This article is based on a doctoral research project "Food and healthy eating: progression in the curriculum".
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Food and Healthy Eating in the Curriculum – a case of too many cooks spoiling the broth

Knowledge about food and healthy eating is so important that it has found its way into many areas of the National Curriculum in use in England today. Despite this, we are in the midst of an obesity crisis with The World Health Organisation (WHO, 2014) stating that 'obesity is one of the greatest public health challenges of the 21st Century'. Paradoxically, anorexia cases requiring hospital treatment in England have also risen by 10% in the last 10 years (The Telegraph, 2009). Food and healthy eating forms part of the Science, Design and Technology (DT) and Personal, Social and Health Education (PSHE) remits so one might assume that pupils obtain a good understanding of the subject through their schooling. However, the figures appear to contradict this.

I approached this area as part of a doctoral research project looking at progression in the Science curriculum (Ryland, 2009a). There had been reporting of pupils' discontent due to poor progression and repetition (Lord and Jones, 2006). However, research was yet to confirm whether these claims were justified. The National Curriculum is based on the spiral curriculum proposed by Jerome Bruner (1960). Bruner (Ibid.) surmised:

> *A curriculum as it develops should revisit the basic ideas repeatedly, building upon them until the student has grasped the full formal apparatus that goes with them. (p.13)*

This means that fundamental concepts are introduced in a basic form in key stage 1 (KS1) and are then revisited and developed in later key stages. Progression is paramount in the successful implementation of a spiral curriculum.

The Study

My study centred on concepts connected to food and healthy eating for pupils in KS1 to KS3. One primary and one secondary school located in Birmingham were involved in the study. The research was designed to assess progression through documentary analysis of the National Curriculum Science programme of study (PoS) (DfEE and QCA, 1999; QCA, 2007); the Qualifications and Curriculum Authority's schemes of work (QCA, 1998); the schools' schemes of work; and pupils' exercise books. The views of pupils and teachers at the two schools were also sought.

Documentary analysis

The National Curriculum Programme of Study (1999)

Food and healthy eating was found to be taught at each KS of the National Curriculum. When the statutory content was analysed, it was found to show clear progression. The statutory content developed progression in both the use of language and the depth of knowledge. In KS1 the language focused on 'types of food'. I interpreted this as meaning foodstuffs such as bread, meat, potatoes, fruit and etc. In KS2 the focus was on what food is used for, thus making the link between food and activity, growth and health, for example, meat/beans help us grow. Some more technical terms such as 'adequate' and 'a varied diet' were also introduced. In KS3 the key term 'a balanced diet' and the scientific terms for the main nutrients such as carbohydrates, proteins etc. were detailed. The sources of these nutrients were also covered. Digestion was not covered at all in KS1; in KS2 the very beginning of the digestive process was introduced by covering the function of teeth; in KS3 the digestive system was explored in addition to the function of enzymes. At each key stage there were aspects that were revisited and developed and further new aspects were also introduced.

A new PoS for KS3 (QCA, 2007) was introduced in schools in 2008. The statutory content it proscribed was difficult to analyse for progression in relation to the previous two key stages as it was particularly vague when compared to the 1999 version. It seems relevant to note at this stage that despite the introduction of a new PoS in 2008 (during the field work stage of the research), both the school and QCA stated at the time that they had no plans to change their existing schemes of work based on the 1999 publication. Put simply, the new PoS was introduced to little effect. The reasons behind this will be discussed later, along with teachers' views of the curriculum.

The Schemes of Work

The PoS is translated by schools into schemes of work. The QCA published schemes of work (QCA, 1998) as part of their non-statutory guidance and these could be adopted by schools. The primary school in the study used these schemes whereas the secondary school developed their own.

The QCA schemes of work revisited the food and healthy eating twice per KS from KS1 to KS3; this was in years 1, 2, 3, 5, 6, 8, and 9. The secondary school's schemes of work also revisited the topic twice in KS3 in years 8 and 9. When the content of the schemes of work were analysed for progression, there seemed to be little between the first and second revisit within KS1 and KS2 and some between the revisits in KS3 (Ryland, 2009b). For example, in the learning objectives, scheme 3A for year 3 states 'an adequate and varied diet is needed to keep healthy' (p.2) and in the year 5 scheme 5A 'to stay healthy we need an adequate and varied diet' (p.2). These objectives appear to be identical and it is difficult therefore to identify possible progression in their outcomes. Progression was much easier to observe in KS3, as the content covered was significantly different in theme, with year 8 concentrating on nutrients included in a balanced diet, digestion and enzymes and year 9 getting to grips with the intricacies of a balanced diet and focussing on deficiencies, disease, malnourishment and the adverse health effects of an excess of some minerals such as salt.

The QCA schemes of work were also found to be confusing as to when certain concepts should be introduced. This was mainly because they contained terms within their guidance to teachers which were unsuitable for use with the pupils. For example, Unit 5A for year 5 states:

> *'…children do not need to be able to classify foods formally into groups such as protein or carbohydrate' and later 'most children should be able to understand that energy foods are of two types - carbohydrates (starches and sugars) and fats.'* (p.2)

To the casual reader it may appear that the term carbohydrate was to be covered with year 5 pupils. However this is not included in the National Curriculum until KS3.

Another confusing example appears in the scheme 2A for year 2 (KS1), which outlines how some pupils will be able to 'describe how their diet is balanced' (p.1). So the words 'diet' and 'balanced' are being used in close connection, yet the National Curriculum does not introduce the term 'diet' until KS2 and 'balanced' until KS3. This suggests that some pupils may develop some understanding of the concept of 'balance(d)' two key stages earlier than planned. This may be an attempt to show potential for differentiation. However the mere mention in the scheme could indicate to teachers that they should be teaching the term to all pupils. I expect that some pupils could adopt and use the phrase relatively easily, but without grasping the true scientific interpretation as covered in KS3.

Pupil exercise books

The analysis of pupils' exercise books was possibly the most informative aspect of the study. This revealed what had actually been included in classwork and homework. The analysis included books from each of years 2, 3, 5, 8 and 9. It showed that certain aspects were introduced much earlier than stated in the National Curriculum and then repeated at each revisit throughout the pupils' education. For example key nutrient types, such as carbohydrates and proteins, were covered in year 2 (KS1) and then repeated at each revisit in years 3, 5, 8 and 9 although these concepts were not included in the National Curriculum until KS3. So pupils were being exposed to repetitive content throughout their education. Such scientific terms were observed in the exercise books in pupils' own notes and also in externally produced worksheets for KS1 and photocopies of KS2 revision guides (Parsons,

1999 reprinted 2005). Despite this repetition, some aspects did show progression. However, this was achieved by 'borrowing' content from the next key stage. For example, pupils in year 5 (KS2) gained progression by learning about the function of the digestive system which was only described in the PoS for KS3. As a result of this early introduction pupils were exposed to repetitive content in KS3.

Comparative analysis of documentary sources

When the documentary sources were compared, it was found that 42% of the concepts identified in the National Curriculum PoS were introduced early in the exercise books. It was also noted that more concepts and key words were observed in the exercise books than were observed in the corresponding schemes of work in KS1 and KS2. For example, in the QCA scheme of work for year 2 fifteen concepts and key words were included yet twenty-nine were observed in the books. Thus, more content was covered with the pupils than was required by the statutory content of the National Curriculum or the non-statutory guidance given in the QCA schemes of work and this was the case for all years in KS1 and KS2 in the study.

Pupils' voice

Pupils in years 5, 8 and 9 participated in the pupils' voice phase of the study, completing questionnaires on the food and healthy eating topic. A sub-set of pupils also took part in focus groups.

The majority of pupils felt learning about food and healthy eating was important and should be taught in school because they recognised the health benefits arising from such knowledge. However, pupils also felt that it was covered too frequently and this lead to repetition and boredom. The pupils also reported learning about food and healthy eating from many sources both inside and outside of school and this compounded their negative feelings. They identified how the same content, such as food groups (fats, carbohydrates and proteins etc.) and a balanced diet was covered in Science, DT and PSHE lessons. Pupils were left feeling that they learnt about food 'every year' and this was too much.

Teacher Voice

Four teachers were interviewed as part of the study. These included a class teacher and a head of department from each school who were involved in teaching the pupils in the study.

The teachers were largely unaware of what the pupils had learnt about food and healthy eating in the previous KS. For example, a KS2 teacher stated that he had *'no idea'* what was taught about food and healthy eating in KS1 and a KS3 teacher stated *'I think they vaguely cover healthy eating'* at KS2. As they were unaware of the detailed knowledge that the pupils had, they unwittingly included concepts in their lessons that were repetitive for the pupils.

However they were much clearer about what had been taught earlier in the KS they were teaching as all the teachers in the study taught both years within a KS. This in-depth knowledge of the schemes of work and of pupils' experiences led the KS2 teachers to introduce KS3 concepts early because they felt the QCA scheme did not offer enough progression for their pupils. The primary head of department, when speaking generally about the entire curriculum, stated:

> *We are aware that we cover some material from secondary school…we like to extend the children…[I am aware] they then get bored in year 7 and 8.*

The KS3 teachers were aware that some KS3 content was covered in KS2. The head of department stated:

> *In my view for primary schools to make their experience more pleasant they are nicking all the KS3 practicals [experiments]. So when the kids get here they find it dead boring… You see this is where prescription would be (pause) IS essential.*

He also outlined concerns that the 2008 PoS was too vague and described the content as appearing to be 'top secret' and felt that 'absolutely anything' could be included in exams. It was this feeling of vagueness that led the schools not to alter their schemes of work when the new PoS was introduced in 2008.

Discussion of the study

The three phases of the study highlighted some key areas of concern regarding the repetition of concepts in Science lessons and identified some areas where future research could identify the extent of the overlap with DT

and PSHE. Since the completion of the study, the new Coalition Government instigated a consultation on the National Curriculum. I submitted detailed data to that consultation, outlining my concerns regarding the teaching of food and healthy eating. This consultation culminated in the publishing of a new curriculum (Department for Eduation (2013b) for Science and DT (Department for Eduation (2013a) and I will now reflect on these documents.

Curriculum 2013

My first observation is that the new PoS for Science details content on a yearly basis in KS1 & KS2 as opposed to the KS basis detailed in earlier documents. Looking at KS1 and KS2, food and healthy eating first appears in year 2. The 2013 statutory content is very similar to that included in the 1999 PoS, including types of food in the right amounts and the importance of exercise. Similar concepts are covered in year 3, including food types and amounts of 'nutrition'. The non-statutory guidance for this year also mentions 'food groups', but does not specify terms such as carbohydrates etc. In year 4 pupils look at teeth. This again mirrors the content of the 1999 PoS, but differs in that the basic function of the digestive system is also included. This was previously KS3 content, although this study observed it being introduced in year 5. The topic is also revisited in year 6, when pupils consider the ways in which nutrients are transported within animals. This was previously included in KS3 in the 1999 PoS. So, in summary, the food topic is revisited in years 2, 3, 4 and 6 in the new 2013 curriculum, whereas those following the non-statutory guidance of the QCA schemes based on the 1999 version revisited it in years 1, 2, 3 and 5.

In KS3 the content is not described on a yearly basis and includes the key scientific terms carbohydrates, proteins etc., the consequences of imbalances, deficiency disease and the digestive system and enzymes. This reflects closely the 1999 PoS for KS3.

The overall feel of the 2013 PoS is that is very similar to the 1999 version, all bar a small amount of tweaking to reflect what was being taught in schools anyway. My overriding concern however is that I do not believe it will solve the problem of repetition as it is not prescriptive enough. This is highlighted by the fact that the terms for the nutrient types only appear in the statutory content for KS3, yet evidence suggest their use in school from KS1. Indeed they were included in published revision guides for KS2 (Parsons, 1999 reprinted 2005).

I shall now turn to the new DT PoS and identify a potential overlap with the Science curriculum. In the 'cooking and nutrition' section, content is detailed for each from KS1 to KS3. Content which has a clear identifiable overlap with Science includes the principles of a healthy and varied diet in KS1 and KS2 which would almost undoubtedly lead to the inclusion of food types. These concepts are revisited in KS3 when pupils should be taught to understand and apply the principles of nutrition and health. As an example of how such overlap or repetition is likely to occur, the Science PoS for year 3 'notes and guidance' suggests that pupils (Department for Education, 2013b):

> *Might research different food groups and how they keep us healthy and design meals based on what they find out (p.17)*

This also seems to be an entirely appropriate activity for the KS2 DT statutory content (Department for Education, 2013a):

> *Understand and apply the principles of a healthy diet (p.5)*

In Science, pupils research how certain foods keep us healthy this is directly comparable to the pupils in DT understanding the principles of a healthy diet. Further, when the guidance in the Science PoS suggests pupils design meals, this could also be thought of as applying the principles of a healthy diet as outlined in the DT PoS.

In summary, the 2013 National Curriculum continues to be vague, thus allowing a variety of different interpretations for a wide age group of pupils. Although this might appear to make it flexible, it is easy to see how repetition could continue to occur.

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