Pupil's perceptions of design & technology education in England and Wales: emergent findings

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Abstract

The curriculum for Design and Technology in secondary schools in England and Wales has been under review. With policy makers questioning not only the position the subject occupies within the curriculum, but also the value Design and Technology holds. As a result, Design and Technology's future, as a subject, is uncertain. Set against a background of policy and curriculum change, this paper presents the findings of a research study designed to elicit the perceptions of, and gain an insight into the way Key Stage 3 pupils (11 - 14 years) view Design and Technology. Utilising the concept of the original PATT Tool (Raat & de Vries, 1986), and building upon the work of previous studies undertaken nationally or globally (de Vries, 1988; de Klerk Wolters, 1989; Bame & Dugger, 1993; Volk & Yip 1999; Van Rensburg, Ankiewicz & Myburgh, 1999; Ankiewicz & Van Rensburg 2001; Becker & Maunsaiyat 2002; Chikasanda, Williams, Otrel-Cass & Jones, 2011; Gaotlhobogwe, 2010; Ardies, De Maeyer & Gijbels, 2012, 2013), the fundamental aim of the research at inception was to investigate the perceptions of pupils with respect to their understanding of what is technology education. Although simplistic in origin, the findings presented illustrate that this is far from the case. Framed epistemologically within a social practice lens (Suchman, Blomberg, Orr & Trigg, 1999), the research tool used was a questionnaire

comprising of a series of open and closed questions. Administered by teachers who recorded both electronically and in hard copy, the sample was drawn randomly via those choosing to respond. Responses were gathered from 173 schools throughout England and Wales with data being collected over an eight month period commencing in July 2012. Analysis of the data elicited a number of key findings which are presented here. Although exclusively based on the perspective of school pupils in England and Wales, it is anticipated that the findings will provide both stimulus and a starting point for researchers working under similar curriculum constraints or revisions. Given the nature of the curriculum changes which have occurred, the research team intend to develop the tool further and expand it to include pupils in the post compulsory age bracket (16 - 18years) and the primary education age bracket.

Keywords

Pupils attitudes, design & technology, perceptions

Introduction

It is important to understand the context from which the study emerged. The authors of this paper were brought together due to a curriculum debate around Design and Technology in England and Wales. (Gove, 2011).

Since the first National Curriculum for England and Wales was published (DCSF, 1989) there have been a number of changes (DfE, 1995; DfEE, 1999; DfES, 2004; QCA, 2007) but drafts of the new curriculum (DfE, 2013) led many within the subject (DATA, 2011) to believe that policy makers were questioning not the curriculum position of the subject but the value and importance assigned to it.

When delivered effectively, the subject engages children and promotes their ability to understand key knowledge sets associated with other subjects, through practical application of theoretical concepts (Sage, 1996). This vision has not always been fully realised, and for too long in a significant number of schools in England and Wales the pedagogical focus of Design and Technology lessons has been product completion (Miller & McGimpsey, 2011). This focus has led to stakeholders being consumed in the drive to create a finished outcome. As a result there has seemingly been limited opportunity for the learner to reflect, and provide them with the potential to generate meaningful constructs (Piaget, 1953).

This, it could be argued is a failing of Design and Technology, which has not gone unnoticed (Ofsted, 2008, 2011, 2013) and has undoubtedly impacted negatively upon the subject. It could also be perceived that Design and Technology is of limited in value and of a lower status (Sayers, Morley & Barnes, 2007).

So how could those researching and supporting Design and Technology best respond? There was clearly a need for evidence to show that the subject is valued by stakeholders. For the authors, one of the key stakeholder groups was pupils. It was decided to use the PATT tool (de Vries, 1988) to provide a starting point to develop a body of evidence from pupils with respect to their understanding of what technology means to them.

Research methodology and methods

This is a mixed methods (Creswell, 2011) study, with the primary research method being an online survey. The ontological and epistemological stance of the researchers, however, leans towards an interpretive approach (Lincoln, Lynham & Guba, 2011), recognising the multiple realities, experiences and understanding of the participants (pupils) regarding their experience of Design and Technology education (Guba, 1981).

The intention of the team was to explore the beliefs of the participants through their experience of learning in Design and Technology, within a social practice framework, recognising the interconnectedness of individuals, and their learning activities in terms of designed and made products (Reckwitz, 2002).

The team were conscious of their own assumptions and beliefs in the value of the subject. The intention of this study was to examine personal expectations and correlate this with previously reported attitudes elicited through prior studies involving the use of the PATT tool.

Ardies et al. (2012, 2013) tested and evaluated the original PATT survey developed by de Vries (1988) and significantly reduced its length. Given their experience, this 'reconstructed' PATT instrument seemed a logical choice for the current study. Their reconstructed instrument had been tested for validity with a significant sample (n=3039) who's findings have been reported within the Design and Technology community.

Predominantly, the responses sought were quantitative, however the survey design facilitated additional qualitative feedback. The data was gathered over a period of eight months, analysis of which was undertaken by the team who are all engaged in Initial Teacher Education (ITE) and as such the ontological position is one of a firm belief in the benefits of Design and Technology education.

Research sample

The selection of participants in this pilot was by convenience sampling (Cohen, Manion & Morrison, 2005), with the survey being deployed through practitioner networks in England and Wales. As a non-probability sample of the population of Key Stage 3 pupils, in this pilot, the study does not claim to be representative of the wider body of pupils, rather to identify a 'snapshot' of pupils' beliefs, experiences and aspirations at a time of flux in the subject. The questionnaire was introduced to pupils by their teacher.

In total, responses were gathered from participants from 173 different educational settings situated throughout England and Wales, yielding 561 individual responses. The questionnaire was designed for completion by pupils within the predefined age group. As such the terminology and reading age necessary to access the questions and hence provide an appropriate response was carefully considered. The questionnaire comprised of short and concise questions, which were based upon, and developed from, the work of Ardies et al. (2012, 2013).

Ethical considerations

The team adopted the guidelines of the British Educational Research Association (BERA, 2011) in designing the study and conducting the data collection. The purpose and scope of the study was clarified to ensure that all stakeholders were in a position to give informed consent to their individual participation in this study.

Presentation of findings

There have been a number of studies considering gender within Design and Technology and the debate about gender within the subject continues (Bell, Hughes & Owen-Jackson, 2013) so the team sought to establish the gender of the respondents. This is something that has been retained from previous versions of the PATT tool including the revised version (Ardies et al., 2012; 2013). Results illustrate an almost equal split between male (48%) and female (52%) respondents.

The team then sought to determine the geographical location of respondents, as they wanted to ensure that the study only considered those affected by the then proposed curriculum changes.

The data shows, over 50% of the respondents live in the North West of England. Over 27% were located in the Midlands with the smallest recorded percentages being attributed to respondents living in the Isle of Man and Wales. This underpins the team's belief that this work should be viewed as a pilot due to a lack of proportional representation.

Next the team sought to establish the age of the pupils taking part in the study (Figure 1). In England and Wales pupils are taught in year groups which equate to their chronological age. Year 7 Pupils are aged 11-12 years, Year 8 Pupils are aged 12-13 years and Year 9 Pupils are aged 13-14 years.

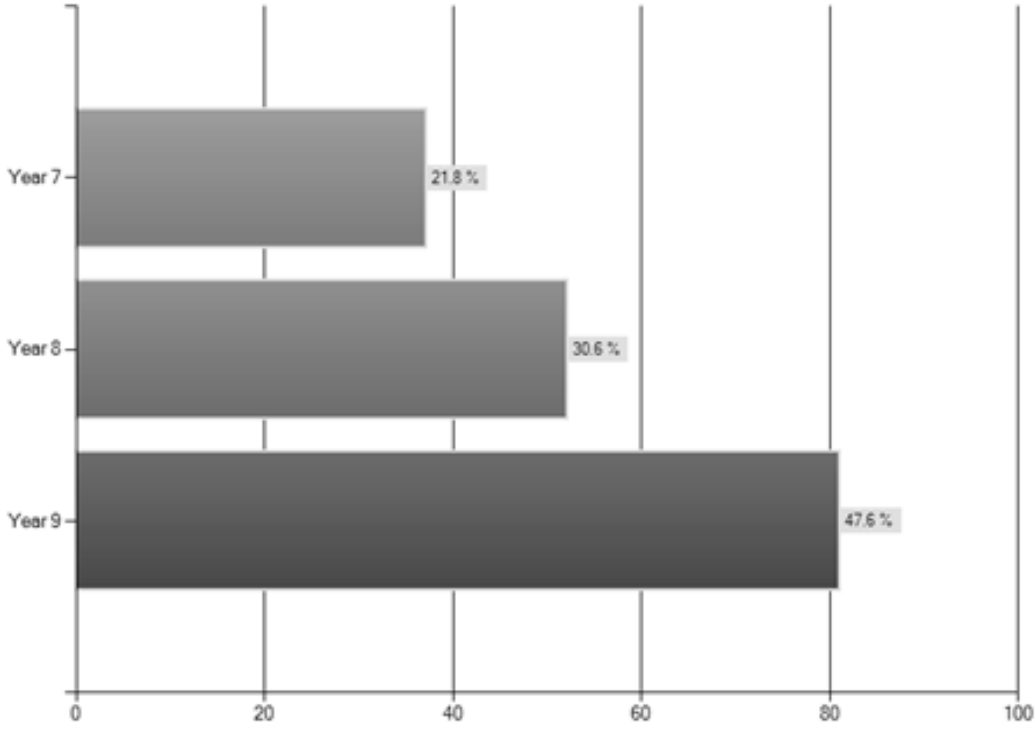

Figure 1. Graphical representation of age groupings of respondant cohort

Typically during Year 9 pupils in England and Wales undergo a selection process to elect which subjects leading to the award of the General Certificate of Secondary Education (GCSE) they will study. So those in Year 9 should have formulated valid opinions about Design and Technology having already studied it for a minimum of two years.

To contextulise the study, the team sought to establish the level of interest the children had in relation to Design and Technology (Figure 2). In excess of 70% of respondants indicated an interest.

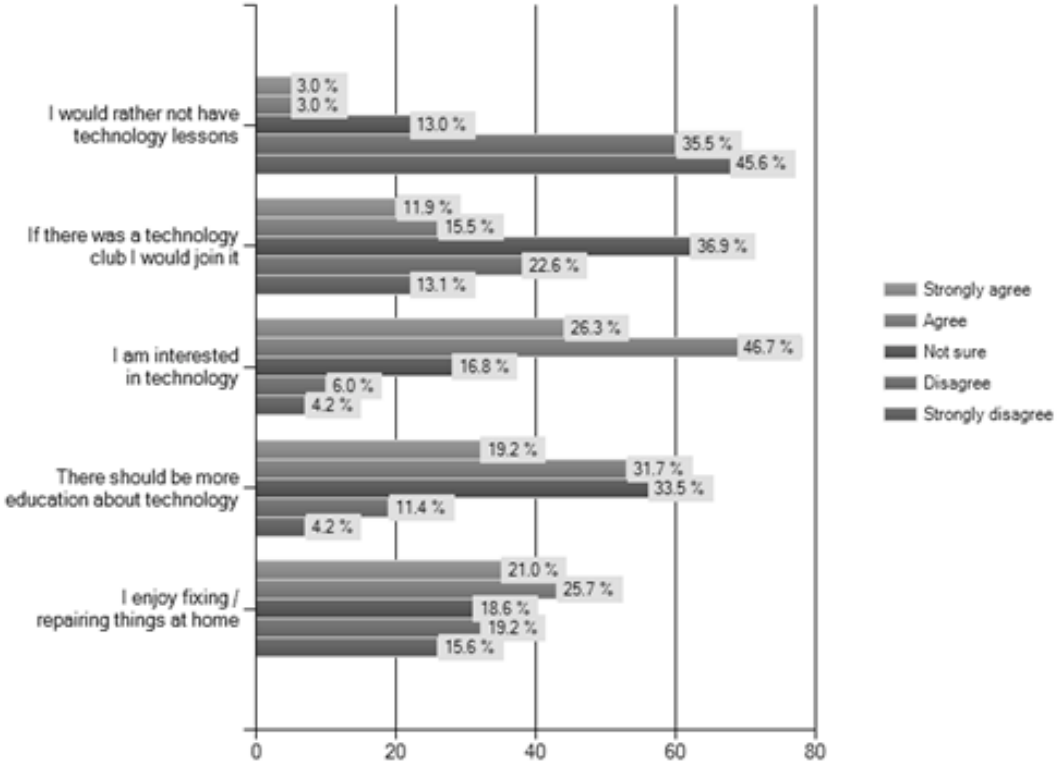

Figure 2. Pupil's interest in technology

The team then used the tool to establish pupil's individual attitudes towards technology (Figure 3). Overwhelmingly, respondents indicated that they perceive technological activity to be of interest in both career based options and personal, leisure based options.

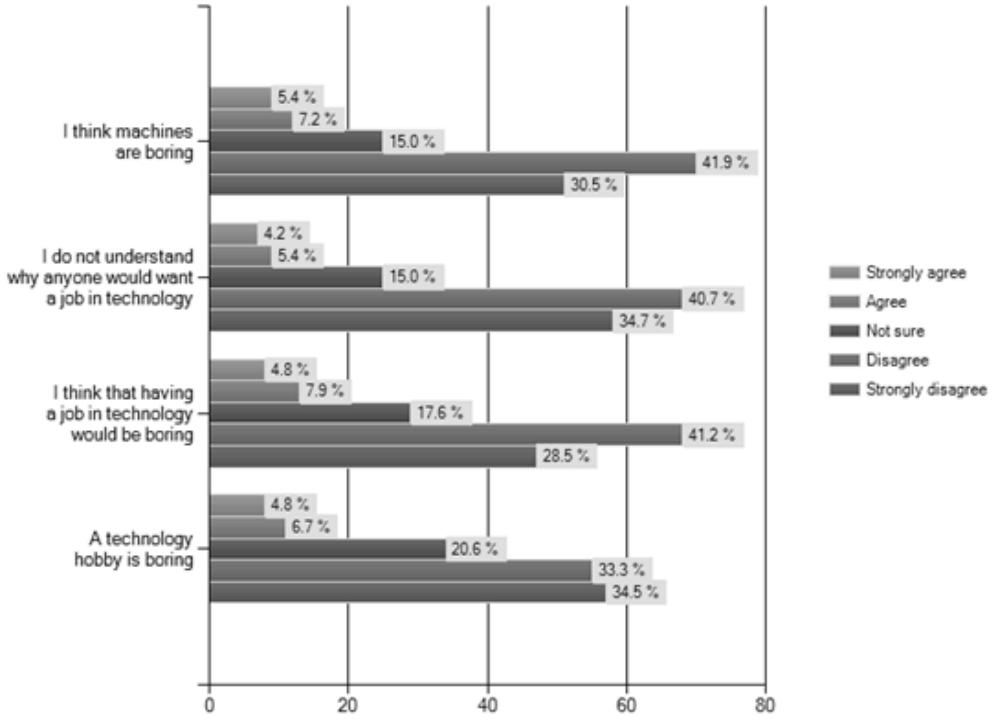

Figure 3. Pupil's attitudes towards technology

The survey then returned to engendered questions; pupils were then asked to respond to a varitey of questions with a gender bias, for example; "*Girls know more about technology than boys*" with 33% reporting uncertainly at this idea (n=185). A similar response rate determined that "*boys are more capable of doing technological jobs than girls*" with 32% either strongly agreeing (17%) or agreeing with this (15%).

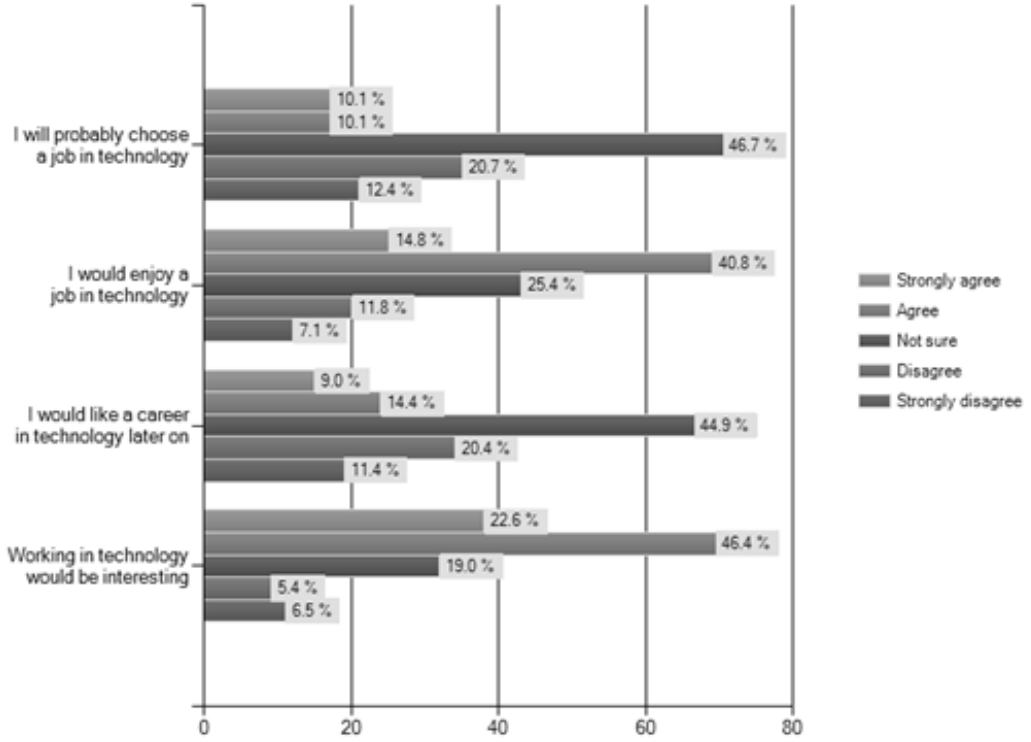

Figure 4. Pupil's career aspirations

Figure 4 highlights a contrast in the perceptions of pupils with more than 55% saying they would enjoy a technology job and 69% saying that it would be interesting, yet only 20% reported that they would choose a job in technology, rising slightly to 23% if they considered their options later.

This illudes to the importance of accurate advice relating to careers and employment highlighting the options and pathways that are open to pupils should they choose to pursue technology.

Having considered career options, the next question determined that all respondants were able to consider the importance of technology in their own personal lives and the wider global context. This was echoed in their belief that lessons in Design and Technology were important.

Pupils were then asked to respond to the statement; '*I think technology is easy*' 36% of pupils responded indicating they were unsure. When asked do you need to be good at mathematics or Science to study Design and Technology? 28% agreed. Only 20% considered they had to be clever to study Design and Technology, only 14% considered they needed to be talented. This suggests that participants in this study believe Design and Technology is an 'easy' subject.

To conclude, the team wanted to illicit further responses if pupils wished to comment, 28% did so. To clarify commentary, responses were grouped according to similarities they exhibited. This yielded the areas/themes shown in Table 1.

Table 1. Response groupings

Response groupings
Those expressing a general interest and/or enjoyment of one area of Design and Technology
Those expressing a deeper interest/and or enjoyment of Design and Technology
Those expressing comments relating specifically to gender issues in Design and Technology
Those who were concerned/desired a 'making' only curriculum
Those who recognised the importance of technology in a wider context

Drawn from these, set against and within the context of the overall data, some interesting findings begin to emerge.

Expressing an interest in a technological career:

The majority of pupils expressed an interest in the subject, and technological hobbies, welcoming a career in the subject as they perceived it to be interesting. Responses lead the team to believe that teachers should work to capitalise on this and promote links beyond the seemingly self-imposed subject boundaries inherent in Design and Technology. Possibly through the use of Science, Technology, Engineering and Maths (STEM).

An easy option:

Data indicated that pupils perceive technology to be easy, so by inference respondents must consider themselves not to be talented or clever. This is in line with findings from the initial study (Raat & de Vries, 1986).

Given huge technological advances over the past decade (Manyika, Chui, Bughin, Dobbs, Bisson& Marrs, 2013), disregarding the idea that the majority of respondents to the questionnaire are indeed talented or clever and assuming a mix of ability in the same cohort, this leads to the conclusion that curriculum tasks are insufficiently challenging.

Gender:

The results indicate that gender is not a barrier to undertaking a technological career and this comment drawn from the survey raises an interesting point.

> "I enjoy doing cooking and sewing more than metal and electronics but I think some people are very sexist towards girls about what they wanna do!"

This highlights that there is still some work to be undertaken to ensure gender equality in areas of the subject at the very least.

Conclusion

From the data it is clear that the majority of respondents in this study enjoyed Design and Technology and they felt motivated to engage in it, mindful that it would likely play some role in their future plans or careers.

However the data illustrates there are significant challenges ahead of the subject if it is to emerge from the curriculum review and become a subject important to the future industrial and technological

aspirations of the nation (DATA, 2011). Not only does this relate to policy makers (Paton, 2013) but the findings presented here highlight that it also relates to the pupils studying it.

Teachers of the subject and those in the wider Design and Technology community have a lot of work to do in terms of educating pupils about the wider implication of the subject and the potential impact it has upon their futures by means of career choices.

Respondents in this study found the subject too easy which suggests work is required to ensure tasks set are of sufficient complexity and challenge to ensure engagement of those undertaking them. This corroborates the thoughts of the head of the schools inspectorate who has contacted all schools in England and Wales highlighting that all future inspections will have a strong focus on stretching the most able pupils (Wilshaw, 2013).

This pilot study also highlights that there is much work to undertake in the field of career guidance, this cannot be left to a single individual body of people (eg. teachers) to affect change. Turning to gender; data collated through this study indicates that there was no significant belief by pupils that one gender had more technological ability than another.

It seems that pupils find that it's too easy and you don't have to be talented or clever to be good at technology, this is maybe why the first proposed draft of the new curriculum seemed to have a post war 'make do and mend' approach to the subject (DfE, 2013) offering little in the way of a creative outcome, devoid of opportunities for challenge and innovation.

There is no doubt that if we, as a Design and Technology community, wish to disengage with the modernisation of our subject, and we do not articulate the benifits and positive impact our subject has, and we only seek to contain the middle achievers in classes without stretching and challenging the most able, then we will continue to see responses like those presented here.

Next steps

The team propose to undertake the following:

- Extending the work undertaken here by undertaking a larger scale piece of work being more representative of the geographic nature of pupil demographics in England and Wales,
- Undertaking an almost identical study since the new curriculum has been firmly embedded in all schools to determine if this new content has had an impact on pupils perceptions,
- Undertaking a pilot within the Primary education sector to see if the ideas formulated and articulated by the age range considered here are formed by the time pupils leave primary school, or if they are shaped and moulded by their secondary education experiences.

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