

University of Hertfordshire School of Education

Evaluation of the Primary Science Quality Mark programme 2013-15

Summary Report

June 2016

Context and aims of the research

This large-scale research project was designed to explore the overall impact of the Primary Science Quality Mark (PSQM) Programme from 2013-15 and wider issues relating to primary science teaching, learning and subject leadership, and to evaluate the PSQM programme against its five aims. These aims are:

- raising the profile of science in primary schools;
- providing schools with a framework and professional support for developing science leadership, teaching and learning;
- celebrating excellence in primary science;
- using networks to provide local support for science for schools; and
- assembling a rich database of current practice in primary science and making it accessible to the wider science education community.

Methodology

This practice-focussed research took an interpretive approach to understand the experiences of the participants. Data collection methods included: email questionnaires to the Director of the PSQM, PSQM hub leaders and science leaders; semi-structured telephone interviews with PSQM stakeholders and a hub leader; a focus group with science leaders; and a review of some of the submissions available on the PSQM portal. The Ofsted report (2013) and the Impact of Royal Society of Chemistry bursary-funded PSQM on primary science teaching report (White et al., 2015) were also drawn on to provide further evidence for the impact of the PSQM.

The research was funded by the Primary Science Teaching Trust. Ethical approval was obtained through the relevant University of Hertfordshire Ethics Committee.

Full report: WHITE, E., DICKERSON, C., MACKINTOSH, J. & LEVY, R. 2016. Evaluation of the Primary Science Quality Mark programme 2013-15. University of Hertfordshire.

The contribution of the PSQM to raising the profile of science in primary schools

The findings suggest that the PSQM has been playing an important role in raising the profile of science in primary schools, in a context where there has been a perceived emphasis on literacy and numeracy to the detriment of the other curriculum areas. There were examples of ways in which a commitment to the value of science was developed at all levels: the senior leadership team, the staff, the pupils, the parents and the governors. Typically, the profile of the science leader was enhanced, giving them the recognition with which to lead change.

The teachers grew in confidence to teach science, there was an increase in science-related talk in the schools and increased visibility through displays. The profile of science was raised through special science events sparked by the PSQM process. Some of the changes have introduced an element of fun and excitement around engagement with science, helping to create positive attitudes towards science teaching and learning in pupils and teachers. The PSQM may be playing a significant part in increasing the science capital of pupils through the extended reach to parents leading in some cases to engagement with science in the home.

PSQM submissions showed that the profile of science in these primary schools was raised through engaging in the PSQM programme at bronze, silver and gold levels. The characteristics of the award meant that silver and gold submissions had an impact beyond the science leaders' classroom to the whole school, and gold submissions had substantial impact beyond the school. The gold PSQM award that requires teachers to work with other schools provides a good mechanism to promote inter-school collaborative work to raise the profile of primary science more widely.



The contribution of the PSQM to providing schools with a framework and professional support for developing science leadership, teaching and learning

The PSQM was focussed on leadership development through providing a clear structure, developing understanding of the role and some of the key skills and creation of principles for a whole school approach. Reflecting on, and evaluating, practice was provoked by engagement with the framework and the science leaders were developing skills of modelling and team teaching to disseminate good practice through the school.

Science leaders were better equipped for their own teaching because they had good signposting to professional development. The development of science subject knowledge and pedagogy was largely through networking, access to the knowledgeable hub leaders and through the signposting to appropriate CPD opportunities.

The key principles for science teaching were developed as part of the PSQM programme through listening to the teachers and pupils, which provided a common vision. Action planning provoked review and development of teaching and learning strategies and the framework deconstructed subject leadership into manageable steps. The PSQM provided a legitimate space for teachers to reflect on science in their school and the resources and support to help them to develop science learning. It also provided a supportive sharing network across schools and a mentoring relationship between the science leaders and the hub leader.



There was a wider range of learning strategies and learning opportunities for children as a result of participating in the PSQM programme. These strategies were being implemented in conjunction with a focus on child-led and hands-on learning. Pupils were asking their own questions and

working scientifically to answer them in their own investigations. There was more consistency in the quality of teaching primary science across the school. Changing pedagogy was a challenge for many of the science leaders and teachers where this approach was new. Listening to pupil voice had a powerful impact on the science leaders.

The PSQM was having a wider impact on teaching and learning in primary science beyond their own schools partly through providing resources for the Teacher Assessment in Primary Science (TAPS)¹ project and the Exemplar website.²

The programme required the commitment of the senior leadership team to giving the science leader time and support in developing science during the PSQM year. Sustained impact was largely dependent on the science leader and the long term commitment of the school. Some hubs carried on as a local network post-PSQM, but most hub leaders encouraged schools to maintain the network independently or via existing regional primary science networks.

Where science leaders had become hub leaders, they had a wider impact as they worked with clusters of schools to raise the profile of science. Some science leaders built on their PSQM success in their own or another school. The science leaders gained from the leadership development and this impacted their career development, and provided skilled leaders to support further school improvement, though not always focussed on primary science.

The submissions to the PSQM portal revealed a high impact on the leadership of science and on the breadth of learning and teaching experiences within and beyond the classroom. There was also evidence of changes emerging that would ensure the impact of the PSQM would be sustained beyond the programme year through planning and wider networking.

The contribution of the PSQM to celebrating excellence in primary science

The PSQM award ceremonies were greatly anticipated and publically recognised the work involved in achieving the award. They helped to raise the profile of primary science to a wider audience. Some science leaders who take their school through the PSQM go on to gain a Primary

¹ <https://pstt.org.uk/resources/curriculum-materials/assessment>

² <https://pstt.org.uk/who-we-are/partners/psqm>

Science Teaching Trust PSTT award³ to recognise their individual contribution or win an ENTHUSE Celebration Award⁴ for their contribution to science education.

The Exemplar Material project² is another way in which excellence in primary science is celebrated. Science leaders have not been well engaged in providing material for this site due to practicalities of the uploading process and a need for affirmation from their hub leaders that the work is of the required quality. The Exemplar Material is useful for those doing the PSQM for the first time.

In some schools, engagement in PSQM has been associated with science teaching and learning being highlighted as successful by Ofsted.

The contribution of the PSQM to using networks to provide local support for science for schools

The PSQM is the only award available to recognise whole school achievement in primary science. The PSQM Director has close links with a number of organisations that promote primary science, and these organisations work together in the PSQM stakeholder group, seeking opportunities to further their common aims of developing primary science. This group has recognised expertise that gives it credibility in the world of science and education and was perceived as being very valuable to the members and their organisations. The PSQM stakeholder group has the potential to raise awareness at a governmental level and to bring about policy change, leading to science having recognition as a core subject.

A major benefit of this group for the PSQM is the 'critical friendship' that it provides to the PSQM leadership. The interactions are mutually beneficial for the organisations in terms of up-to-date awareness of developments in the field, marketing opportunities, building membership, and providing a rich interwoven network to enhance science teaching and learning through primary science leaders.

Recruitment to PSQM of new hubs may be through links with existing primary science networks or by new hub leaders being recruited by the PSQM Director from award winning schools

³ <https://pstt.org.uk/what-we-do/primary-science-teacher-awards>

⁴ <https://www.stem.org.uk/project-enthuse>

and school improvement organisations. Schools are either recruited by hub leaders or come direct to PSQM having heard about the programme through word of mouth or publicity. Recruiting new schools can be challenging in the current climate of decreasing local authority networks.

The contribution of the PSQM to assembling a rich database of current practice in primary science and making it accessible to the wider science education community

There has been limited use of the database for research, but it is possible as the data is used more, for example, in this report and by other researchers including doctoral studentship holders focussing on this area, others might see the potential that is available to them. Currently the data is not easy to access, and it would need to be organised effectively for more extensive use.



Understanding the process of implementing the PSQM programme

A number of areas were identified in which the PSQM could develop to become more effective including financial support for the cost of doing the PSQM and for science CPD as needed, and protected time for the science leader to mentor and coach colleagues, do developmental work and complete the process.

The silver award was seen as very valuable because it requires whole school commitment to high quality science and a subject leader who is having impact on the science learning of all the pupils in the school. Progression to gold was seen as unrealistic for many schools and not essential for all schools as long as there are some excellent schools doing outreach. There was an identified need to monitor how the school is getting on after the award, if the science leader is still in place,

and to offer further support as required. In future 'gold light' might be usefully introduced where the science leader has not changed, involving collecting evidence to show sustained impact in and beyond the school over the intervening years. The value of doing a complete resubmission was appreciated in some cases, especially where there had been a change of subject leader, staff or curriculum. A platinum award may be a future development for gold schools that would like to develop primary science further. This could include practitioner enquiry to develop science teaching and learning further within the school or beyond. Where science leaders move on some of the rich experience and learning goes with them into a new setting. This is good for the school system as a whole, but may constrain the sustainability of the PSQM within the original school, unless there are opportunities for renewal, for upskilling the new science leader, or for a teacher to shadow the science leader to be able to transfer skills smoothly.

The need to monitor the quality of hub leaders and to support their on-going professional development was seen as vital if the PSQM is to expand further, as more hub leaders will be needed. Identifying key hub leaders to move the work forward in areas which are identified as needing targeted support would lead to strategically planned growth of the PSQM into areas where the impact will be very significant. Time in hub meetings was usually focussed on procedural aspects of the PSQM programme; a third day could provide more time to focus on primary science knowledge and pedagogy.

Further growth of the PSQM programme could be constrained by the capacity of the core leadership team and a review of the working of the central team may reveal a need for more investment in staff.

New networks will need to be explored in order to continue recruiting new schools, such as Teaching Schools Network and Multi-Academy Trusts. This could be in the remit of the PSQM Director and the hub leaders.

The PSQM framework was widely accepted as appropriate. A number of suggestions were shared by the hub leaders and the science leaders for developing the framework and documentation further. The science leaders felt that there should be more inclusion of pupil voice and pupil impact rather than focussing on the science leader and the teachers. It is also notable that there is

nothing in the framework explicitly regarding pupil progress in science.

The PSQM stakeholder group might want to consider providing a shared primary science website as a starting point for all things to do with primary science as a resource for primary teachers and hub leaders who are finding the information fragmented.

The PSQM programme may be a good model for other subject areas and consideration could be made as to whether the framework and resources could be repackaged as a franchise for other subject areas for school improvement.

The Way Forward

The full report includes a summary of possible ways forward that had been suggested on the basis of the findings, for the PSQM team to explore. The suggestions include ways forward relating to:

- The new school landscape in England and beyond;
- Initial school engagement and sustaining impact;
- Maintaining and improving quality of PSQM support;
- Internet presence; and
- Further use of the PSQM submissions database.



References

- OFSTED, 2013. *Maintaining Curiosity: A survey into science education in schools*. Report No. 130135. London: Ofsted.
- WHITE, E., DICKERSON, C. and MACKINTOSH, J. 2015. Impact of Royal Society of Chemistry bursary-funded Primary Science Quality Mark on primary science teaching. [http://vuh-la-risprt.herts.ac.uk/portal/en/projects/evaluation-of-rsc-bursary-funded-psqm\(cdd1fbd0-0609-48f8-a554-c6f910a543c8\).html](http://vuh-la-risprt.herts.ac.uk/portal/en/projects/evaluation-of-rsc-bursary-funded-psqm(cdd1fbd0-0609-48f8-a554-c6f910a543c8).html)