

Title: The inclusion of food technology as an aspect of technology education in the English school curriculum: A critical review.

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Abstract

An understanding of the rationale for the introduction of the teaching of food in the English school curriculum helps clarify some of the issues related to the inclusion of food technology as an aspect of technology education today. The paper refers to its roots as a practical subject in elementary schools to raise the living standards of girls from the working classes and to prepare them for low paid employment. The position of food teaching in the school curriculum prior to the introduction of the National Curriculum in 1990 is evaluated against the social and economic context of that period, identifying the key issues of gender, status and an association with less able pupils.

The impact of the political decision to include food technology in the National Curriculum as an aspect of design and technology, a compulsory subjects for all pupils aged 5-16 years, is discussed taking into account the views of schools, teachers, professional associations and government bodies. The paper looks at the how the traditional subject content, focus and teaching approaches used have been changed to align food technology with the philosophy of design and technology teaching and learning. It reports the findings of an investigation into teachers' perceptions of the changes and the potential benefits and losses of these recent developments for the curriculum area. In conclusion, the paper refers to a recent government funded research and development project investigating the concept of 'designing' in the medium of food technology.

The rationale for the introduction of food into the English school curriculum

The British Museum contains a record of a cookery school in London dated 1740, indicating that the study of food was originally available for ladies with private means from the upper classes. A number of eighteenth century educational writers referred to the importance of girls or young ladies from wealthy families learning how to cook (Yoxall, 1965), and throughout the nineteenth century specialist high class private cookery schools provided for the upper classes. However, the origins of food in the English school curriculum were more philanthropic or utilitarian and are linked to providing training for low paid employment. The teaching of food can be traced directly to the elementary state system for the lower working classes of the 1840s when domestic economy was introduced to improve basic living standards (DES, 1978). The emphasis in the elementary schools was not on high-class cookery skills, but on teaching girls the skills of plain cookery that could be used to feed their families. This was considered to be necessary because of the separation of home from the workplace and the movement of people to the overcrowded, poor living conditions of the new centres of factory industry in towns (Sillitoe, 1966). It was thought that the teaching of what was then know as domestic economy, would help girls develop an understanding of nutrition and the management of their family's resources (Arnold, 1908).

Health

Links between the teaching of food and health were reinforced during the South African Boer War 1899 - 1902, when it was found that the vast majority of the men who volunteered were physically unfit as a result, it was suggested, of a poor diet. The Hadow Report (Board of Education, 1926) reiterated the theme, justifying the teaching of food in terms of its value in promoting good health and efficient management to raise basic standard living standards. The study of food should be part of domestic subjects, the new title, and taught to girls as preparation for their future household duties adult life.

Vocational training

A second economic reason for the original introduction of food into the elementary state school system was concerned with vocational training for low paid employment, for example servants (Dyhouse, 1977). The teaching of food has a long history of links with industry, though originally this has been limited to preparing the working classes for menial, low paid employment (Whyld, 1983). In the eighteenth century Charity Schools provided training in crafts for future employment and the 'School of Industry' opened in 1799 in Kendal, Cumbria taught bakery for a this reason. The need to produce a skilled workforce in the UK led to an increased emphasis on vocational training in state education. Schools with a technical bias were created in the early years of the twentieth century where senior classes of elementary pupils were given a 'practical' bias to their curriculum, for example 'cookery', though it was emphasised that this should not prejudice general education.

Low status and association with the less able

However, in selective grammar school for more academically able girls, food was taught through domestic science with more emphasis on nutrition and science, with the most able guided towards academic subjects such as Latin and foreign languages. Similarly, in the post war era of 1945 secondary modern schools for the less academically able offered a curriculum with a practical bias for girls with a vocational slant towards catering and the food trades as a preparation for adult life (DES, 1963; Geen, Jenkins and Daniels, 1988). However, both these occupations were relatively low paid and considered low status. Creese (1965) described two main divisions in food related careers, a commercial path for the less able based on household management or catering in a large institution and another from course in domestic science leading to teaching or advising women how to run their own homes efficiently.

Gender

Food preparation, as with other household duties, has a long association with females, and this factor has had a strong traditional influence on the way in which food has been taught in the school system. Educationalists in the nineteenth and early twentieth centuries considered that boys required a different kind of education to girls with domestic subjects for girls and technical instruction or craft design technology (CDT) for boys. Both subjects, the precursors of design and technology (D&T) as we know it today, owe their introduction into the school curriculum to that philosophy. It was thought that girls should be taught how to feed and look after their families and boys how to earn their living outside the home. Domestic subjects were considered essential to prepare girls to be wives and mothers and 1885 saw the beginning of technical instruction or manual to prepare boys for the world of work outside the home to create a skilled workforce (Penfold, 1988; Attar, 1990; Newton, 1990;

Eggleston, 1996). The range of roles undertaken by women during two World Wars of 1914-18 and 1939- 1945, when the men were away fighting, had little effect on attitudes. After the Second World War the rationale for the teaching of food to girls was the need to restore the health of a nation after a period of austerity and to rebuild family life.

Changing social attitudes

Such social attitudes and values were increasingly challenged by educationalists and feminists in the post-war era, where it was recognised that radical changes in the structure and life style of the population and the role of women would continue to have many repercussions on the education system (Crowther Report, DES,1959). Yet, despite these the Newsom Report (DES,1963) looking at the education of pupils aged thirteen to sixteen of average or less than average ability still referred to the need for provision of workshop crafts for boys and domestic crafts for girls. The Sex Discrimination Act (1975) in the UK was a landmark in the provision of a common education for girls and boys, as it made sexual discrimination unlawful in schools and required equality of access to the all areas of the curriculum. A direct result was the need for headteachers to make both 'craft' areas of the curriculum available for boys and girls. This resulted in equality of access but in management terms there was the issue of teaching time available and the introduction in many schools of 'circus' type lower secondary timetable where pupils followed short courses in the entire craft subjects.

Leading up to the introduction of the National Curriculum (DES, 1990), food teachers continued to strive to overcome food teaching's association with the issues of gender, status and the teaching of the less able. Prior to the introduction of the National Curriculum attempts were made to encourage a gender-free approach to the teaching of food, now known as home economics, more attractive to males. Brown (1985) describing his experiences gaining a BSc in Home Economics, included remarks from fellow school pupils regarding 'woman's' work. He felt it would be difficult for a man to become a teacher of home economics because of the traditional view that it should be taught to girls by females. After graduation, it took him some time to find employment as he felt that he was confronting both female and male stereotyping in a female dominated sector of society (Brown, 1988). It was increasingly argued that because of social changes, there was no valid reason to teach a subject that was created as a girls' subject to prepare girls for preconceived traditional female roles in the home (Attar, 1990).

The introduction of the National Curriculum

Although, before the introduction of the National Curriculum in 1990 the term 'technology' had not appeared previously on most school timetables, it was not a new subject. The document 'The Curriculum from 5-16' (DES, 1985) included technology as an area of experience and learning and a particular form of problem solving concerned with bringing about change, of designing in order to effect control. The introduction of National Curriculum Technology (DES, 1990) was a landmark in that it was a compulsory subject for all pupils aged 5-16 focusing on the design process of designing and making and including the traditional practical, craft subjects of CDT and home economics. Though it was recognised by some that the skills and processes used in food, were common to other technological areas this was not a widely held view (Wandsworth, 1986). In food the learning style emphasised using domestic

equipment for practical and investigative activities to prepare meals for the family (DES, 1985). On the other hand, the guidance published for CDT (DES, 1987) emphasised designing practical solutions and creative problem solving activities for boys and girls. As a result CDT teachers were more able to relate to the central philosophy of the design process in the Technology National Curriculum document when it arrived because the CDT guidance was closer to its requirements (Newton, 1990).

Many secondary food teachers were confused and alienated by the terminology used in the National Curriculum Technology Orders (DES, 1990). In the original Technology Orders there was a D&T and an Information Technology (IT) component, but these were later given their own Orders (DFE, 1995a, DFE, 1995b). Though, food was named as a material for designing and making for pupils aged 5 - 16 years, the programmes of study cited few examples related directly to food. Many food teachers felt 'de-skilled' when they considered the implications of the D&T component of the original Orders (Atherton, 1990, p50). Terms unfamiliar to food teachers were used, such as designing, artefacts, systems, environments and mechanisms which was not assisted by the noticeable absence of food specialists advising on the National Curriculum D&T Working Party (DES, 1988). In addition it was now expected that food should be taught as part of D&T not only for secondary pupils but also for children aged 5-11 years, though how this was to be achieved was unclear.

In National Curriculum D&T, as with other materials, the teaching of food technology, as it was now known, required a change of emphasis from the domestic to commercial production (DFE, 1992). The food industry in the UK was then, and continues to be, a large, influential body with the potential for a range of food related high status careers across the gender and ability range. This was a fundamental change from the purely 'domestic cookery' low status image that has for so long influenced the teaching of food within schools. Rigour is demanded in knowledge and application of nutrition and food science and an understanding of the processes involved in product development. There is an emphasis on sensory food evaluation in a methodical, analytical manner and understanding how food can be used creatively to produce a variety of high quality products to suit the needs of a target market of consumers. Food technology now includes knowledge and understanding of the properties of foods, and involves the ability to select and use the appropriate tools and materials to explore these properties for developing food products. There is a need to use designing skills, many of which are generic to other materials used in D&T, together with the appropriate knowledge, understanding and making skills for creative problem solving to design and develop food products for a target market (Rutland, 1997).

For example, when pupils follow a recipe out of a book and just make, copy what other people have designed and made with no thoughts of their own, they are engaged in rote, mechanistic learning without any understanding of the concepts and knowledge underpinning the activity. Such pupils are not designing, being creative, thinking and making decisions: they are only *making*. Food technology requires pupils to be creative, to design and make their own food products based on a sound knowledge of the working properties of foods. A sample brief might be based in the context of a school requiring pupils to develop a low cost, high-energy product for marketing at the lunch bar. Ideas for a range of food products using different

ingredients and skills would be generated, made and evaluated for their suitability against the brief. One food product is then chosen for further development, a specification written and a prototype produced. Consideration would be given to suitable packaging and labelling but not necessarily made, though this has potential for working with graphics colleagues in an integrated project. There is a constant process of investigation, exploring possible solutions and ideas, modifying, evaluating, developing a prototype and evaluating against the original brief. This type of food work is not based on the mechanistic, rote learning of skills, but requires 'thought in action' (Kimbell et al, 1991, p21).

Implementation of food technology in the National Curriculum

In the early 1990's there was a growing consensus, lead by the National Association for Teachers of Home Economics (NATHE), that a new direction for the teaching of food could be found through food technology in the newly introduced National Curriculum Technology (DES, 1990). It was argued that this provided the best opportunities for the future of food teaching in schools as it was an approach that accommodated changing attitudes and values concerned with gender, status and its association with the less able. Food teachers could no longer afford to ignore the pressures of social and economic events, as despite the 'whole' family focus the field has been populated largely by women and had directed its message to a female audience. It was even suggested by some that food teachers were generally politically weak, resistant to change and tended to avoid the political arena of the school staff-room (Lawson, 1993). There was not a general call for the abolition of food but for increased flexibility to find a new direction for the teaching of the subject. There was genuine concern that if food teachers failed to acknowledge that food technology could be successfully taught as part of D&T, there was a danger of losing the subject area from the school curriculum (Rutland, 1997).

Alternative views for food teaching

Food teachers have traditionally valued the link between food and society and the Orders (DES, 1990) implied that this would be lost with the move from a focus on the 'family' towards industry. In the early 1990s' there were food teachers who believed that food should be delivered through the cross curricular themes, for example health education and personal and social education. However at that stage the cross-curricular themes were not examined and did not carry a high profile. A range of curriculum patterns and management practices occur in schools to this day to address personal, health and social education and each can cause problems. Taught outside the core and foundation subjects they can lack co-ordination, become fragmented and be of low status to the pupils. If food is taught in tutorial classes by the form tutor, there will be a lack of specialist knowledge of food and the teaching will be theory based without any practical activity. The essence of pupils learning how to 'make' with food would be lost. Today citizenship, including personal and social education, is a compulsory subject in the English curriculum and there are specialist teachers of citizenship, however, their curriculum brief is very much broader than just teaching food. Never the less, it is important to remember the contribution of food technology to the cross-curricular social, economic, cultural and environmental values.

In the early 1990s there were other problems for the food technology teachers, when within the community of D&T there was evidence of disagreement over the subject areas that should be part of Technology. Smithers and Robinson (1992, p15) thought

that 'being able to cook, use a computer and word processor to fill in forms are affected by technology but are not necessarily part of it'. That cooking, for example, should be given its own slot in the curriculum. A comment indicating that little has changed regarding perceptions of the educational value of teaching food. It was still seen by many as using equipment, learning 'how to cook' and little else. There was no appreciation of the wider value of food technology teaching to promote human well being (Geen, 1992), indicating fundamental differences between how people define or interpret the term technology.

Industrial focus

However, it would be unjust to say that food technology teachers did not take up the challenge. Despite a general lack of in-service training to support their work teachers made every effort to make the necessary changes, though government guidance was provided and a range of teaching materials developed. The change of emphasis from domestic to industry was supported by the production of a range of teaching materials including paper-based resources, videos and CDs. Secondary pupils learnt about health, safety and quality procedures such as hazard analysis critical control points (HACCP), industrial equipment and the manufacturing processes. The industry focus was introduced into the new Food Technology General Certificate of Secondary Education (GCSE) and post sixteen external national examinations, so influencing the food curriculum for pupils aged 14- 16 years.

The emphasis on industry in food teaching has had a positive impact, as it is generally perceived that the status of food has improved. Yet, teachers' concerns were highlighted in a recent national research study, supported by the Design and Technology Association (DATA), investigating teachers' perceptions of changes in food-related subjects. Questionnaires were sent to a sample of four hundred food technology teachers and were followed by interviews with thirty food technology teachers and ten key D&T informants. The study explored teacher's perceptions of the change from a domestic to an industrial focus in food education in England and Wales (Belby, 2005). It indicated that the majority of the food technology teachers in the study had reservations about the emphasis on 'industrial practices'. One of the findings was that the teachers perceived that this was at the expense of developing the practical skills required for food preparation and nutritional knowledge and understanding, factors considered necessary to guide pupils and adults in wise food choices and a healthy life style. It was considered that there was a lack of clarity for the aims of food technology and few of the teachers, though they wished food technology to remain in D&T, were clear about the value of teaching young people about the food industry. It was concluded that there is an over emphasis on industrial food production and a more critical view of the food industry, for example the impact of highly processed foods on children's health, should be encouraged as there is still scope to teach domestic food preparation.

The use of computer aided design and computer aided manufacture (CAD/CAM) has a high profile in D&T and plays an important role in manufacturing in the food industry, but its actual application in the classroom in food teaching is limited. A range of software, including spreadsheets and databases can be used very successfully in food technology, so a more effective approach might be to encourage the use of CAD/CAM in other material area of D&T and develop integrated curriculum projects that include, for example, food technology.

Today, there is growing concern by the public and the government that adults, and particularly children, are not considering the impact of unhealthy eating on themselves in the future. For example, eating 'junk' ready made foods produced by the food industry lacking in proteins and high in fat, sugar and starch at the expense of fresh fruit and vegetables. The government publication 'Healthy Schools, Active Minds: a Healthy Living Blue Print (DfES, 2004) is intended to encourage children to eat sensibly, stay physically active and maintain good levels of personal health. In food technology pupils could consider issues such as the genetic modification of foods and the use of chemically and physically modified starches in the foods the general public eat. It is interesting to note that the links between health and food teaching continue, as they did in the 19th Century, to be important though the issues current today may be different. Today the healthy issues include obesity, diet and cancer, food poisoning, heart disease, hypertension, under nutrition and the nutritional content of meals served to children in schools. Food technology teaching in schools has a major and important role in highlighting and addressing such issues.

Training food technology teachers

The introduction of food technology the National Curriculum for D&T meant that the term 'home economics' was outdated as a title. Overnight experienced home economists had to take on a new title and new teachers entering the profession described themselves as D&T teachers with a food technology specialism. Before the introduction of the National Curriculum the most common route to join the profession for food teachers, as for CDT, was through four-year courses B Ed Home Economics courses combining a relevant subject degree with a teaching qualification and providing immediate entry to teaching. The majority of students on BSc Home Economics courses, that included a one year industrial placement, went into posts within the food and retail industry or welfare, social services with some completing a one year post graduate certificate in education (PGCE) as an entry into teaching (Rutland, 1984).

During 1997-8 The Association of Teachers of Home Economics and Technology (NATHE) became acutely aware a national shortage of food technology teachers, as schools wanted to recruit teachers able to teach the new Food Technology GCSE courses introduced in 1996 for pupils aged sixteen. In the Spring of 1998 NATHE conducted a national survey of higher education institutions, as it was thought that the shortage of food technology teacher was due to a lack of food related degree courses as preparation for teaching. The results indicated that the range of food courses available for pupils leaving school at eighteen years had actually increased, as had the variety of possible careers. The content of many food courses had a strong industrial and business basis. Food degrees were predominately BSc courses and included a high element of food science, food product development, microbiology, nutrition, ICT and communication. There were only two courses that included 'home economics' in their title, but 'consumer studies' was frequently used. There was no shortage of relevant food related degree courses but there were no longer any four year food BA or BSc degree course that included qualified teacher status (QTS) and not all PGCE D&T courses were recruiting food technology specialists (Rutland, 1999; Rutland, 2001).

The degree courses are very appropriate to the content of food technology in schools but there is a disappointing lack of graduates entering the teaching profession due to for a number of reasons. Firstly, a lack of understanding by the public of the changes that had taken place in the teaching of food, secondly very good career opportunities in the food industry and finally, a shortage of ITE institutions that trained food technology teachers. Circumstance that are still relevant today, resulting in the removal by some schools of food technology from their curriculum because of their inability to recruit food technology teachers.

Teaching food technology in primary schools

A positive outcome for the compulsory inclusion within D&T of food technology for primary children aged 5- 11 years, is that essential knowledge of the importance of food for health and basic personal health and hygiene rules are taught to young children. Prior to 1990 D&T food activities were generally limited to 'fun' sessions taught by volunteer parents. In the early 1990s primary teachers lacked in-depth knowledge and were concerned about how to manage the teaching of food safely in a typical primary classroom environment. However, there is evidence that primary teachers have successfully overcome these difficulties using a variety of curriculum materials and resources (Rutland and Barlex, 2000; Barlex and Rutland, 2003b). In addition, food technology is generally taught as part of primary initial teacher education (ITE) D&T courses to support school experience classroom practice resulting in an increased confidence by primary teachers. Primary practice presents ideal opportunities to link the teaching of food to other areas of the curriculum including science and the humanities.

Designing with food

As with other areas of D&T, one of the key issues for food technology teachers in the early days of the National Curriculum was the emphasis on 'designing' and its interpretation by some teachers as a paper based activity and the subsequent loss of practical food based activities. Inspection findings (Ofsted, 1998, 2000) have reported consistently since the introduction of D&T into the National Curriculum in England that designing skills lag behind making skills. That in some schools there is insufficient attention to the processes of designing, particularly for pupils aged 11- 14 years where their experience of D&T is merely a sequence of short focused practical tasks with no opportunity to apply their own ideas in a longer design task (Ofsted, 2002). A government funded research project explored this issue with one year PGCE D&T course and it emerged that the trainees teaching food technology experienced difficulty and expressed particular concern over designing with food (Barlex and Rutland, 2003a; Barlex and Rutland 2004)

A second, on going, government funded research study at the same ITE provider is building on the previous findings with a group of sixteen trainees with food technology as a first or second area of expertise, within a cohort of thirty one-year postgraduate D&T trainees. Six food technology trainees are being studied in depth, three with food technology as a first specialiam and three with food technology as a second specialism. A series of intervention activities focusing on 'designing' are carried out during the course and the preliminary findings indicate that initially trainees with food as a first specialism have the greatest difficulty as the language and approach is unfamiliar. The concepts and techniques of researching, investigating, making and modifying a range of products using a variety of skills and knowledge

before developing a final product is new to them. They tend to think designing is essentially a paper based, 2D drawing activity, for example food package, and do not at first value the use of generic design techniques.

A typical school food technology project for pupils aged 11-14 years in the UK covers eight one-hour sessions and how the other 'design based' sessions are planned and taught is crucial. Otherwise there is likely to be a lack of practical work and the development of 'skills', a predominance of written work with one product made and remade over a number of lessons. In home economics there would have been a series of practical and theory sessions around a unifying theme, for example a vegetarian. It has been noted in the study that trainees with food technology as a second specialist are more able to transfer their understanding of designing from, for example, product design. They understand the concept of a design brief and use a range of design based activities, for example mood, image boards, brainstorming ideas, presenting ideas through sketches and trying out a range of ideas before working on a final design. It is intended to explore how the food technology trainees teach designing in food through classroom observation, their teaching practice file, an analysis of interviews after the curriculum interventions and at the end of each teaching experience.

Conclusions

The paper identified the three key issues of an associated with the less able, low status in the curriculum and gender for the teaching of food before the introduction of the National Curriculum in 1990. Despite changes of name and dedication of the teachers over the years these issues continued to dominate the teaching of food. The introduction of the D&T National Curriculum with the inclusion of food technology for primary and secondary pupils has impacted on how food is taught in schools. On the positive side, the status and associated gender issues have steadily improved. Food technology is more likely to be studied to a higher level by the full ability and gender range and it is taught to young children. The knowledge content is rigorous and requires pupils to combine 'thinking and doing' with an ability to make informed decisions. The learning style is based on problem solving and no longer focuses on rote learning and despite problems in the early 1990s and difficulties recruiting food technology teachers it continues to be popular for pupils aged 14- 16 years. In the GCSE Examination entry for Summer 2003 food technology was the second highest entry with twenty five percent of the total D&T entry (DATA, 2004).

However, there are causes for concern including the need to train more food technology teachers. Secondly, there is a perception by some teachers that the emphasis on industrial practices, including knowledge of equipment and processes in the food industry has been to the detriment of pupils gaining knowledge, understanding and skills in food preparation and factors related to healthy living. Thirdly, the curriculum requirement for the use of CAD/CAM in food technology is another cause for concern, as is the continued difficulty of some food technology teachers to relate to the language, terminology and concept of designing with food. Ways of addressing these issues are urgently required, including discussions with examination boards to review how 'industrial practices' in food technology can be realistically addressed without the loss of the teaching of domestic food preparation. In conclusion, a food technology curriculum that emphasises its contribution towards the future health of the pupils would be a positive way forward.

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