

# Learning lessons from Finland and Estonia

■ Neil McIntyre

*Over recent years, much has been written about science education in UK schools and possible reasons why we fare relatively poorly in international league tables compared to countries such as Finland and Estonia.*

Like many science teachers in the UK, I was interested in the latest PISA results<sup>1</sup> and questioned why British pupils are apparently behind in their learning of science-based subjects compared to their peers in many other countries. In order to gain a better understanding of this subject, I decided to apply for a Winston Churchill Memorial Trust Travelling Fellowship<sup>2</sup>, with a proposal to visit Finnish and Estonian schools to study good practice in science education. After an interview in London in January 2014, I was delighted to be awarded a Fellowship, which paid for my travel costs to Finland and Estonia. In May 2014 I had the

privilege to travel to both countries, where I visited four schools over a one-month period – The Helsinki School of Natural Sciences, Kulosaari Secondary School, Tallinn Reaalkool and Viimsi School.

My main objective during my school visits was to gain an understanding of the Finnish and Estonian education systems, with a particular focus on science education. In each school I spent time observing science lessons, as well as discussing issues with science teachers and pupils. Throughout this time I gained knowledge of the Finnish and Estonian science curricula and witnessed areas of good practice.

Below is a brief summary of my findings. For a full account, please visit the Winston Churchill Memorial Trust website, where you can download my report, *Increasing Achievement in Science Education: Learning lessons from Finland and Estonia*.<sup>3</sup> The report is also available on the ASE website, [www.ase.org.uk](http://www.ase.org.uk), in the *EiSExtra* section.

## Summary of findings

### Subject specialism:

Both Finland and Estonia pride themselves on subject specialism. For example, in Helsinki and Tallinn there are specialist science schools, which attract pupils from different areas of the country who have an interest, or talent, in the subject. Although these schools have a focus on science, they also provide a broad education incorporating all the fundamental subjects. Some of these schools receive extra funding for the sciences or devote more time to the subject each week. Both countries also have highly qualified science teachers. Usually a Master's degree is required to teach a science subject and all teachers have to complete a teacher training course – typically for one year.

While visiting Viimsi School in Estonia, I was interested to discover that pupils are taught science from the age of ten by subject specialists. Indeed, it was usual for children as young as ten years old to see as many as five different teachers per week for different subjects at Viimsi. I was told by staff that primary teachers in Estonia were not expected to be experts in all subject areas and teachers usually taught to their strengths.

### Science is compulsory:

In Finland and Estonia, all science subjects are compulsory for pupils until the age of eighteen. Schools in both countries follow a very broad curriculum where pupils are exposed to all subjects. Unlike in most UK schools, Finnish and Estonian pupils cannot drop science subjects at sixteen years of age if they decide to stay on at school.

During my school visits, I spoke to a number of teachers about the issue of making subjects compulsory for pupils up to the age of eighteen and whether they believed it was good or bad policy. In all cases, teachers agreed that making subjects compulsory was good for pupils. Some teachers commented on the fact that most young people were

Figure 1: A chemistry experiment at Helsinki School of Natural Sciences.



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unsure of what occupation they would like to pursue and, therefore, providing them with a broad curriculum kept many options open. Others thought that most pupils were simply too young to choose subjects at age sixteen.

Presently, the uptake of science-based subjects post-16 is poor across much of the UK, according to a recent in-depth study by The Royal Society.<sup>4</sup> It appears that Finland and Estonia avoid this problem by making all science subjects compulsory to the end of upper secondary school.

## Curriculum and teaching methods:

During my visit, I spent time studying Finnish/Estonian science textbooks to gain a better understanding of the school curricula. I also spent a great deal of time in classrooms observing science lessons and discussing issues with teachers and pupils. One surprising conclusion from my travels was that there did not appear to be a big difference between the science topics covered in Finnish/Estonian classrooms to what typically occurs in most UK schools. I say surprising because I always held the belief that Finnish and Estonian children must be learning more difficult scientific concepts at an earlier age than their peers in the UK, given their impressive PISA rankings. Having spent many hours observing science lessons in Finland and Estonia, I do not believe that this is necessarily true.

The teaching methods I observed science teachers using in Finland and Estonia were very similar to methods you might expect to see in most UK schools. For example, I witnessed many science lessons where pupils were carrying out experiments (see Figure 1), investigations or researching topics.



Figure 2: Young pupils attending a robotics club run by a local university student.

Teachers often made good use of ICT in lessons. Some of the schools I visited had good links with universities in which undergraduate, Master's and PhD students supported STEM clubs run by the school (see Figure 2).

## Other factors:

Although the focus throughout my Fellowship was issues relating to best practice in science education, it did not escape my attention that other factors were likely to be playing a role in explaining Finland and Estonia's success.

For example, I was constantly impressed by the language skills of the pupils I met. All senior pupils could speak a minimum of two languages fluently – usually their mother tongue and English. However, some could speak three or four languages fluently by the time they were sixteen. Although it was beyond the scope of my Fellowship to study this in any great detail, I was

continually impressed by the ability of pupils to speak multiple languages and I began to question whether this had a knock-on effect and helped pupils in other subject areas, such as science.

Finland and Estonia have also invested in excellent computer-based reporting systems that link the teacher, pupil and parents together. For example, parents can log on to the computer program *eKool*<sup>5</sup> in Estonia to get brief summaries of lessons and access the coursework that their child is studying in all subject areas. They can also find out what homework is due and when tests are occurring. Therefore, parents/carers can play a much greater role in supporting their child throughout their time in school.

**Dr. Neil McIntyre** is a chemistry teacher at Webster's High School in Angus, Scotland. Prior to this he gained a chemistry PhD at the University of St Andrews and completed a PGDE in science education from the University of Dundee. He was awarded a Winston Churchill Memorial Trust Travelling Fellowship in 2014.

<sup>1</sup> <http://www.oecd.org/pisa/keyfindings/PISA-2012-results-UK.pdf>

<sup>2</sup> <http://www.wcmt.org.uk>

<sup>3</sup> <http://www.wcmt.org.uk/users/neilmcintyre2014>

<sup>4</sup> Vision for Science and Mathematics Education. The Royal Society Science Policy Centre 2014. (See [royalsociety.org/vision](http://royalsociety.org/vision)) <http://www.interacademies.net/File.aspx?id=25298>

<sup>5</sup> <http://ekool.company/en/>