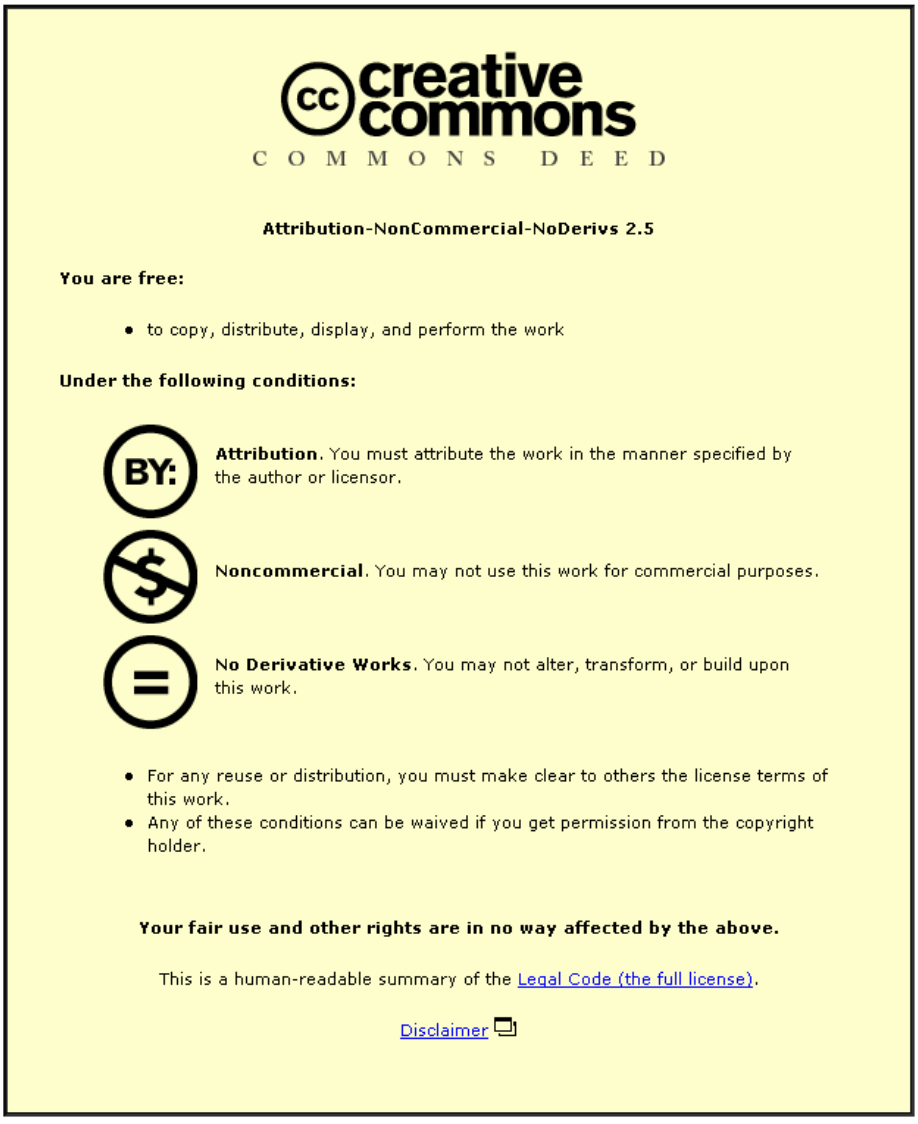

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Reflective and literate boys: can design and technology make a difference?

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Abstract

During 1999–2000 a small scale research project was undertaken to evaluate the impact of a curriculum initiative aimed at increasing literacy skills through linking their development to design and technology. The initiative, the Enriching Literacy through Design and Technology Project, was conducted in Year 2 and Year 6 classrooms in six primary schools in an Education Action Zone (EAZ) in the North East of England. The research compared the impact of the project on these schools with a further group of five schools in a broadly similar locality. The approach that was taken in the project involved integrating literacy and design and technology within activities, each of which was supported by resources that included some form of 'handling collection'. The involvement of the handling collections promoted an emphasis on hands-on exploration and on product analysis.

The research project explored the impact of the initiative in a number of ways. Teachers in both schools completed questionnaires; teachers in the intervention schools were interviewed; the children in both schools took combined literacy and design and technology assessment activities and the children completed an activity evaluation questionnaire. The data provided demonstrated the positive effect on the intervention group in overall terms, and indicated contributions to the development of certain literacy and design and technology skills. One aspect that emerged was the notable positive impact on boys of certain aspects of literacy skills and, where design and technology was concerned, on the development of reflective skills.

This paper will discuss certain concerns that emerge from literature on the underachievement of boys and will consider these in the light of the indications from this new data. It will provide an account of the approach taken through the curriculum initiative and explore how this approach may have contributed to the enhancement of boys' skills.

Keywords: design and technology, literacy, boys, underachievement

Introduction

Gender differences, both in provision of and response to the curriculum, have existed for as long as girls and boys have been included in formal schooling. Since Equal Opportunities legislation in 1975 and the introduction of the National Curriculum in 1990, overt differences in provision have been minimised. In some quarters there was an expectation that if equal access to the curriculum for girls and boys was achieved, that gender difference in performance would dwindle away, but the reality is quite the opposite. Where design and technology is concerned, lack of opportunities for girls and the linked issues of girls' aspirations and attitudes was a major focus in the 1970s and 1980s, but the Assessment of Performance Unit's (APU) design and technology survey of 1988 placed on record the specific differences in performance of girls and boys in design and technology, particularly in relation to the reflective aspects of capability and boys underachievement in these areas. (Kimbell *et al*, 1991) While no large scale survey of the APU type has been conducted since 1988, public examination results such as GCSE have shown a continual upward trend in girls outperforming boys. (Spendlove, 2000) With literacy, a similar picture of boys' underachievement had also been noted through APU studies in the 1980s. The continuation of this trend into the post Education Reform Act (1988) era has been confirmed by

public examination results and highlighted through Ofsted reports.

It was against the background of developing literacy skills that the 'Enriching Literacy Through Design and Technology' Project (Shaw and Stables, 1999) was initiated. The project bid drew attention to the concerns that Ofsted had raised about boys' achievement in English and consequently the evaluation team included a focus on monitoring boys' skills in literacy. While not the initial focus of the research, the team also became aware of data with regard to boys' performance in design and technology, particularly in relation to reflective skills. This paper outlines these findings and addresses the relationship between the findings and the experiences provided by the intervention project. But in advance of this, certain broader issues of gender and achievement are discussed to set a context through which the research findings can be viewed.

Gender issues and boys underachievement

Much of the concern in terms of gender underachievement until the 1990s focused on girls. In technology education, this was highlighted by initiatives such as GIST, GATE, WISE and GASAT, which were variously interested in girls' underachievement in maths, science and technology. But since the 1990s, there has been a twist in the tale, almost to the point of hysteria, concerning underachievement of boys. GCSE results started to paint a clear picture of girls winning 'hands down' in virtually all areas of the curriculum. Some have expressed this as a major concern, voiced by a range of agencies from Ofsted and the Equal Opportunities Commission (EOC/Ofsted, 1996) to the BBC (through the somewhat polemic 'The future is female' *Panorama* programme). Others have pointed to the irony in this situation: girls' underachievement was never such big news.

Research points to different perception of boys' and girls' underachievement. In a historical analysis of boys' underachievement, Cohen (1998) identifies how boys' underachievement is perceived as extrinsic while girls' is intrinsic:

> ... underachievement has never been treated as a problem of boys. The main reason for this is the way the discourse on achievement has been organised and deployed. Boys' achievement has been attributed to something within – the nature of their intellect – but their failure has been attributed to something external – a pedagogy, methods, texts, teachers. The full significance of this becomes clear when the subject of the discourse is girls, for in their case it is their failure which is attributed to something within – usually the nature of their intellect – and their success to something external: methods, teachers or particular conditions. Cohen (1998: 20)

Epstein *et al* (1998) classify the literature on boys' underachievement into three categories: 'Pity the poor boys', in which boys are seen as victims of education; 'Failing schools failing boys', in which places the emphasis on the school and promotes solutions for example through school effectiveness initiatives; and finally the 'Boys will be boys' analysis which takes a biological stance. Whatever the approach to rationalising the situation, there has been a major emphasis in recent years on the search for ways of improving boys' attainment. Put bluntly in the words of John Head:

> The task is not to deny the successes of women but to see what is needed to improve the lot of the young men. (Head, 1999: 6)

However attractive such a single minded task might seem, it runs the risk of painting over more complex realities of gender differences in achievement. In respect of language and literacy development, evidence of differences in attainment of boys and girls has been consistent over the years, for example in 1995, 16.9% more girls than boys achieving grade A–C in English GCSE. Much has been made of girls' early interest in literature and of the different reading habits of young girls and boys, with boys showing more interest in factual, information books and girls more interest in fiction. Millard (1997) suggests that teachers' disappointment in the boys' preference has contributed to the lack of progress in boys' literacy, and that it is more helpful to think of boys and girls as being 'differently literate'. Millard also points to the fact that, whilst there has been concern over boys' underachievement in language and literacy, there has been a lack of curriculum development aimed at addressing the issue.

One of the major shifts in the literature on gender and achievement in recent years has come through the recognition that treating girls and boys as separate homogeneous categories, and using these categories to search for the holy grail of approaches to achieving 'success' is not helpful, as it does not match reality. There is a recognition that it is more helpful to consider differences in gendered behaviours and to see gender as multifaceted: thus it is more helpful to explore

'masculinities' rather than 'masculinity'. In this way it is hoped that, as educators, we can come to a better understanding not just of the realities of achievement, but of the educational constructs and assumptions that can act as barriers to realising a learner's individual potential. This is not to deny the value of looking at gender differences, but to recognise the complexities that lie beneath what might appear as a simple (and often numeric) difference in attainment.

Where does design and technology fit into the picture?

The 'girl positive' initiatives of the 1970s and 1980, such as GIST and GATE, were proactive interventions, specifically targeted at providing experiences and role models which girls could relate to and through which technological skill and understanding could be developed. They were about providing positive learning experiences for girls. Unlike the analysis presented above about intrinsic and extrinsic rationales for gendered performance, there was within these initiatives an approach that assumed that girls had the ability to achieve and that sought to identify ways of motivating girls to engage with design and technology. An important element identified by Grant (1983) was the starting point for engagement in activities and, more particularly, the importance of prioritising values and starting from social issues. Research from science was supported by the experience, for example, of those involved with the GATE project that such a focus gained more commitment from girls. The 'added value' of this is pointed out by Grant:

> Design and technology from social issues ... broadens the scope of the subject and consequently is likely to be more attractive to more girls *and to be of greater benefit to all young people*. (Grant, 1983) (my italics)

Much of the thrust of what evolved over the following years highlighted the importance of taking a values stance to motivate girls in design and technology and, indeed, with the APU design and technology project, we found that, where the context of an activity was centred around the needs of people, girls outperformed the boys.

Another major finding within the APU project focused on procedural skills. Through an analysis of the process of designing the project highlighted the iterative nature of active and reflective skills and found that, where these were well balanced and integrated, we found good performance, where there was an imbalance, a gender effect was noticeable: girls tending to lack the more active skills of generating and developing ideas, boys the more reflective skills of considering issues and evaluating. This was the beginning of research indicating gender differences in designing styles as opposed to motivations and was followed, for example, by Atkinson (1994) and Lawler (1997) relating cognitive style to designing.

Unlike the analysis provide by Epstein *et al* (1998) that identifies approaches to seeking to explain gendered performance, the APU design and technology project set out to explore the nature of capability, and within this found itself discovering insights into gendered performance as a result. Starting from a concern to identify critical aspects of design capability and a belief in assessing authentic performance, rather than knowledge and skill in isolation, has enabled a deeper understanding of the different ways of operating effectively in design and technology and of supporting differences in learners which may or may not be gendered. Thus the data can be used to inform, not to stereotype. This view accords with more recent general research into gender that sees multifaceted abilities rather than a cut and dried boy/girl divide. Some might argue that a critical precursor of this perspective was the approach advocated by, amongst others, the GATE project, that promoted a broad and humanistic vision and that has encouraged the rewarding of applied rather than pure knowledge, as is alluded to by Murphy and Elwood in their comparisons between science and design and technology assessment.

> While a girl's typical contextualised response might be devalued and misinterpreted in a science and maths situation, the converse occurs in design and technology. The APU surveys in design and technology found, for example that girls were ahead of boys on identifying tasks, and investigating and appraising ideas. Girls, in addition, dramatically outperformed boys on evaluating products. Many assessment tasks in design and technology give value to responses that reflect a broad perspective and which recognise human needs. (Murphy and Elwood, 1998: 170–1)

Insights from evaluating the Enriching Literacy through Design and Technology Project

The Enriching Literacy Through Design and Technology Project sought explicitly to improve literacy skills and hypothesised that the Project would make a particular impact on boys. The evaluation of this project was overtly looking for

evidence that would confirm or deny this hypothesis. Where design and technology was concerned, the evaluation had not anticipated any differential impact on performance between genders.

The Project itself was set up to operate with Year 2 and Year 6 classes. A resource was prepared which structured three design and technology projects (one each term) that had literacy skills, linked directly to the Literacy Hour, embedded. Following the success of previous work, each project had a central focus on product analysis activities, supported by a specifically chosen handling collection. Each project involved the children in designing and making, in keeping a structured workbook and in utilising and developing a range of literacy skills involving speaking, listening, reading and writing. The teachers were given in-service training and a limited amount of classroom support whilst the project was under way. All material resources were provided.

The evaluation involved gathered feedback from teachers by questionnaire and semi-structured interview. Teachers in the control schools also completed a questionnaire of background information. The team also observed INSET sessions and reviewed samples of children's work. This gave valuable insight into the approach to learning and teaching enshrined in the project and two features were particularly noticeable. The first was the direct, experiential learning made possible through the handling collections – an approach that has a particular value in design and technology (Stables, 2000a&b). The second was the way in which the activities were contextualised – using stories that engaged the children's imaginations, creating situations in which the children had very real issues to consider.

Data was collected from the children in both schools undertaking an assessment activity, based on a handling collection and also contextualised to give a clear set of issues to be addressed, that involved both design and technology and literacy skills. The assessment activity was derived from an approach to performance based assessment, which promoted a short, focused design activity managed through a structured response booklet (Stables and Kimbell, 2000). Each child also completed an activity evaluation questionnaire.[1]

In discussion, the teachers conveyed that the greatest impact on the children had been created by linking the literacy and the design and technology in a way that helped the children develop their thinking skills. One teacher's comments indicate the power of this link: 'development can be seen in their booklets from one project to the next. Thinking about things, considering design features that they never thought about before. More interested in the world around them' (T.No 1A/6)

Most teachers commented on how the project supported the children in 'stopping and thinking', in being more reflective and 'thinking about the reasons 'why' things will work'. As the project had actively encouraged reflective skills through the product analysis activities and had then reinforced these through linking them to literacy tasks, these comments were very encouraging to hear. One teacher went on to say 'the less able are more confident to write and word build, able boys who were reluctant writers are now less so. (T.No 3A/2)

The findings from the assessment activities further reinforce these comments. For literacy, there is a clear indication that, where the children are using writing in context (as in 'genre' and 'writing for the reader'), the project has supported the children well, and in most aspects this holds well for boys as well as girls. Figures 1 and 2 indicate the differences between the 'A' schools (the project schools) and the 'B' schools (the control schools) broken down by gender. Although the research was only based around a small sample, this finding is particularly interesting in the light of comments from Ofsted on the most recent inspections in primary schools.

> The teaching of basic skills of literacy and numeracy through design and technology is weaker than in most subjects ... Where the work is at its best, pupils are taught to select and use a variety of communication techniques, often judiciously mixing drawing and writing in annotated sketches. They also frequently emphasise sequencing in both predicting and reporting their work. (DfEE, 2001)

This description of best practice from Ofsted mirrors the approach taken through the project. The

[1] For more information about the structure and findings of the evaluation project see: Stables, K. et al (2001) Enriching Literacy through Design and Technology: Evaluation Project Final Report, London: TERU, Goldsmiths, University of London.

Rogers, M. and Stables, K. (2001) 'Providing Evidence of Capability in Literacy and Design and Technology in both Year 2 and Year 6 Children: Alternative frameworks for assessment', Paper accepted for CRIPT conference, July 2001

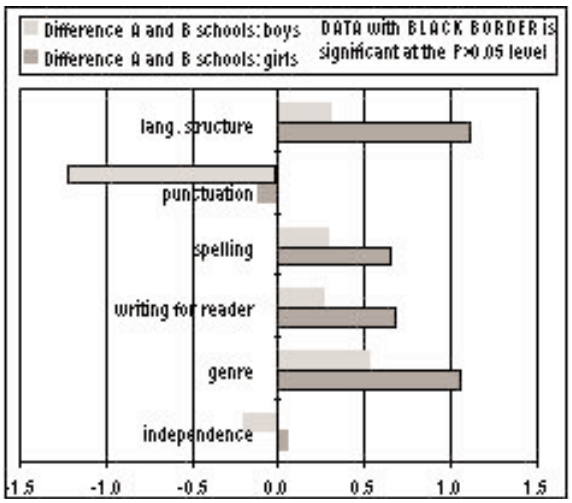

Figure 1: Literacy Year 2 Comparing A& B schools by gender.

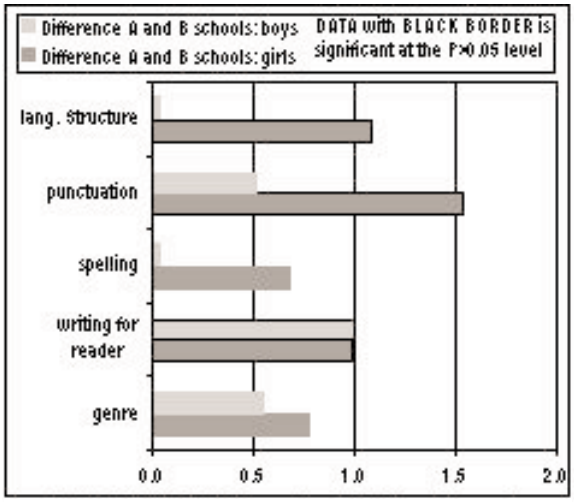

Figure 2: Literacy Year 6 Comparing A& B schools by gender.

predominance of the project schools in design and technology is even more marked. In Year 2 the differences between project and control schools are significant at the >.05 level in every instance and in year 6 this holds true for girls, and half of the areas for boys. What is most interesting, is that it is in reflective skills where there is the greatest difference for boys. In the case of Year 6 these are the areas where there is statistically significant differences and in Year 2 the reflective skills are also amongst the highest differences. In both cases, generating and developing ideas (the center ground of active skills in the APU project) is the aspect where there is less difference between the boys. Figures 3 and 4 show these differences.

The children's evaluation of the assessment activity, which was collected through a series of questions about the child's enjoyment of different aspects of the activity, each of which had a 'Likert type' scale of 'lots and lots' to 'no' (indicated for Year 2 by 'smiley faces'), generally showed that all the children enjoyed at least some aspects of the activity but that the project school children's enjoyment was greater. One particularly interesting finding occurred when Year 6 were asked to tell us whether they generally enjoyed reading and the boys in the project schools had a higher mean than both the boys *and the girls* in the control schools.

So, this small-scale project has indicated that, given a certain type of very practical, structured and 'hands-on' learning experience, aspects of boys' development can be enhanced. If this were to be replicable on a larger scale, there would be some very important messages. The literacy skills were developed very much 'on task' and the nature of the task was carefully developed from two important drivers in the design and technology curriculum: the contextualisng of the task through an issues base, as identified through early

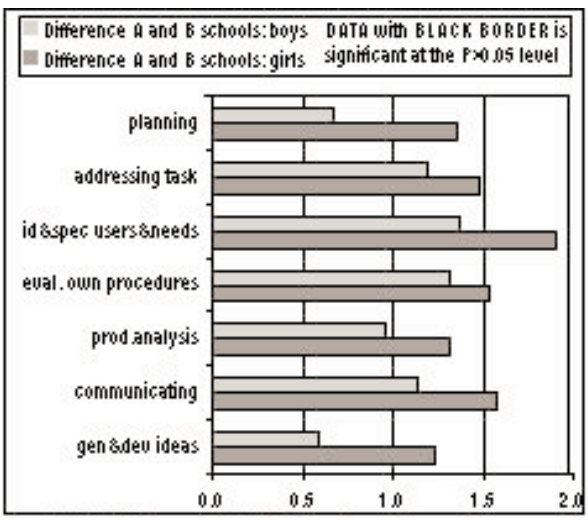

Figure 3: D&T Year 2 Comparing A& B schools.

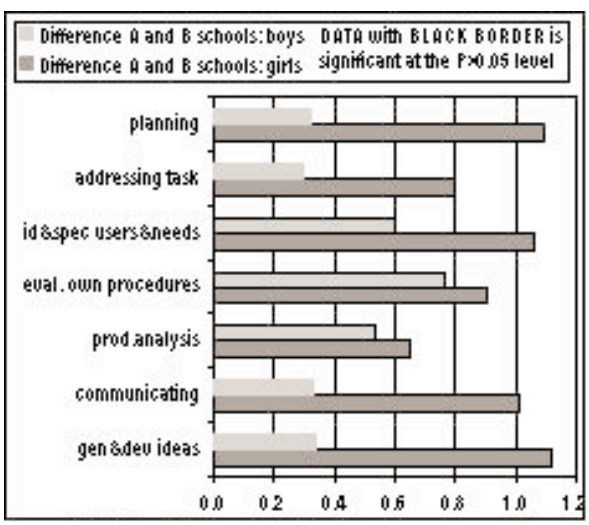

Figure 4: D&T Year 6 Comparing A& B schools.

initiatives such as the GATE project and the use of hands-on experience facilitated through the handling collections. While this paper has focused on the impact on the boys, it is true to say that the impact on the girls was potentially even higher. But the project gave insight into aspects of development where no previous research data exists – such as the reflective skills of young boys, so comparing the boys and girls is not necessarily helpful. What is both interesting and important is that the activities provided by the project that have created this impact, have been curriculum driven, derived from what has come to be recognised as good practice in design and technology, rather than from the introduction of remedial activities, aimed specifically at compensating a particular gender. A larger scale survey now beckons, in order that we can have a fuller understanding of the impact of the design and technology curriculum on children's learning across the formal years of schooling.

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