

Masculinities and Femininities in the Design and Technology Classroom

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ABSTRACT

Design and Technology is a secondary school subject that is perceived by students to be masculine and has been documented by the literature as an environment that can be considered off-putting to non-laddish masculinities and femininities. This paper posits that dominant forms of masculinity and femininity, and the characteristics that make up these forms, are highly dependent on the context in which they are being observed. Furthermore, the paper presents the findings of a small, qualitative group interview with four girls at a private secondary school in a deprived area of East Anglia. The participants were asked about their perceptions of whether specific tasks, artefacts (e.g., clock), and projects were masculine, feminine, or neutral to document which parts of the subject are most associated with masculinity. The study found that the participants' perceived confidence in the workshop to be a masculine trait, as well as any tasks or projects related to electronics or robotics. Conversely, working with textiles and creating similar projects were considered feminine. Tasks and projects that focused on problem solving, and using materials other than electronics, robotics and textiles were neutral. The paper also found that general practical tasks and building projects were considered neutral, though the participants perceived that their (masculine) teachers did not believe they were competent.

Key Words: Masculinity, Femininity, Design and Technology, Tasks, Projects

1. INTRODUCTION

This paper seeks to explore how specific tasks, practical outcomes and projects taught in secondary Design and Technology (D&T) lessons were perceived by the participants to be masculine, feminine, or neutral. The paper adopts Connell's (1989; 2020) definitions of masculinity and femininity: that the collective social practices that make up cultural understandings of gender structures (Connell, 1989; 2020) masculinity and femininity are not fixed, and come into place as people act (Connell, 2020). As such, multiple versions of masculinity and femininity can be seen throughout different microcosms of society (Connell, 2020), and thus, it is essential to explore how masculinities and femininities are manifested in the D&T classroom specifically. Indeed, the practice of categorising different forms of masculine or feminine identities in schools is seen often within the field. To name a few, we have 'pussys', 'fags', 'wimps' (Schippers, 2007), 'cool guys', 'swots', 'wimps', 'Cyrils' (Connell, 1989),

'super-girls', 'mean girls', 'ladettes' (Ringrose & Walkerdine, 2007), 'geeky girls', 'tomboys', 'mosher girls', 'lesbians', 'girlies' (Renold & Allen, 2006), 'tomboys', 'girly-girls' (Paechter, 2010), 'lads' (Francis, 1999; Dixon, 1996), 'spice girls', 'tomboys', 'nice girls', 'girlies' (Raey, 2001). Further, each category had characteristics, appearances, and assumptions that the participants understood on a local scale. Thus, this paper aims to explore the dominant forms of masculinity and femininity within the participants' school and the behaviours and perceptions of masculinity and femininity in their D&T classrooms.

2. LITERATURE REVIEW

2.1. Masculinity and Femininity in Schools

Establishing the versions of masculinity and femininity that afford social capital within the context of that specific school is vital to forming a holistic picture of the participants' belief structures. For example, within state-school settings, being middle-class, well-behaved, and academic was regularly found to count against children's social capital. Raey's (2001) 'nice girls' were categorised by other children in the class as being boring, unpopular, and well-behaved, with Raey (2001) observing that these individuals were all white, academically intelligent, and middle-class, which were contrasted with the dominant working-class majority. Likewise, Connell (1989) noted a similar status for 'Cyrils', who were academic, middle-class boys in a working-class school, where the dominant qualities of masculinity are often sporting prowess and toughness. The subordination of academic intelligence within certain schools can be understood as a rejection of middle-class femininity, with boys who display this version of femininity being effeminised by their peers and posing a threat to social order (Connell, 1989; Raey, 2001; Schippers, 2007). One way power can be claimed back by low-attaining boys is through adopting 'laddish' behaviour (Connell, 1989; Francis, 1999; Schippers, 2007), defined as "white, working-class and anti-school" (Francis, 1999, p.357). Thus, boys and girls enacting non-laddish versions of masculinity or femininity, such as academic intelligence, are perceived as contaminating and threatening to social order. The social hierarchy must be balanced through establishing academic ability with low social capital.

Of course, the construction of masculinity requires internal regulation and self-control of social and sexual instincts. To explain this, Dixon (1996) applied Berger's (1972) concept of the male gaze; an idea usually applied to how women learn to see and scrutinise themselves through the imagined gaze of the heterosexual man. Instead, Dixon (1996) called for the 'male gaze' to be applied to how boys learn to see, scrutinise, and self-regulate their behaviour and appearance to align with the dominant norms of heterosexual masculinity. Similarly, Paechter (2006) suggested that individuals learn to see themselves through the eyes of another when operating within a particular social group and are regulated by the group and by themselves. Further, the group norms are created in opposition and dichotomy with other groups (Connell, 1989; Raey, 2001; Schippers, 2007; Paechter, 2006). For example, just as masculinity is in dichotomy with femininity, the girly girl is dichotomous with the tomboy (Paechter & Clark, 2007). Thus, which version of masculinity or femininity is deemed desirable or cool depends on the environment and school in which research is conducted, as masculine or feminine identities are often constructed just as much from what they are *not* representing, as what they are.

2.2. Masculinity, Femininity and D&T

Within secondary schools, some subjects are found to be associated more with masculinity than femininity. For example, Physical Education (PE) (Paechter, 2003; Clark & Paechter, 2007; Paechter, 2010), Science, Technology, Engineering and Maths (STEM) subjects (Francis et al., 2017), and D&T (Paechter & Head, 1996; Dixon, 1996; 1998). Likewise, specific forms or versions of masculinity are associated with these different subjects within the spectrum of masculinity. For instance, D&T and PE appeal to many of the qualities associated with laddishness. This could be due to the physical nature of working with one's hands, which was considered a working-class masculine endeavour, and the taking home of D&T artefacts as a symbol of working-class manhood (Paechter & Head, 1996). This perceived working-class status of D&T and PE, and subsequent appeal to laddish boys, meant that teachers of D&T and PE formed close relationships and associations with "disaffected and working-class boys due to their more informal teaching arenas" (p.24). Here, boys could display laddish behaviour, often without punishment, creating an environment where 'mucking around' became the main aim of the lesson (Dixon, 1996, p. 150). As a result, to control this 'rowdy' behaviour, teachers of D&T need to display domineering 'chief wolf' type teaching styles to maintain control of rowdy or laddish behaviours (Anglim, 2021). Indeed, this teaching and behaviour management style can be off-putting to non-laddish, high-attaining, and feminine types of students (Anglim, 2021; Dixon, 1998). Thus, this could be one of the reasons why D&T is perceived as the domain of working-class masculinities (Dixon, 1996; 1997; 1998). Thus, the masculine identity of the subject has been repeatedly perpetuated and reinforced by both students and teachers.

Due to these masculine associations, certain girly-girl, super-girl, or nice-girl versions of femininity may be formed through resistance to masculine subjects like D&T or PE (Paechter, 2003). Also, many of the qualities required to be good at subjects like PE and D&T are associated with masculinity, e.g., physical strength, competitiveness, aggression, and large stature; thus, if wishing to exert femininity, there is a reluctance to be seen as to be good at them (Clark & Paechter, 2007; Dixon, 1996; 1998). Correspondingly, the literature suggests that girls tend to be more nervous around tools and practical tasks, with teachers perceiving that they need much more encouragement and reassurance when tinkering or building (Dixon, 1996; Paechter, 2006; Anglim, 2021). However, Anglim (2021) found that when teaching single-sex classes, teachers reported that girls were more confident, even when tackling masculine materials such as electronics and programming, potentially due to the removal of stereotype threat (Anglim, 2021). Such initiatives have been implemented via interventions designed to facilitate femininities in the D&T and encourage girls to tinker and build confidence in the workshop.

Furthermore, creating spaces for girls to operate safely and openly within the masculine domain of the D&T workshop allowed girls to feel protected and playful and removed the fears they had about being the only girl in D&T (Betser et al., 2022; 2019; Betser & Martin, 2018), and encouraged them to take on more valued, non-stereotypical project roles in group work (Betser et al., 2019; Buchholz, 2014). However, facilitating single-gender D&T environments in the timetabled school day is potentially logistically complex and would require more than just the classroom teacher's input. Likewise, it takes more of an essentialist perspective on masculinity and femininity. It considers children as simply boys and girls, while we already know that there are laddish boys, academic boys, tomboys, and girly girls.

3. METHODOLOGY

This study forms a preliminary phase of a larger body of research performed as part of the author's ongoing PhD in Education at the University of Cambridge. The study was undertaken at a private, mixed-gender secondary school in a deprived area East Anglia, and the participants were four Year 9 girls. Data collection took one afternoon. During the study, the participants were asked to answer a series of questions and undertook several activities during semi-structured, photo-elicitation group interviews. The interview was audio recorded and then transcribed. During the interview, the participants were asked to consider the activities they might do during a D&T lesson. Once the participants had established the list, they considered and discussed whether those tasks were masculine, feminine, or neutral. Following that, the interviewer gave the participants a set of 22 photographs of D&T artefact outcomes, e.g., images of completed projects such as cotton tote bags or steel paperweights. The participants were asked to rank them in order of most masculine to most feminine. Next, the participants were presented with eight sample D&T projects, and the interviewer provided an explanation and visual guide as to what would be involved in each project; e.g., participants were presented with visual examples of the planning, designing, and making stages of each project. The participants were asked to order the projects from most masculine to most feminine.

4. FINDINGS

Table 1.

Participants' perceptions of masculine, feminine and neutral artefact outcomes in D&T

Most masculine to most feminine	Artefact Outcome
1 (most masculine)	Raspberry Pi arcade machine
2	Kitronik robotics project
3	Lego Wedo robotics project
4	Kitronik soldered electronic memory game
5	Speaker/radio project
6	Metal paperweight project
7	Pine trebuchet project
8	Electronic steady-hand game
9	MDF phone stand
10	Pine bird box
11 (neutral)	Wooden box
12	Architecture project
13	E-textiles pencil case
14	Clock (free design)
15	Designing Our Tomorrow Asthma Challenge
16	Sensor project
17	Clock (Memphis style)
18	Pewter keyring
19	Cotton tote bag
20	Micro:bit moisture sensor plant watering
21	Embroidered cushion
22 (most feminine)	Upcycling

Table 2.

Participants' perceptions of masculine, feminine and neutral project processes.

Most masculine to most feminine	Project title	Project process
1 (most masculine)	Kitronik Soldered Electronic Memory Game	Creating a digital mood board of memory games Learning about resistor values and how to read them. Soldering.
2	Wooden Pine Trinket Box	Creating an isometric drawing of a trinket box. Practical lessons completing the project.
3	Memphis Clock Project	Completing a product analysis of an existing Memphis product. Design specifications. Designing the clock. Making & decorating the clock.
4	Designing Our Tomorrow Designing for the Elderly Project	Task analysis using simulation gloves and glasses to role-play what it might be like to be elderly. Ideation and designing. Prototyping using card. Improving the prototype. Creating a model using MDF. Final prototype.
5	Sensors & Programming Project	Soldering a sensor. Learning how sensors work in the world around us. Programming the sensor. Creating the prototype. Creating a poster explaining and evaluating the final prototype.
6	Biomimicry Plywood Photo Holder	Collecting images of plants. Sketching the plants. Finding abstract shapes in the plants. Creating plywood formers in the shape of abstract lines. Constructing the frames.
7	Designing Our Tomorrow 'Asthma Challenge'	Learning about the problem of infant asthma. Role-playing and learning about the wants and needs of various stakeholders. Developing design ideas. Creating the designs. Evaluating the designs based on stakeholder wants and needs.
8 (most feminine)	E-Textiles LED (light emitting diodes) Pencil Case	Creating a mood board of different pencil case designs. Learning about circuits. Creating design ideas and competing WWW/EBI for each. Creating final design.

5. DISCUSSION

5.1. Existing Understandings of Masculinity and Femininity

Given that the extant literature argues that masculinity and femininity are not fixed and depend on the context in which they are being observed, it was necessary to gauge what masculinity and femininity looked like at the school the participants attended. At the start of the interview, the participants were asked to articulate their understanding of masculinity and femininity and what sorts of characteristics and behaviours were evident in dominant (popular) masculinity and femininity at their school. The group's definition of masculinity was 'a guy' who was muscular and tough. For femininity, it was having long hair, softness, wearing dresses and being 'girly'. No reference was made for being a 'girl' when describing femininity. When describing the qualities of popular masculinity, the participants detailed being good at rugby, having a specific hairstyle, being cheeky in lessons, being tough, and possessing a big personality. Toughness and sporting prowess as markers of hegemonic masculinity have been discussed and reflected in the literature (Paechter & Head, 1996; Connell, 1989; Paechter, 2003; Clark & Paechter, 2007), as well as displaying disruptive behaviour in the classroom (Dixon, 1996, 1998; Anglim, 2021; Francis, 1999; Connell, 1989). For defining dominant femininity, the participants described a specific popular girl in their year, which was being sporty (playing netball and hockey, specifically), being academic, being funny, and if you were an 'older one', then wearing make-up and being 'girly' were also important. Indeed, being good at sports, girly, funny and academic speaks to the pressure girls face for needing to 'have it all' through carefully balancing elements of masculinity (sporting ability) with femininity (Skelton, 2010), each aspect of this identity requiring time and effort to achieve (Ringrose & Walkerdine, 2007; Raey, 2001). The knowledge of the participants' existing understanding of masculinity and femininity and the hegemonic forms of each was essential to establish before exploring their perceptions of masculine or feminine tasks, artefacts, and projects in D&T.

5.2. Masculinity and Femininity in D&T

Indeed, it is inevitable that the participants' perceptions of specific tasks in D&T as either masculine or feminine are entirely subjective and were informed by their personal experiences of D&T. Nonetheless, the participants had clear ideas and opinions as to which tasks were masculine, feminine, or neutral. For example, when creating their list of D&T tasks, participants perceived any task with programming or electronics as masculine, which aligns with much literature surrounding girls' perceptions of Technology and computing (Coulter, 2023; Weibert et al., 2014). Likewise, any tasks involving textiles and fabrics were perceived to be feminine. Further, while discussing project outcomes (Table 1), the participants made distinctions and generalisations between masculine and feminine project outcomes, with one of the opening statements made during the activity being, "*Anything to do with textiles is feminine*", with the rationale being that only two boys were doing it in Year 9, whereas robotics and electronics were generally masculine. However, contradictions arose here in their earlier statements surrounding D&T tasks, and their perceptions of outcomes and projects in Table 1 and Table 2. In fact, while perceiving any task to do with programming and electronics as masculine, we can see that many of the outcomes and projects that involve these are not always perceived as masculine, and the textiles pencil case is neutral in Table 1. The micro:bit and e-textiles were not associated with

masculinity, despite involving coding/programming and electronics. Perhaps the strong associations between femininities and caring (the sensor project was for a baby product and a plant feeder) and femininities and textiles (the e-textiles pencil case) overpowered the perceived masculinity of programming or electronics.

Moreover, the literature suggests that combining an intensely feminine material with a strongly masculine one leads to a neutral product and encourages engagement with opposing gendered materials. For instance, e-textile projects have successfully challenged stereotypical attitudes towards creating products using textiles (associated with femininity) or electronics (associated with masculinity). For example, Coulter (2023) found that using e-textiles in a longitudinal group-working cross-curricular STEM and design challenge could degenderise the pupils' thinking, especially towards textiles. Similarly, Weibert et al. (2014) found that boys and girls could engage equally using e-textiles and sewable programmable components, reducing gender-stereotyped behaviour. It was the case in the current study that the participants perceived the e-textiles pencil case to be quite close to neutral on the scale of masculine to feminine artefact outcomes (Table 1), though when the e-textiles project process was considered (Table 2), it was perceived to be the most feminine project out of all the projects. Interestingly, this demonstrates that thinking about the project processes involved can be perceived as more or less feminine/masculine than the resulting artefact, or the act of completing a task associated with the project, i.e., a pencil case is neutral (Table 1), but sewing and using textiles, and the pencil case project process (Table 2), is perceived as feminine.

Both Coulter (2023) and Weibert et al. (2014) emphasised the importance of scaffolding projects that focused on presenting problems for children to solve using e-textiles and programming as part of a material solution, with a focus on pupil creativity and ownership as opposed to emphasis on producing polished, identical end outcomes. However, the participants did consider projects and outcomes that focused on solving problems to be gender-neutral, which supports the importance of scaffolding and encouraging a problem-based learning approach. Interestingly, the participants rated project processes that focused on the practical making aspects as more masculine than those that focused more on designing, prototyping, iterating, and evaluating. For instance, the two projects that were considered most masculine were the electronic memory game and the pine trinket box, both of which had minimal designing activities and instead required pupils to learn about resistor values or complete an isometric drawing. Both projects were taught this way in Year 7 at the participants' school.

The participants perceived problem-solving in D&T to be a neutral task during the interview discussion, and projects and outcomes that encouraged or demonstrated open-ended solutions (such as the Designing our Tomorrow projects, or the sensors) were also considered neutral or feminine. However, when thinking about tasks in D&T when everyone was making their own individual/unique project in D&T was perceived as masculine. Everyone following instructions to make the same thing was perceived as feminine. This is somewhat contradictory, given that problem-solving projects tend to involve everyone making their own individual/unique project.

However, the participants frequently discussed and referenced the confidence and arrogance of the boys in their D&T classes and held firm beliefs that boys wanted to make products for themselves, regardless of the project brief. Indeed, the perception of confidence within the D&T

workshop was perceived to be masculine, which reflects findings of the existing literature (Dixon, 1996; 1997, 1998), despite the elapsed time between the literature and this study. Further, this perceived masculine confidence was met by irritation by the participants, who were dissatisfied with boys' domination of the D&T workshop, again aligning with the literature on this topic (Dixon, 1996; 1997, 1998). This frustration appeared to stem from the fact that the participants particularly enjoyed the prospect of creating and coming up with their design ideas, with some of the projects in Tables 1 and 2 sparking excitement. Similarly, unlike suggestions from the literature (Dixon, 1996; 1997, 1998; Anglim, 2021) and the author's pre-existing assumption, the participants enjoyed the subject's practical elements.

However, while the participants expressed their enjoyment of practical tasks working with materials such as wood, metals, CAD/CAM, and plastics, they believed that their teacher, whom they identified as being highly masculine, did not perceive them as being capable of completing specific practical tasks to do with these materials. For example, while discussing using saws to cut wood or using the laser cutter, the girls explained how their male D&T teacher would often get a boy to help them or complete their work without the girls wanting this to happen. Further, the girls explained that they believed their teacher did this because he thought they did not know how to do it properly, which they found frustrating. In this instance, rather than allow them the opportunity to complete the task on their own, their project is handed over to a boy to complete. Likewise, by removing the participants' opportunity to persevere with their practical tasks, they could not build familiarity with the procedure, which, if left to complete it independently, could have built their confidence with the task. Interestingly, the girls did not categorise many other tasks and activities involving material manipulation as masculine. For example, working with wood, metals, plastics, CAMs, 3D printers, sanding, gluing, and using screws were all deemed neutral tasks. The participants' perceptions of masculine and feminine tasks illustrate how careful teachers must be when implicitly implying that girls cannot complete a specific task.

In conclusion, according to the participants in the context of this school, masculinity and femininity have distinct identities, with certain qualities such as appearances, academic abilities, sports played and mis/behaviours in class being essential factors in defining such status as masculine or feminine. Likewise, in the D&T classroom, specific tasks, product outcomes and types of projects are also considered masculine or feminine. In this case, the participants considered that confidence in the D&T workshop and engaging with a more experimental approach in D&T were masculine, and focusing on solving problems and considering the needs of others were feminine. In contrast, those that focused on skill building, rather than design thinking/problem solving were more masculine. As teachers, we must understand the gender rules within the specific context we are working within to ensure projects are as inclusive and appealing as possible. Indeed, for D&T to be genuinely inclusive, projects should be problem-focused instead of skills-focused, and teachers should be cautious about asking boys to help girls with their work when assuming that girls do not enjoy the practical elements of the subject.

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