

Mathcymru Project



Arolygiaeth Ei Mawrhydi Dros Addysg
A Hyfforddiant yng Nghymru
Her Majesty's Inspectorate
For Education and Training in Wales



BUDDSODDWR MEWN POBL
INVESTOR IN PEOPLE

...Rhagoriaeth i bawb.....Excellence for all...

© Crown Copyright 2005

Published by:

Estyn
Anchor Court
Keen Road
Cardiff
CF24 5JW

This publication (excluding the Royal Arms and departmental logos) may be re-used free of charge in any format or medium provided that it is re-used accurately and not used in a misleading context. The material must be acknowledged as Crown copyright and the title of the publication specified.

This publication is also available at www.estyn.gov.uk

Any enquiries regarding this publication should be addressed to the Publications manager at the above address, or by e-mail to

publications@estyn.gsi.gov.uk

Contents	Page
1. Purpose	1
2. Background to the report	1
3. Main Findings	1
4. Recommendations	3
Annex:	
1. Teaching and learning	4
2. Lectures for pupils aged 14-19	4
3. The professional development of teachers	5
4. The support of LEA advisers	5
5. Evaluation	5
6. Publicity	6

1. Purpose

The purpose of this submission is to respond to the request from the Welsh Assembly Government for information on the progress made in implementing the Mathcymru Project. This report summarises the main findings from visits during the autumn 2004 to primary and secondary schools, attendance at lectures for secondary school pupils, and meetings people who are implementing and supporting the project. It also makes a number of recommendations for future action.

The Welsh Assembly Government has been considering its commitment to funding the project. Estyn provided brief and informal interim advice in November 2000. That advice was in line with this final version.

The Annex to this report includes additional information about:

- teaching and learning;
- lectures for pupils aged 14-19;
- the professional development of teachers;
- the support of LEA advisers;
- evaluation; and
- publicity.

2. Background to the report

The Minister for Education and Lifelong Learning made resources available to take forward, across Wales, a number of mathematical activities that had been established through the Welsh Assembly Government funded Mathematics Year 2000. Its aim is to promote mathematics to pupils and others, including parents, and to raise standards in schools. The Mathcymru Project has run for three years. Its work is mainly with schools. We did not inspect events aimed at the general public.

As agreed between the Welsh Assembly Government and Estyn, it is too soon to provide evidence that standards in mathematics have improved as a result of the Mathcymru Project.

Both Mathematics Year 2000 and Mathcymru have been based at Techniquet, Cardiff. Techniquet has had responsibility for managing these projects. There is one full-time national co-ordinator and two part-time staff support him. There is an Advisory Group which includes representatives from WAG, Techniquet and experts in the teaching and learning of mathematics.

3. Main Findings

Overall, Mathcymru is a worthwhile project that is very largely meeting its aims. Mathcymru could usefully develop and expand over coming years to secure greater participation and long-term impact across Wales.

- The project is having a very positive short-term impact at the schools that have engaged with the project.

- Taking part in events provided, or supported, by Mathcymru stimulates almost all pupils to the extent that they make significant gains in their knowledge of mathematics. These pupils' enjoyment of mathematics is often palpable. At best, they take away what is likely to be a lasting insight into the nature of mathematics.
- Teachers also gain useful teaching ideas and sometimes a fresh perspective of their pupils through participating in the activities. At best, there is an opportunity for teachers to discuss the activities with external providers, as well as among themselves. This improves the chances that an event has a lasting impact.
- Headteachers and teachers who have engaged with Mathcymru greatly value the learning opportunities for pupils and staff offered through the project. Some schools, though Mathcymru, strive to improve parents' attitude to mathematics. The project, also, encourages parents to participate in activities.
- Overall, the project is effectively managed. The national coordinator is continually looking for ways forward, and is an energetic presenter of mathematics to pupils. The Advisory Group is kept informed, cooperative working arrangements have been established with event providers and some LEA mathematics advisers. Good management has considerably reduced the cost of maintaining the Mathcymru website.
- There are working systems to provide publicity for Mathcymru, including a newsletter, a website and contact with the media. The publicity for the annual mathematics week generates activities in schools, over and above those funded by Mathcymru. The publicity systems are not always as effective as they might be in order to increase participation across Wales.
- Mathcymru's documentation for the public is generally available in English and Welsh. Its own presentations to pupils are available in Welsh, through one of its part-time staff. Presentations by other visitors to schools are usually in English only.
- Monitoring and evaluation procedures are largely informal and at an early stage of development. Mathcymru staff attend a sample of funded events to gain first hand experience of the quality of the work.
- Mathcymru's self-valuation document provides a useful overview of its aims and activities but is insufficiently evaluative.
- Mathcymru, with the agreement of the Advisory Group, has deferred action on one of its aims. This relates to a feasibility study into the establishment of an association of teachers of mathematics in Wales. This deferment is appropriate given the current demands on the Mathcymru staff and the nature of their past experience.

4. Recommendations

In order to develop its current activities and increase its impact on attitudes to mathematics and the learning of mathematics, those involved should consider a number of issues.

- Mathcymru should develop:
 - quantitative systems for monitoring and evaluating its impact, especially in respect of aspects such as participation; and
 - more robust systems for publicity, and, in particular, provide more guidance for organisations that take responsibility locally for organising events.
- External providers of events in schools should usually provide at least a short meeting with a group of teachers in order to allow them to discuss:
 - any outstandingly good experiences during the pupil sessions and how to build on them; and
 - the extent to which the objectives of the event were met.
- LEA mathematics advisers who have been actively involved with Mathcymru should share their good practice, experience, and expertise with fellow advisers.
- The Mathcymru Advisory Group should support the above actions through practical advice.
- The Welsh Assembly Government should convene a small high level task and finish group to consider and advise on the appropriateness of the aim that, as noted above, Mathcymru has deferred been deferred by Mathcymru.

ANNEX

This Annex provides further details on the impact of the Mathcymru project.

1. Teaching and learning

In participating schools, most pupils have highly motivating experiences. Suitably nurtured by teachers, these experiences could have long-term positive effects on pupils' attitude to mathematics and eventually make some contribution to raising standards.

In most cases, events based on the use of a visiting activity leader are for a whole day. Typically classes spend about 45 minutes in the school hall on a rota basis. This uses the visitor's time and expertise effectively. Following a brief introductory talk, the pupils are highly engaged in a wide range of useful hands on investigative mathematics activities using apparatus. Often teachers accompany their pupils. This is good practice. The teachers sometimes find that they, themselves, are challenged, as they support their pupils in challenging tasks. Teachers could reproduce a considerable minority of the activities in a normal classroom, at very modest cost.

One investigative presentation, for which the Mathcymru staff uses ICT, is of a high standard.

In the most active schools, there are many special mathematical activities throughout the national mathematics week and, sometimes, also at other times. These activities generally have clear aims and are well delivered. They promote the enjoyment of mathematics. Some have a specific theme such as 'mathematics in the environment', elements of competition, or joint working between primary and secondary schools. Outside involvement includes specialist mathematics presenters and speakers from LEAs, various workplaces, and other schools. As well as developing pupils mathematically, the activities often contribute developing other key skills.

2. Lectures for pupils aged 14-19

Higher Education institutions have provided venues for lectures aimed at secondary school pupils aged 14 to 19. These lectures are usually of high quality and are, sometimes, excellent. In some cases, initial teacher training students join the audience.

With enough publicity and promotion, such events could reach many more pupils. There are audiences of the order of about 100 pupils. However, such figures can represent as few as two secondary schools. The speakers could generally just as well address 300 or more pupils.

Schools have largely fixed travel cost for a group of pupils to attend a talk. These events could be more effective and attractive, if the staff were to provide an accompanying activity. This happened accidentally at one lecture, when pupils who

arrived early became highly engrossed in a worthwhile mathematical hands-on activity that was available at the site.

3. The professional development of teachers

Mathcymru's activities provide many informal opportunities for teachers to develop their skills. In the best cases, schools are sharply aware of this and profit from the opportunities. Teachers follow up activities in their classes. This sometimes prompts teachers to find useful new teaching resources.

The focus of visitors who lead on mathematics activities in schools is rightly on the pupils. However, in terms of teacher development and value for money, it is inappropriate that in many cases the visitors leave without having a discussion with teachers. Such discussion could focus on any outstanding achievement by pupils, the thinking behind unfamiliar investigations, and what teachers could easily adopt in the normal classroom.

4. The support of LEA advisers

Advisers in some areas have worked particularly well with Mathcymru. They have:

- helped to organise events;
- encouraged schools to participate in competitions and funded projects; and
- recommended schools that might use visitors well during a mathematics day.

However, despite the efforts of the Mathcymru officer, in some areas, advisers do not provide this level of support.

5. Evaluation

One external provider supplies evaluation forms to be completed after sessions. Another school has effectively used its evaluation of a mathematics week to support its application for the Basic Skills Quality Mark.

Schools, sometimes, write letters thanking Mathcymru for support and these include some brief, broad evaluation. However, schools are generally uncertain about what Mathcymru expects of them in terms of evaluation. Sometimes, the fact that the school is unaware of the reason for its selection for Mathcymru special support hampers the evaluation process. The selection is often through LEA advice but Mathcymru does not make the criteria for selection explicit to the school.

In terms of evaluations processes, Mathcymru does not draw enough on the expertise within its Advisory Group.

6. Publicity

Active mathematics advisers play a large role in informing schools about Mathcymru.

The Mathcymru national coordinator has addressed trainee teachers and their tutors about the project's work in schools. In one case, a tutor and trainees visited a school to support a mathematics day. The trainees and pupils developed their skills.

Mathcymru aims to increase the geographical area within which it makes an impact. However, many schools are not well aware of the Mathcymru newsletter, website, grant aid and local events. Even schools that have taken part in projects are sometimes still unaware of the full range of Mathcymru's activities.

The lack of effective publicity has led to the low number of schools attending talks for secondary pupils. For example, one school which has been very active in terms of extracurricular mathematical activities was unaware of local talks. On one occasion, schools some distance from the venue received notice of a lecture but a nearby institution did not.

Mathcymru rightly ensures coverage of events in the media. In one or two cases, greater preparation for interviews could have improved the impact of what was reported.

In terms of ensuring publicity, Mathcymru does not draw enough on the expertise within its Advisory Group.