the Maths4All website, where website membership rose to 1400 by June 2021.

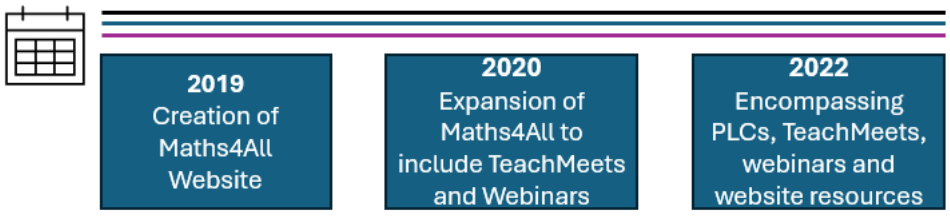


Figure 1. History of Maths4All.

This report presents an evaluation of activities associated with the third round of funding. It addresses activities which took place between January 2022 - December 2024. This iteration of the project aimed to engage more meaningfully with teachers while continuing to build on the strong foundation of our previous work. Clare Education Centre and the Teachers' Research Network (T-Rex) were key partners on that helped the project to reach teachers at a national level. Over the course of the project, we developed partnerships with other organisations, such as Tralee and Navan Education Centres. In addition, our partnership with the Early Childhood STEAM network facilitated important work with preschool educators and lectures. We are also extremely grateful to our large number of partner schools and teachers, a full list of whom is available on the Team page of the project website. Below, you will find an outline of project aims and the planned activities.

Project Aims and Planned Activities

This project aimed to support the development of high-quality mathematics teaching at preschool and primary level nationally. It was considered particularly timely given the growing recognition of the importance of early learning opportunities (Government of Ireland, 2024) and the introduction of the new primary mathematics curriculum (Government of Ireland, 2022).

The overarching aim of the project was to engage teachers in dialogue about mathematics education research, research-informed practice and critical reflections on practice.

Like earlier iterations, the 2022-2024 iteration of the Maths4All project built on well-established research which emphasizes reflection as the main driver of teacher learning (Chapman, 2012). Research has also highlighted the potential of teacher collaboration (Jaworski et al., 2017) and teacher-researcher collaboration (Goos, 2014). Reflection and collaboration come together in the idea of professional learning communities where groups of teachers collaborate to inquire into their teaching practices and their students' learning with the aim of improving both (Brodie, 2020). A professional learning community is "a group of connected and engaged professionals who are responsible for driving change and improvement within, between and across schools that will directly benefit learners" (Harris & Jones, 2010). The role of academic team members as mentors is intended to support the development of a collaborative culture and improve teaching by promoting teacher-inquiry and engagement with research (Kilbane, 2009; Vossen et al., 2020). Professional learning communities can drive systemic change where there is entire system collaboration and networking, with a concerted focus on pedagogical improvement to improve learner outcomes (Harris & Jones, 2010).

This research base informed our overarching goal and we designed a range of different outreach activities which would engage teachers in different ways. As outlined on figure 2, we planned for the project to proceed in two main phases with some activities ongoing throughout both phases. Across phase 1, our plan was to have teachers and practitioners collaborate with academics to interrogate research understandings in key priority areas and to understand the implications of the proposed content and pedagogy of the new primary mathematics curriculum. It was also envisaged that as they worked in their classrooms, records of practice, including lesson plans, samples of children's work and where possible video, would be collected.

For phase 2, it was planned that the 'expert teachers' from the initial professional learning community would be supported to create and facilitate professional learning communities for other teachers and preschool practitioners. We intended for these activities to utilise the records of practice created in the first phase as a means of facilitating critical inquiry into mathematics lessons (Dooley et al., 2014). Each professional learning community would offer a series of at least three meetings so that attendees could trial the ideas in their own classroom and return with questions/comments. It was intended that activities would be structured in such a way as to allow for collaborative relationships, i.e., a series of workshops focused on the teaching of a specific maths topic or class level so that participating teachers could engage in ongoing conversations as they trialled new ideas and reflected on practice.

In the next section, we detail the activities which took place throughout the project and give information about how these activities were evaluated.

Phase 1Goals	Related Activities
Develop and support a professional learning community of mathematics teacher-experts.	In collaboration with these teachers, trial innovative lessons and create and share records of practice (lesson plans, samples of children's work). Organise TeachMeets to allow for semi-formal sharing of practice. Organise webinars for teachers from relevant national and international mathematics education researchers.
Phase 2 Goals	**Related Activities**
Teachers from the professional learning community of mathematics teacher-experts will work to support professional learning communities at a local level.	In collaboration with participating teachers, develop and deliver professional learning communities showcasing novel teaching approaches and examples from Irish classrooms. Facilitate follow-up meetings for attendees who are interested in developing their practice further Organise TeachMeets to allow for semi-formal sharing of practice.

Figure 2. Goals and activities associated with the two planned phases of the project.

Section 2. Project Activities

This was a complex project with a number of interwoven strands. It encompassed: Researcher Webinars, TeachMeets, and Professional Learning Communities. In addition, it involved the development of activity plans and videos for the Maths4All website.

The following tables list the project activities and provide relevant details including the number of attendees where appropriate. We also list the new activities added to the website and the number of children and teachers involved in each.

TeachMeets

As detailed on table 1, we ran three TeachMeets in total, with a total of 14 teacher presenters, and 61 attendees. TeachMeets offered an opportunity for teachers to speak directly to other teachers about the successes and challenges of implementing novel approaches in their teaching.

Date	*Activity*	*Speakers*	*Attendees*	*Total Engagements*
Q3 2022	TeachMeet	4	25	29
Q1 2023	TeachMeet	6	22	28
Q3 2023	TeachMeet	4	14	18
Total Engagements		**14**	**61**	**75**

Table 1. Engagements at TeachMeets

Researcher Webinars

As detailed on table 2, research webinars were presented by a variety of national and international speakers on topics of interest and relevance to Irish teachers. The best attended webinars were those presented by Blair Minchin, a research-engaged Scottish primary teacher, on the topic of playful approaches to mathematics teaching. We were also able to provide access to nationally and internationally recognised academics such as Professor Alf Coles (University or Bristol) and Professor Hamsa Venkat (Dublin City University). In the webinars, researchers spoke directly to teachers about the implications of their research in mathematics education.

Date	*Title*	*Speaker*	*Attendees*
Q1 2022	Towards Enactment of The New Primary Mathematics Curriculum	Dr Thérèse Dooley *Formerly of Dublin City University*	75
Q4 2022	Open-ended tasks in primary maths: A bit of fun or useful for learning?	Professor Hamsa Venkat *Dublin City University*	27
Q4 2022	Two myths of learning mathematics and why you might want to re-think them	Professor Alf Coles *University of Bristol*	37
Q1 2023	Developing Data detectives and Statistical Thinkers in Senior Primary Classes	Dr Aisling Leavy *Mary Immaculate College*	20
Q2 2023	Thinking Algebraically in Primary School	Dr Aisling Twohill *Dublin City University*	29
Q2 2023	Supporting Learners with Additional Needs in Mathematics	Dr Carol-Ann O'Sioráin *Dublin City University*	66
Q4 2023	Teaching Number in Senior Primary School Classes – Some Insights from Research and Practice	Dr Sean Delaney *Marino Institute of Education*	104
Q4 2023	Towards a New National Numeracy Strategy: Lessons from the Literature	Dr Lorraine Harbison *Dublin City University*	41
Q2 2024	Playful Approaches to Mathematics in Senior Primary	Blair Minchin *Primary Teacher, Scotland*	288
Q4 2024	More Playful Approaches to Mathematics in Senior Primary	Blair Minchin *Primary Teacher, Scotland*	102
Total Researcher Webinar Attendees			789

Table 2. Engagements at Researcher Webinars

Professional Learning Communities

Table 3 and 4 detail the professional learning communities organised as part of this project. Nine PLCs (table 3) were facilitated by DCU staff in phase 1 where we endeavoured to work with committed educators with the intention that they may lead their own professional learning communities in phase 2. Each PLC was organised to suit the needs and interest of participating teachers. At the primary level, the majority of Phase 1 PLCs ran online, typically meeting for an hour or two on a number of occasions. Practices varied by groups with some PLCs meeting monthly across the school year and others meeting more regularly in a shorter time period. All groups worked with the collaborating academic to explore research and teaching ideas related to the focus theme. We also hosted a joint sharing session across the main primary PLCs to share experiences across the groups. One primary PLC was also held in face-to-face format on DCU St. Patrick's campus, Drumcondra. This was to allow participants to participate in an Art-Maths workshop which involved creating Art pieces.

Date	*Focus and level of PLC*	*Facilitators*	*Mode*	*Attendees*
Q 3 2022	Teaching Number in the Senior Classes (Primary)	Siún Nic Mhuirí	Online	4
Q 4 2022	Teaching Number in the Junior Classes (Primary)	Siún Nic Mhuirí	Online	6
Q 4 2022	Universal Design for Learning (Primary)	Siún Nic Mhuirí	Online	4
Q 4 2022	Linkage and Integration (Primary)	Aisling Twohill	Online	5
Q2 2023	Picture books and incorporating mathematics in everyday routine (Preschool)	Córa Gillic	Face-to-Face (Dublin)	5
Q2 2023	Picture books and incorporating mathematics in everyday routine (Preschool)	Sandra O'Neill	Face-to-Face (Dublin)	4
Q2 2023	Picture books and incorporating mathematics in everyday routine (Preschool)	Nicola O'Reilly	Face-to-Face (Kilkenny)	11
Q2 2024	Integrating Art and Maths to support spatial thinking (Primary)	Andrea Cleary, Siún Nic Mhuirí	Face-to-Face (Dublin)	6
Q2 2024	The Magic of Maths (Maths4All & Plé-Preschool)	Sandra O'Neill, Córa Gillic	Face-to Face (Dublin)	10
Total Engagement in Phase 1 workshops				46

Table 3. Total Engagement in Phase 1 Professional Learning Communities

Early Years (preschool) PLCs prioritised face-to face contact. Educators in preschools have different working conditions that those in primary schools and block-type professional learning opportunities were considered most appropriate. For this reason, face-to-face workshops of a half-day duration were initially prioritised. In addition, our partners in the Early Years STEAM network organised 'The Magic of Maths', a one-day event which gathered educators and interested academics from universities and third level institutes to discuss and build shared understanding of the importance of mathematics in preschools, and the importance of mathematics education in educator-qualification courses.

In Phase 2, the DCU team continued to support teachers where relevant as they developed plans for, and facilitated, their own professional learning communities. The majority of Phase 2 PLCs followed the format of 3 x 1 hour online workshops where the presenters shared research-based ideas from their own practice and encouraged participants to try ideas out in their own classrooms and report their experiences in the next session. One PLC followed the same format, but was co-presented by teachers and an academic, and ran over a longer period of 6 weeks in an effort to build sustained collaboration and engagement. In response to feedback from teacher PLC leaders (see the report on the qualitative data which follows), a number of the PLCs topics were repeated. This allowed the teacher-leaders to develop and refine their approaches for a new audience. It also served to address the demands that appeared to be present. We believe that this approach was successful and could have been utilised further but there were a number of factors which impacted our ability to run repeat sessions of PLCs:

(i) Time. The school year limits the amount of time available, with professional development running ideally between October and May and avoiding Easter, Christmas and other holidays. This limited timeframe, and the need not to compete with our own events limited how often we could repeat outreach activities

(ii) Teacher Availability. Participant teachers' other commitments and leadership opportunities which arose in the duration of the project resulted in some of them being unavailable to run or repeat PLCs. For example, during this period of intense curriculum change, a number of our expert Phase 1 teachers were recruited to develop textbooks. Two teachers took on school principal-roles while two others took on roles in other educational bodies.

(iii) Sustained Engagement. There was some tension between the idea of running repeat sessions for new participants and running for longer periods with the same cohort. We experimented with this with one longer-running PLC. The PLC group addressing Universal Design for Learning continues to meet and delve deeper into this topic, having recruited a new co-leader and interested members. Our attendance numbers indicate that smaller numbers of people attend courses of longer duration but these PLC leaders report that they draw much meaningful learning from the experience.

Date	*Focus and level of PLC*	*Facilitators*	*Attendees*
Q2 2022	Maths through play: Using the "Notice, Explore & Talk about Mathematics" approach (Primary)	Elaine Dillon	12
Q3 2022	Incorporating Digital Tools for Supporting Teaching, Learning and Assessment of Maths in Junior Classes (Primary)	Sarah Byrne	17
Q1 2023	Incorporating Digital Tools for Supporting Teaching, Learning and Assessment of Maths in Junior Classes (Primary)	Sarah Byrne	22
Q2 2023	Using Universal Design for Learning to support all learners in Mathematics (Primary)	Jennifer Holligan, Deirbhile Travers, Lisa Walsh, Catriona Wynne	22
Q4 2023	Teaching Number in the Junior Classes (Primary)	Rachel Brennan, Elaine Dillon, Josephine Fitzgerald, Sinéad McGill, Orla Ryan, Sophie Roche	69
Q4 2023	Teaching Number in the Senior Classes (Primary)	Edward Fitzgerald, Grainne Higgins	92
Q2 2024	*Moving Towards the New Maths Curriculum (Primary)	Siún Nic Mhuirí, Denis Kelly, Sarah Clinton	30
Q2 2023	Incorporating Digital Tools for Supporting Teaching, Learning and Assessment of Maths in Junior Classes (Primary)	Sarah Byrne	5
Q2 2023	Using Universal Design for Learning to support all learners in Mathematics (Primary)	Jennifer Holligan, Deirbhile Travers, Lisa Walsh	15
Q1 2024	Supporting Children's Mathematical Learning during Child-Led Play (Primary)	Elaine Dillon	18
Q1 2024	Integrated approaches to teaching Maths (Primary)	Mary Kearney, Aaron Carroll, Grainne Higgins	57
Q1 2024	Using Universal Design for Learning to support all learners in Mathematics (Primary)	Jennifer Holligan, Deirbhile Travers, Lisa Walsh	23
Total Engagement Numbers			365

Table 4. Professional Learning Community Engagement in Phase 2

The total teacher engagement in professional learning communities across phases 1 and 2 is shown on table 5.

Phase	*Teachers*	*Students*
Phase 1 PLC Engagement	46	1150
Phase 2 PLC Engagement	365	9125
Total	**411**	**10275**

Table 5. Overall Engagement numbers arising from Professional Learning Communities

Activity Plans and Videos

This project endeavoured to produce high-quality activity plans and videos of Irish classrooms available to primary and early years teachers. As documented on table 6, there was over 2000 new registrations on the website throughout this iteration of the project, and total registration now stands at 3706 members. The website was promoted in marketing materials and in the outreach activities such as the TeachMeets and Professional Learning Communities. Significantly, it was also named as a recommended resource by Oide, the professional development service for teachers, as part of their work to prepare teachers to enact the new mathematics curriculum. It seems likely that this recommendation was significant in driving increases in our membership figures.

Website Membership June 2021	1400
Website Membership March 2025	3706
New members during the time period 2022-2024	**2306**

Table 6. Growth in website numbers during this iteration of the project

Table 7 details the activity plans and records of practice developed and made available on the website. Records of work included samples of children's work and/or videos. Irish-language translations of all activities were also created to facilitate those working in Irish-medium contexts. Please note the majority of these focused on the senior end of primary school as the previous iteration had largely focused on junior primary. As many of the teachers who were involved in the developing these plans, were also involved in the professional learning communities, we only count the child participants when approximating how many were involved in these activities (see table 8).

Stage	*Title*	*Strand*	*Records of Practices*
Preschool	A Focus on Pattern	Algebra	Samples of children's work
Preschool	Identifying Maths in Everyday Life	All	Samples of children's work
Preschool	Money in Everyday Life	Measures	Samples of children's work
Preschool	Support Number Sense	Number	Samples of children's work
Preschool/ Junior	Supporting Maths Through Play	All	Samples of children's work
Junior	2-D Shape	Shape & Space	Samples of children's work
Junior	Art & Maths	Shape & Space	
Senior	Directional Instructions and Co-ordinates	Shape & Space	
Senior	Introduction to Mapping	Shape & Space	Samples of children's work
Senior	The Distributive Property	Algebra	Videos
Senior	CSO Data	Data	Video
Senior	The word is a village (Expressions and Equations)	Algebra	Videos
Senior	Making a Fair Profit	Number	Videos
Senior	Patterning Zadie	Algebra	Videos
Senior	Tessellation	Shape & Space	Samples of children's work
Senior	The Maths of Maps	Shape & Space	Videos
Senior	Release the Prisoners	Data & Chance	Videos
Senior	Polygons with Scratch	Shape & Space	Videos
Senior	Measuring Barbie	Measurement	Videos
Senior	Exploring Islamic Art	Shape & Space, Measurement	Samples of work

Table 7. Website Activity Plans

Level	*No. of classes*	*Approximate Total*
Preschool	4	40
Primary	13	325
Total		**365**

Table 8. Approximate number of children involved when activity plans were trialled in schools

Total Engagement

The total number of participants directly involved in this iteration of the project is 14221 (see table 9). This is made of teacher attendees at Researchers Webinars, TeachMeets, and professional learning communities and new teacher registrations on the website. Students engagement numbers are based on the children who engaged in research informed mathematics activities as part of the development of activities for the project website, and students whose teachers attended PLCs. Each teacher participating in professional learning communities was encouraged to try out ideas and report these back in later meetings. We observed that the majority of attendees did this. We estimate that the project has impacted a wider group of children still as website members may have tried our activities. While we do not have evidence that website members trialled activities in their classrooms, we note that if each new member tried one website activity in their classroom, this would result in project activities reaching more than 50,000 children.

Activity	*Teachers*	*Students*	*Overall*
Research Webinars	789		
TeachMeets	75		
Professional Learning Communities	411	10,275*	
Activity Plans/videos for website		365	
New website members	2306	(57650)*	
Total	3581	10640	14221

Table 9. Overall engagement numbers

Note: * denotes that the estimated reach of PLC activities and Website membership if each class contains 25 children, and each teacher tries one idea. Student engagement as a result of teachers' involvement in PLCs was included in the final engagement figure as teachers had to report back to the PLC on ideas they tried out in their classrooms. Student engagement arising from teachers' registration on the website is not included in the final engagement numbers. It is included on the table as an indicator of the reach of this project.

Section 3. Evaluation Approach and Results

In this section, we first detail our approach to evaluation and then move on to presenting our findings.

Evaluation Approach

The evaluation approach was developed in partnership with external evaluator Dr Anatasios Karakolidis, and our partner Clare Education Centre. Evaluation questionnaires for Research Webinars, TeachMeets, and online Professional Learning Communities were developed by the project team and shared with Dr Karakolidis for his feedback. The final versions were circulated by Clare Education Centre to attendees in the days following the activity. Project activities for Early Years educators generally occurred face-to-face and in these situations paper-based evaluation forms were used.

In addition to the questionnaires, we also ran two focus groups with the expert teachers from the professional learning communities. The interview schedule for these interviews was developed in consultation with Dr Karakolidis and the interviews were carried out by the project research assistant (who was not involved with facilitating PLCs).

In addition, we sought feedback on the impact of our website resources by (i) including a feedback questionnaire on the website itself, and (ii) circulating a request for participation in a questionnaire to our website members and to all schools in Ireland.

In this section of the report, we detail first the evaluation of the Research Webinars, Teach Meets, and Professional Learning Communities.

Notes for interpreting these findings

In some cases, slightly different versions of the instruments were administered after the end of each online event. This happened because, even though the researchers designed the instruments, they did not have control over the administration. An effort was made to retain as much data as possible, by merging similar questions and their responses. Further, some questions that were supposed to collect only one response allowed participants to select multiple responses. Such responses were coded as invalid. These inconsistent responses lead to many missing cases for some Maths4All events. Please note that percentages might not always sum to 100%. In cases where more than one percentages are rounded up or down, their sum might be equal to 100.1% or 99.9%, respectively.

TeachMeet

The responses of 21 participants who took part in a TeachMeet and completed the accompanying survey between September 2022 and October 2023 are summarised and presented in this section. Most respondents indicated that they had not attended a TeachMeet event organised by the Maths4All team before (n = 19, 90.5%).

Participants considered the TeachMeet, overall, either excellent (61.9%) or at least very good (38.1%) (see Table 10).

Overall, the TeachMeet was...	*n*	*%*
Very Poor	0	0
Poor	0	0
Good	0	0
Very Good	8	38.1
Excellent	13	61.9

Table 10. Participants' overall satisfaction with the TeachMeets

All respondents indicated that Teachmeets encouraged them to try new and challenging activities in their classrooms and stated that they would like to attend future Maths4All events.

As shown in Table 11, most participants (90.4%) either agreed or strongly agreed that the TeachMeet prompted them to reflect on their own teaching.

	Strongly Disagree		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	n	***%***	***n***	***%***	***n***	***%***	***N***	***%***	***N***	***%***
This event assisted/prompted me to reflect on my own teaching	0	0.0	0	0.0	2	9.5	7	33.3	12	57.1

Table 11. Participants' rating of the individual aspects of the TeachMeets

All respondents indicated that the Teachmeet encouraged them to try new and challenging activities in their classroom and they stated that they would like to attend future Maths4All events.

Researcher Webinars

This section summarises the responses of 382 who engaged with Maths4All Webinars and completed the relevant feedback surveys between March 2022 and April 2024. Just 21.5% (n = 37) reported having engaged with another Maths4All event before.

As shown in Table 12, most participants (n = 215, 57.2%) found the Webinars they attended excellent, while most of the rest found it good or very good (except for one participant).

Overall, the Webinar was...	*n*	*%*
Very Poor	0	0.0
Poor	1	0.3
Good	36	9.6
Very Good	124	33.0
Excellent	215	57.2

Table 12. Participants' overall satisfaction with the Webinars

Note. n = 6 (1.6%) cases had missing or invalid data.

Almost 95% of respondents reported that webinar content was relevant.

Over 90% rated webinars as very good or excellent.

96% reported that the event prompted them to try new and challenging things in their teaching.

The teacher participants also evaluated the individual elements of the Webinars they attended very positively (see Table 13). More specifically, most respondents agreed or strongly agreed that the Webinars prompted them to reflect on their teaching and increased their understanding of mathematics teaching. In addition, teachers reported that the presentation was of assistance in understanding aspects of the new curriculum.

	Strongly Disagree		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	N	***%***	***N***	***%***	***n***	***%***	***N***	***%***	***N***	***%***
This event assisted/prompted me to reflect on my own teaching	0	0.0	2	1.0	11	5.4	80	39.4	110	54.2
The Webinar increased my understanding of mathematics teaching	0	0.0	1	1.0	10	10.4	39	40.6	46	47.9
I found that the presentation was of assistance to me in understanding aspects of the new curriculum	0	0.0	0	0.0	2	6.7	15	50.0	13	43.3

Table 13. Participants' rating of the individual aspects of the Webinars

Note. Due to the different foci of webinars, missingness ranged from 179 (46.9%) to 375 (98.2%) cases across the statement.

Additionally, the majority of respondents (n = 167, 96.0%) stated that the course encouraged them to try new and challenging activities in their classroom. Most respondents (n = 299, 94.9%) indicated that they would attend future Maths4All events.

Participants were also asked to indicate their satisfaction with the logistics (and content) of the Webinars they attended. Overall, high levels of satisfaction were reported across all different content and logistics aspects of the webinars (Table 14). Specifically, respondents reported being satisfied or very satisfied with the sign-up/registration (92.9%), connection to the Webinars (93.0%), relevance of the Webinars (94.7%), content of the Webinars (92.9%), use of time (94.6%), management of the Webinars (94.7%), level of interaction with the audience (90.3%), and quality of presentations and presenters (92.9%).

	Very Dissatisfied		*Dissatisfied*		*Average*		*Satisfied*		*Very Satisfied*	
How satisfied were you with ….?	***n***	***%***	***n***	***%***	***n***	***%***	***N***	***%***	***n***	***%***
Relevance of the Webinar	5	3.0	2	1.2	2	1.2	28	16.7	131	78.0
Level of interaction with the audience	6	3.6	1	0.6	9	5.5	48	29.1	101	61.2
Quality of presentations and presenters	7	4.1	2	1.2	3	1.8	24	14.1	134	78.8

Table 14. Participants' satisfaction with the content and logistics of the Webinar

Note. Due to the different foci of webinars, missingness ranged from 211 (55.2%) to 217 (56.8%) cases across the statement.

Professional Learning Communities (PLCs)

The responses of 159 participants who engaged with Phase 2 PLCs and the relevant feedback forms/surveys between June 2022 and April 2024 are summarised and presented in this section. Most respondents indicated that they had not attended a PLC organised by the Maths4All team before (n = 49, 57.6%). As shown in Table 15, the majority of participants considered the PLCs they engaged with excellent (64.6%) or at least very good (30.4%).

Overall, the PLC was...	*n*	*%*
Very Poor	0	0
Poor	1	0.6
Good	7	4.4
Very Good	48	30.4
Excellent	102	64.6

Table 15. Participants' overall satisfaction with the PLCs

Note. n = 1 (0.6%) case had missing or invalid data.

95% of respondents rated the PLCs as very good or excellent.

95% of respondents stated that PLCs encouraged them to try new and challenging teaching activities.

The participants also evaluated the individual elements of the PLCs very positively (see Table 16). More specifically, most participants found the PLCs of assistance to them and they agreed or strongly agreed that facilitators delivered the PLCs clearly and satisfactorily and that there was a collaborative

relationship between members. They also agreed or strongly agreed that the PLCs prompted them to reflect on their teaching, and increased their understanding of the focus content, e.g., Integrated teaching approaches, the teaching of Numbers, Universal Design for Learning.

	Strongly Disagree		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	N	***%***	***n***	***%***	***n***	***%***	***N***	***%***	***n***	***%***
I found that the course was of assistance to me	0	0.0	0	0.0	0	0.0	29	30.5	66	69.5
I found that the facilitators delivered the course in a clear and satisfactory manner	0	0.0	0	0.0	0	0.0	19	20.2	75	79.8
This event assisted/prompted me to reflect on my own teaching	0	0.0	0	0.0	1	1.6	28	45.9	32	52.5
The PLC prompted/increased my understanding of the teaching of Integrating	0	0.0	0	0.0	0	0.0	2	33.3	4	66.7
The PLC prompted/increased my understanding of the teaching of Number	0	0.0	1	2.0	0	0.0	23	45.1	27	52.9
The PLC increased my knowledge of Universal Design for Learning	0	0.0	0	0.0	0	0.0	2	40.0	3	60.0

Table 16. Participants' rating of the individual aspects of the PLCs

*Note. Largely as a function of the different foci of PLCs, m*issingness ranged from 64 (40.3%) to 154 (96.9%) cases across statements.

Additionally, the majority of respondents (n = 67, 95.7%) stated that the course encouraged them to try new and challenging activities in their classroom. All but one respondent (n = 80, 98.8%) indicated that they would attend future Maths4All events.

Early Years Workshops

The responses of 20 participants who took part in the Early Years Workshops in May 2023 are summarised and presented in this section. From those who answered the relevant survey question (n = 5), all indicated that, overall, they found the workshop excellent; n = 15 (75.0%) of cases had missing or invalid data. These questionnaires were completed on paper and it appears that about 10 participants only saw and completed qualitative questions on the paper survey. We report on their qualitative response to these questions below.

As Table 17 shows, overall, teachers reported being very happy with the topics covered at the workshops. Also, all teachers strongly agreed that the workshop increased their knowledge and understanding of mathematics learning and they all felt that the way they reflect on their experiences had changed as a result of the workshop. Qualitative response reported increased understanding of

the importance of using mathematical language and attending to mathematics as part of routine activities in the early years classroom. One attendee expressed an interest in learning more about the teaching of maths for children aged younger than 3.

	Strongly Disagree		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	n	***%***	***n***	***%***	***n***	***%***	***N***	***%***	***n***	***%***
I am happy with the topics that were covered	0	0.0	0	0.0	0	0.0	2	22.2	7	77.8
The workshop increased my knowledge of mathematics learning	0	0.0	0	0.0	0	0.0	0	0.0	9	100.0
The workshop positively influenced my understanding of mathematics learning	0	0.0	0	0.0	0	0.0	0	0.0	9	100.0
I feel that there is a change in how I reflect on my experiences as a result of the workshop	0	0.0	0	0.0	0	0.0	0	0.0	9	100.0

Table 17. Participants' rating of the individual aspects of the Early Years Workshops

Note. n = 11 (55.0%) cases had missing or invalid data for each statement.

Additionally qualitative responses were collected from 10 attendees at a joint Maths4All/Plé Ireland event in May 2024, which was facilitated by the Early Years STEAM Network. Plé Ireland is the Irish Association of Academics in Early Childhood Education and Care. This event (entitled 'the Magic of Maths) sought to work with lecturers of preschool educators in order to share and develop good practice relating to mathematics education in third level qualification courses. Respondents' comments indicate that they all enjoyed and learned from this event. Responses include attention to how mathematics education content might be addressed in courses where no existing mathematics module are taught; and to how modules and module assessments might be better refined and designed where they exist.

> **What did you learn?** Importance of maths-specific module.
>
> Importance of community of practice like this.
>
> Excellent workshop. A great day, thank you!

All Maths4All events

This section aims to provide an overall picture of participants' attitudes towards the Maths4All events they attended and to make comparisons across different event types. It summarises participants' responses to survey questions administered after at least two events.

The figures and their attached data tables, summarise teachers' attitudes towards the different events they attended. The number of participants that answered each question, by event type and total, are reported in the graph labels. All percentages provided are based on these numbers.

As shown in figure 3, most participants reported that they had not previously attended a Maths4All event, at the time of responding to this question. This was the case across event types, with the event having the highest proportion of return attendees (42.4%) being the PLCs.

In figures 3 – 10, teachers' opinions about the Maths4All workshops they attended are summarised, by event type. Overall, teachers' feedback was very positive across all aspects of the workshops. This is indicated by the share of the dark green bars**; more positive responses are presented using darker green shades, while less positive responses by lighter green shades**.

Most participants found the Maths4All events to be excellent, a finding that was consistent across event types (Figure 4). Early Years Workshops received the most positive feedback, with the five participants who completed the survey reporting that they found them excellent. The Maths4All Webinars received slightly less positive feedback than the rest of the events; still, all but one participant rated them as Good, very good, or excellent. Most participants agreed or strongly agreed that the course they attended was of assistance to them, a finding that is consistent across event types (Figure 5). They also reported that the courses were delivered in a clear and satisfactory manner, with PLCs receiving the most positive rating in this category (Figure 6).

Figure 3. Attendance of previous Maths4All events, by event type. Green denotes a 'Yes' response.

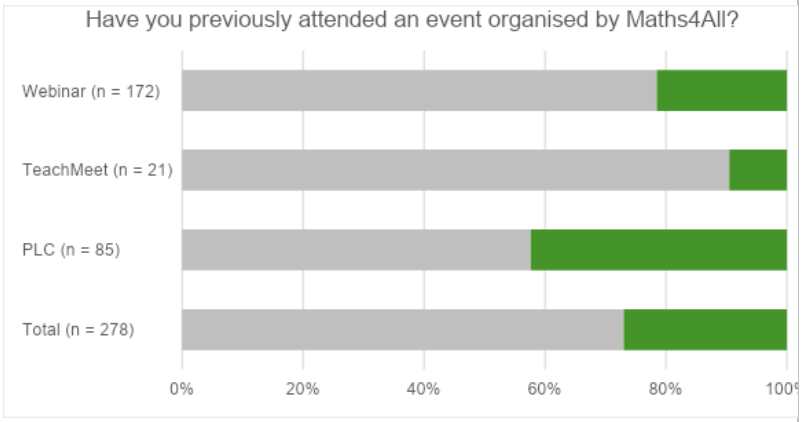


Figure 4. Participants' overall satisfaction, by event type

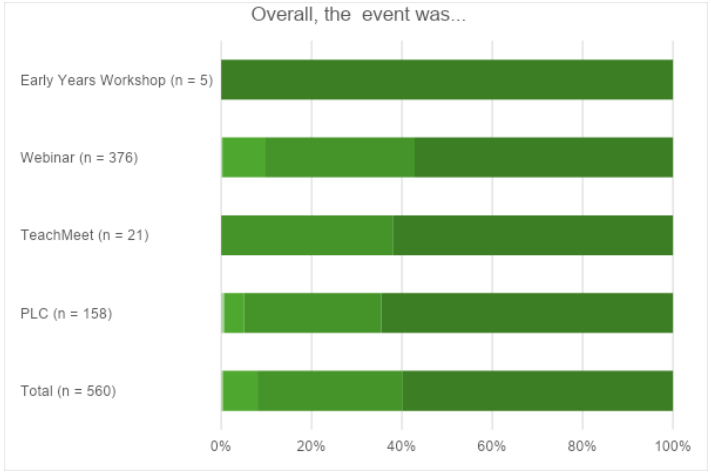


Figure 5.Usefulness of the course, by event type

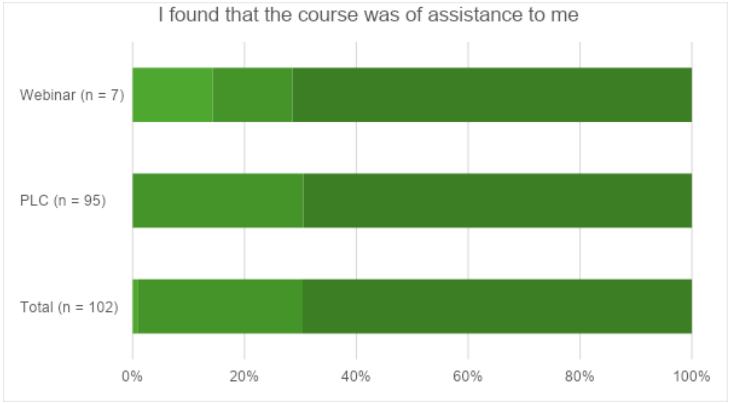
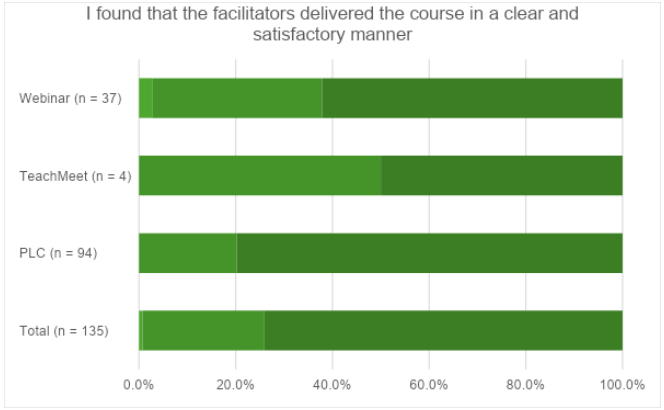


Figure 6. Delivery of the course, by event type



Note: In these figures positive responses (Strongly agree, agree) are presented using darker green shades and less positive responses are represented by lighter green shades

Figure 7. Collaboration at the course, by event type

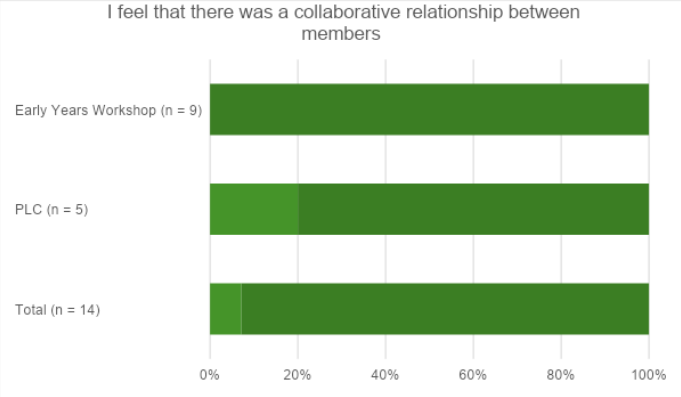


Figure 8. New/challenging activities in the classroom, by event type

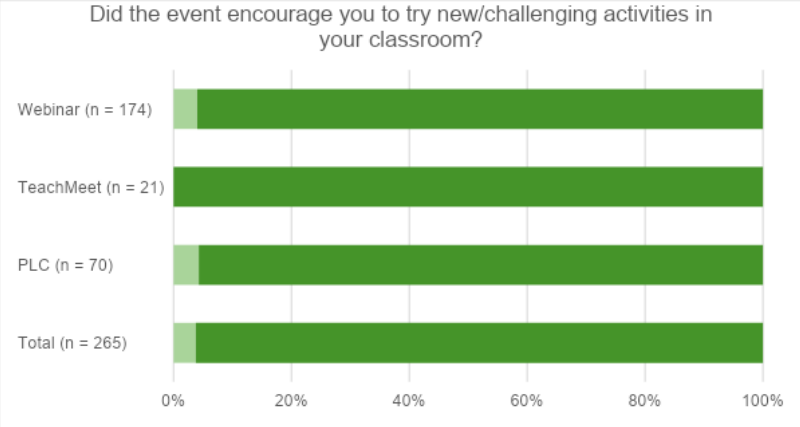


Figure 9. Reflection upon teaching, by event type

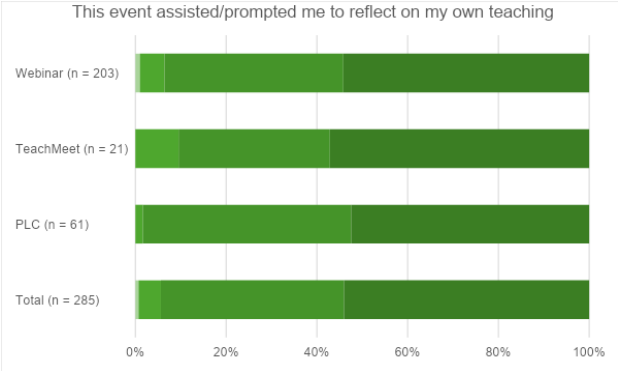
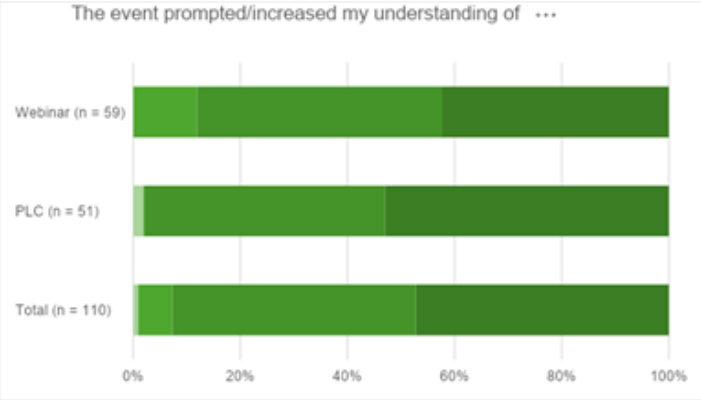


Figure 10. Increases in Understanding, by event type



Note: Positive responses (*Strongly Agree, Agree*) are presented using darker green shades and less positive responses by lighter green shades

All participants agreed or strongly agreed that at the events they attended there was a collaborative relationship between the members (Figure 7). This was the case both for the early Years Workshops and the PLCs. Most participants reported that their involvement with the Maths4All events encouraged them to try new and/or challenging activities in their classroom (Figure 8). They also agreed or strongly agreed that this experience prompted them to reflect on their own teaching (Figure 9). This finding was consistent across different event types, with TeachMeets triggering the most positive responses; all 21 teachers who participated in TeachMeets reported that this event encouraged them to try new/challenging activities in their classroom.

Similarly to previous questions, most participating teachers agreed or strongly agreed that the event they attended increased their understanding of the focus content; another finding that was consistent across both PLCs and Webinars (Figure 10).

Finally, teachers were asked if they would attend any future Maths4All events. The vast majority of participants (96%) reported that they would attend future Maths4All events. This finding was also consistent across different event types, with all respondents who attended a TeachMeet event (n = 21), though, reporting that they would attend other Maths4All events.

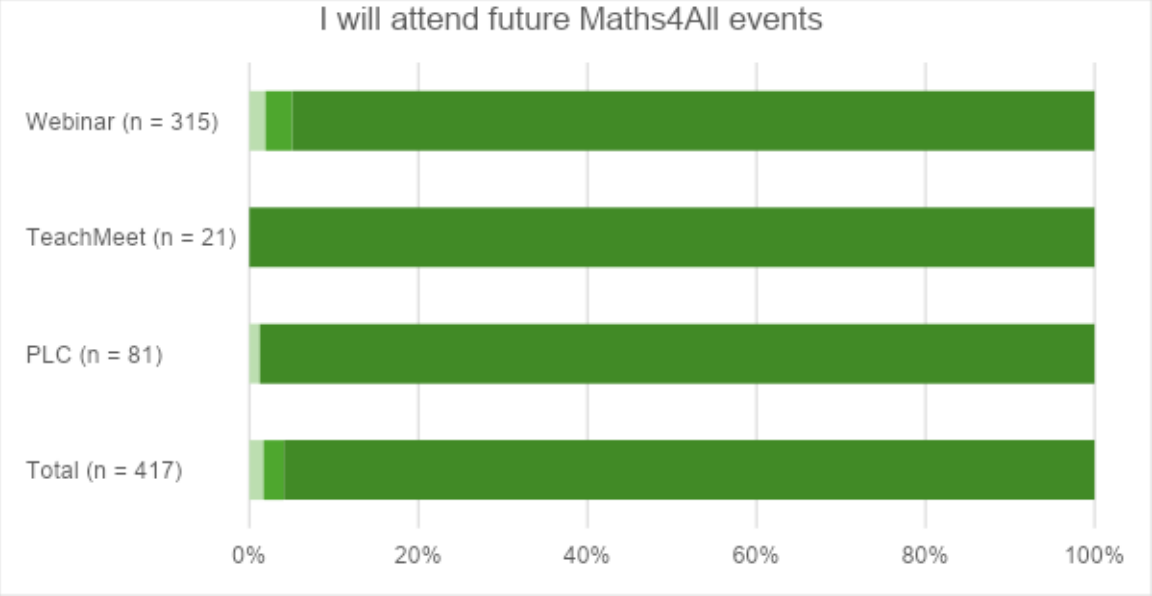


Figure 11. Attendance of future Maths4All events, by event type

Website resources

As reported above, the Maths4All website was recommended as part of the Oide professional development training for the new primary mathematics curriculum. As such, it has been recognised by external professionals as a high-quality resource suitable for supporting Irish primary teachers. The large number of website memberships attest to this. A feedback survey was included on the web site, and an online questionnaire was sent to all schools in Ireland and distributed to the membership list. Despite these extensive efforts, our response rate was very low. Figure 12 shows the n= 21 responses to survey questions asking respondents to rate the quality of the resources found on the Maths4All website.

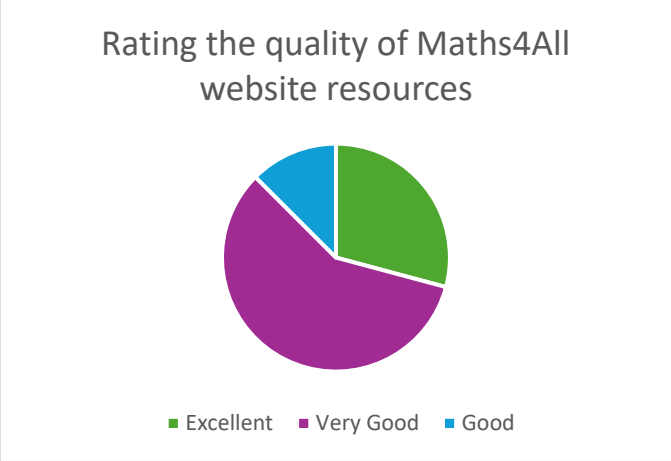


Figure 12. Evaluation of Maths4All Website resources.

Qualitative responses indicated that respondents valued what was provided, in particular the videos of lessons in practice. In the focus groups which were carried out with PLC leaders, participants spoke to the quality and impact of the website videos and described how they used them in Croke Park hours to support other teachers. Responses also indicated where teachers saw the need for more resources to address different topics, or to address specific cohorts of students.

Survey Responses

I love the videos showing real life teaching and children actively engaging in activities, so I would like to see a continuation of these types or videos

More resources for fractions especially at the lower level.

More for complex students with difficulties with productive disposition

During a Croke park hour, I was showing some of the activity plans and I was saying there's videos and everything. And I thought the videos were really good, because …it's one thing reading about it, but actually seeing it in action is so powerful

Focus Group Participant

Given the low response rate, it is important to consider whether the teachers who registered for the website did not find the resources provided their immediately useful or valuable. This is quite possible in a professional development culture which appears to value resources which can immediately be applied in practice. The activity plans included on our website can be used in classrooms but, because of the pedagogies involved, may need to be unpacked by teachers before they are implemented in classrooms. The samples of children's work and videos are a means of supporting the necessary teacher-thinking for this, but we acknowledge that a 'slower' approach to professional development which emphasizes the practice of deep reflection on pedagogical approaches may still challenging for some Irish primary teachers. Despite these concerns, data from recent web analytics suggests that users are actively engaging with the website with a total of 421 visitors during the period 18th March-24th March 2025.

Qualitative Data Findings- Professional Learning Communities

Two focus groups were also carried out with expert teachers who took part in phase 1 and went on to lead focus groups of their own in phase 2. Two teachers took part in the first focus group and 4 teachers took part in the second focus group. Key themes that arose across both focus groups are described below. Codes which contribute to the themes are shown in bold.

Beneficial outcomes

Participants reported that the PLC supported their **learning** by having a positive effect on their knowledge, practice, and collaboration. They further appreciated the opportunity to **share classroom practice** with other teachers and to learn about current practice in other mathematics classrooms. They praised the balance of support and autonomy that was offered to them by the Maths4All team while leading their own PLC groups and emphasised the confidence they drew from having a community of teachers with whom they could collaborate (**Collaboration amongst Maths4All community).** In an AI-age where everything is available online, participants spoke to the value of the PLC experience for **sharing practice**. They noted that **collaboration** and the focus on practical aspects of mathematics teaching meant that all had something to contribute, and all had scope to learn.

Quotes from Focus Groups

> **I knew nothing about UDL before I joined this PLC…when I say I didn't know anything, like, I literally didn't even know what the words meant. Like, I said, it would have been 20 years since I was in college, and even when I did my Masters, it would be 11 or 12 years ago. So it was a very new term to me, and likewise, teachers in my school. So I have learned so much**

> **I think, as teachers, we probably don't get enough opportunity to share what is working well in our classrooms… So I think sharing something that worked well, I just think, maybe something teachers lack confidence. We love getting ideas from other teachers but it's good to actually have the platform to actually listen to other ideas and actually share something that worked well with you, and then know that another teacher gets to try it out in their classroom, and they might experience the same success, or have the same thoughts on it**

as well. But by having the professional learning community, it just provides, I suppose, a safe space to do it as well.

And it's a great experience like that learning. I've learned a lot from other practitioners, other leaders in the area. And it's been great, and I suppose, built up this network, I suppose or this group of, you know, like-minded teachers who have that interest in us. So yeah, that's been a great experience.

And then, yeah, in terms of content, I know like Google is there, and you can google stuff forever, there's loads of suggestions out there. But it makes such a difference seeing how somebody actually enacted something in their classroom or used something in their classroom. And you can kind of put yourself in their shoes and see…. it is, it's a real reassurance to see okay, this can be done, it has been done. I can make tweaks, I can make changes, but you know, to be able to see it actually in practice is really, really helpful.

At the start, … I was probably a bit nervous myself about whether I would have the theoretical background to be able to contribute…So for me, I suppose it was easier for me to be able to share a practical example, or things that I had done from my classroom with the other group because it was something I was doing, and I could explain as I did it. And I felt when I joined the group, ehm, it made me more relaxed because I wasn't sharing, or we weren't discussing things in a really academic way. That we were sharing practical examples from our own experience in our own classroom. So from someone who came in without a masters or anything or hadn't done any lecturing in maths education, it made the experience more welcoming for me.

Strengths and Weaknesses of PLCs

In relation to the **structure** of PLCs, Participants identified that PLCs focussed on particular class levels or topics of interest worked well as they were perceived to be of direct relevance to them. Interestingly features such as being online and discussion-rich were identified as both strengths and challenges of the PLC approach. For example, while **online** hour-long PLCs were considered accessible to teachers around the country and easier to attend, the online format was also considered a challenge to generating meaningful **discussion**.

Positives of online format	I just find online is just really accessible for me as well, and I find that the more that I have done online, the more confidence I have gained, and I suppose the more I'm willing to share, as opposed to sitting in a big room in a circle in an education centre. That seems a little more intimidating to me. I love Zoom. It just makes everything so much more, so much more accessible. And I suppose location wise, even if there's something of interest to people but it's in Clare or Tralee or whatever education centre, it's more accessible then to people across the country which is really useful.

Negatives of online format	Zoom has loads of benefits and I love things being online, but I felt at times people are multitasking during the course. And when it comes to a bit of a breakout room, that they're not as eager to share their practice. Not everybody but I definitely felt it at times But I suppose when you, when people are on webinars like that, there is a tendency to turn off the camera and turn off the mic sometimes as well. So yeah, people might be less inclined to participate in that situation.

Table 18. Positives and negative of the online format

They appeared to value small group **discussions,** both for their own learning and that of teachers attended the PLCs they led. Discussions were understood to encourage sharing/collaboration especially for newer members who might be nervous sharing their ideas/practice in front of the larger group of PLC participants. In relation to leading their own professional learning communities, they noted that it was necessary to have a strict time limit on presentations to allow time for discussion. Some of their observations flagged that attendees were unfamiliar with the nature of engagement expected in PLCs compared to more traditional passive webinar experiences, which may have led to a drop in numbers in some sessions. They reported that at times, it was hard to encourage engagement in PLC small group discussions, but that the mentimeter resource, an online engagement tool, helped.

Maybe people weren't prepared to talk on the spot, or just, you know, weren't familiar with the setup of it maybe.

Quote from Focus groups

The idea that some teachers were more interested in a more passive approach to professional development was supported a response to our online survey which suggested that more traditional style webinars would be welcome ***"where participants may not be under pressure to contribute"***

A recommendation suggested in the first focus group, which was implemented in later PLCs, was that the intention to discuss and share practice should be emphasised to potential participants in all advertising of the PLC.

Impact and future possibilities for Professional Learning Communities

Participants reported positive feedback on the PLCs they led and noted an appetite for Maths4All events with the roll-out of the new primary school mathematics curriculum. There was a recognition that the PLCS they had led were valued and would be beneficial to teachers at this time of curriculum change. Participating teachers suggested that new participants could be recruited through email or social media. They also noted how time-intensive it was to develop and plan for the facilitation of the PLC and suggested that it may be beneficial to run the same PLC multiple times throughout the year. As explained earlier, many of our PLC leaders held other leadership roles too, and the demands on these teachers' time should not be underestimated. Some participants wondered if Maths4All participation could be offered to teachers through their school or mathematics coordinator, possibly facilitating Croke Park hours for teachers.

Quotes from Focus groups

I think it was very successful. I'm very proud of what we did. I think we worked very well together as a team. I think that we covered a lot of content that was relevant to the people that were participating…I got a lot of positive feedback from them, and they said it was very, you know, useful, relevant stuff that they could apply in the classroom.

Like Maths4All really does speak to the spirit of the new curriculum, the playful and engaging learning experiences like that. We have tried to capture that in every, without maybe realising it prior to the new curriculum coming in, but you know, like you said, it's probably the perfect time to capture people's attention and interest and speaking to that playful, engaging part of the, you know, the whole curriculum speaks to that.

Maybe running the same PLC, maybe twice in the year or 3 times in the year as opposed to constantly putting together new PLCs, I think, would be quite beneficial…when the content is so rich, do you know, you put so much time into actually creating it, I think it's definitely worth running it more than once.

Participants were asked whether they would be confident to lead future PLCs either within their schools or online. Allowing for workload demands and the constraints of school contexts, responses were overwhelmingly positive with teachers reporting that their experiences had increased their confidence levels. In addition, they discussed how the work and effort they had put into devising and refining the content for their PLCs should be capitalised on by running the PLC again on subsequent occasions for new attendees.

Quotes from Focus groups

I would, well, I'd still probably nervous if I was presenting it to to a different group, because I suppose there'd be still some unknowns and things that you you wouldn't kind of know in advance, but I definitely would be a lot more confident than I was at the start.

So this kind of like would be the first PLC that I've been a part of, and I think at the start I was a bit nervous, I was a bit apprehensive about it, I wasn't sure. But I think I've definitely got like the experience now, and the skills from working with a group that I have the confidence now that I wouldn't be as intimidated or daunted about taking it on. And that I have a group of people that I can reach out to with questions, or to get ideas from as well to support me along the way. I think that's really, really good. It's hard to find, I suppose, like-minded people that are passionate about maths and that are not using the maths book in their school, and they're taking a playful approach. And just to have that network of people now that you can pop an email to, have a call with, to help you actually lead one in the future. I definitely would be much more confident, saying yes to it, whereas at the start I was like, oh, I don't know, I'm not sure (laughs). But no, I would in the future

In the final section which follows, we summarise our findings and make recommendations which may serve to inform future projects targeting the professional development of primary and preschool educators in mathematics.

Section 4. Summary and Recommendations

The Maths4All project successfully engaged teachers and early childhood educators in high-quality professional development activities focused on mathematics education. The evaluation, conducted through surveys and focus groups demonstrated strong positive impacts on teachers' reflection, their willingness to try new things in the classroom and on teacher collaboration and networking. In addition, we have increased the availability of high-quality resources for Irish classrooms.

Key Achievements

The project has extensive engagement. It reached a wide audience, with 789 teachers attending researcher webinars, 75 participating in TeachMeets, and 411 involved in Professional Learning Communities. Additionally, website membership grew from 1,400 in 2021 to 3,706 in 2025, indicating a significant expansion in resource accessibility. Feedback from surveys showed that over 90% of participants rated PLCs, TeachMeets, and Webinars as "very good" or "excellent", with teachers particularly valuing the collaborative and practical nature of the activities. Many respondents indicated they reflected on their practice and would incorporate new teaching approaches as a direct result of the PLCs, TeachMeets and webinars. The Maths4All website is widely recognized as a valuable professional development tool, with teachers valuing the videos and activity plans. Those teachers who led PLCs report themselves to be more knowledgeable, and confident to lead PLCs in the future. Importantly, the collaboration they experienced in the PLCs allows for networks of teacher leaders into the future.

Challenges

Challenges arose in the evaluation process due to the variety of project activities and diversity of partners in this multi-strand project. In some cases, this resulted in inconsistencies in how the planned evaluations were administered to participants. It was also difficult to get feedback of scale on the resources available through the Maths4All website.

Across the different strands of this project, educators identified different challenges for them and for their peers. In the evaluations arising from the Early Years activities, educators valued the support for high-quality learning experiences in mathematics but noted the challenges facing the sector, and the importance of including modules addressing mathematics in initial qualification experiences.

In the evaluations arising from the primary activities, teachers noted that while PLCs were beneficial, time commitments posed challenges, particularly for those balancing competing workload demands. Some participants noted that online sessions, while convenient, sometimes limited active discussion and participation. They noted the need for ongoing support for teachers in the context of curriculum change.

Recommendations for Future Development

1. Building and sustaining networks

Teacher leaders of PLCs have developed their own expertise and are becoming proficient at facilitating the learning of other teachers. They are a network of mathematics education leaders which should be sustained and supported.

More broadly, the members of the Maths4All website (over 3700) can be considered a community of teachers with a demonstrated interest in mathematics education. This network should be cultivated and further developed to enhance children's learning in schools. At a system level (primary), it is suggested that being able to identify and support the coordinators of mathematics in schools is an important step in enhancing the provision of mathematics in primary schools and could serve to scale the current initiative and to maximize long-term impact.

2. Further developing the use of PLCs to support mathematics teaching

A culture shift is necessary so that teachers understand their role not as passive receivers of continuous professional development, but as active participants in the learning process. PLCs can be a driver of this shift. It is suggested that setting clear participation expectations for PLCs is important. Advertising and recruiting participants should occur via all available channels (e.g., social media, direct school engagement) and professional networks if possible.

For PLCs run through Education Centres, repeating the PLCs more than once in a school year would allow more teachers to participate while reducing the preparation workload for teacher-leaders. This would have the added benefit of allowing PLC leaders to test and refine their approach and content. Efforts are also necessary to enhance small-group discussions in online settings.

School-based PLCs should also be developed, where groups of teachers work together on specific topics of interest. These could be teachers from individual schools of from school clusters. The role of school leadership in supporting such groups of collaborating teachers is important.

3. Research-informed and research-based engagement projects

Activities in this project were informed by the relevant research-base. Formative and summative evaluation sought to provide evidence of project impact but despite the high levels of participations of a range of academic experts, no academic research was carried out as part of this engagement project. Facilitating some aspects of academic research within these engagement projects would (i) strengthen the quality and evaluation of project activities, and (ii) allow for continued and extended academic engagement in the context of a university system which prioritises academic publications.

4. Shared understanding of Project Evaluation across Partners

Ideally, data collection for evaluation should be conducted by those who design the instruments. In partnership projects such as this, the importance of a shared focus and a consistent evaluation approach should be discussed and agreed with all project partners.

Summary

Notwithstanding the challenges identified and the recommendations for improvements, overall, the evaluation confirms that Maths4All has made a significant contribution to mathematics education in Ireland, equipping teachers with the knowledge, confidence, and resources to enhance student learning, and establishing networks of teacher leaders who will contribute to future professional development. Future efforts should focus on sustaining and scaling these initiatives to maximise long-term impact.

References

Chapman, O. (2012). Challenges in mathematics teacher education. *Journal of Mathematics Teacher Education*, *15*, 263-270.

Brodie, K. (2020). Professional learning communities in mathematics education. *Encyclopedia of mathematics education*, 693-696.

Goos, M., Geiger, V., & Dole, S. (2014). Transforming professional practice in numeracy teaching. *Transforming mathematics instruction: Multiple approaches and practices*, 81-102.

Goos, M. (2014). Researcher–teacher relationships and models for teaching development in mathematics education. *ZDM*, *46*, 189-200.

Government of Ireland (2024). Ireland's Literacy, Numeracy and Digital Literacy Strategy 2024-2033: Every Learner from Birth to Young Adulthood. https://assets.gov.ie/static/documents/irelands-literacy-numeracy-and-digital-literacy-strategy-2024-2033-every-learner-from-.pdf

Government of Ireland (2023). Primary Mathematics Curriculum: For Primary and Special Schools. https://www.curriculumonline.ie/getmedia/484d888b-21d4-424d-9a5c-3d849b0159a1/PrimaryMathematicsCurriculum_EN.pdf

Harris, A., & Jones, M. (2010). Professional learning communities and system improvement. *Improving schools*, *13*(2), 172-181.

Jaworski, B., Chapman, O., Clark-Wilson, A., Cusi, A., Esteley, C., Goos, M., ... & Robutti, O. (2017). Mathematics teachers working and learning through collaboration. In *Proceedings of the 13th International Congress on Mathematical Education: ICME-13* (pp. 261-276). Springer International Publishing.

Jaworski, B. (2020). Communities of inquiry in mathematics teacher education. *Encyclopedia of mathematics education*, 102-104.

Kilbane Jr, J. F. (2009). Factors in sustaining professional learning community. *Nassp Bulletin*, *93*(3), 184-205.

Vossen, T. E., Henze, I., De Vries, M. J., & Van Driel, J. H. (2020). Finding the connection between research and design: The knowledge development of STEM teachers in a professional learning community. *International Journal of Technology and Design Education*, *30*(2), 295-320.