

# Gender Differences in Website Design: Implications for Education

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## ABSTRACT

This study examines the implications of a gendered website production and preference aesthetic for the teaching of computer studies. Where the website production aesthetic is concerned, it finds evidence of statistically significant differences on 13 of the 23 factors against which sixty student websites were rated. These results were suggestive of a website aesthetic continuum with male and female production aesthetic tendencies at either end. The preference tests, conducted with 67 subjects, revealed preferences to be in tune with production aesthetics such that men had a statistically significant tendency to prefer home pages produced by men, and women those produced by women. This latter tendency was higher than the former.

The finding of gendered differences in website production and preference aesthetics has important implications for teaching and assessment. Teachers selecting or assessing websites, whether commercial or produced by pupils and students, need to be mindful of the aesthetic employed in those websites. When selecting websites for educational purposes, a match should be made between the website and end-user preferences. Assessment of students' work should ideally be mindful of the potential for positive bias on the part of the assessor in the direction of work displaying their own favoured aesthetic.

### Keywords:

Gender, websites, aesthetics, education, men, women

### Importance of ICT in the curriculum

According to Valentine [15], children excluded from computer technology can become marginalised and disenfranchised as adults. A number of factors are implicated including socio-economic status [10] as well as gender. Thus, a report on the use of ICT by boys and girls in Europe reveals differences in the frequency, context and areas of use. By age 15, boys have used computers for longer than girls [9] and whilst 60 % of boys report using a computer most days, this applies to only 37% of girls. The EURYDICE [9] report concludes: 'Whatever the country or level of school computerisation, the attitudes of girls and boys vis-à-vis the use of ICT

seem to differ in the same way: boys are more attracted to ICT and use it more freely. They say they use computers more frequently (except in the case of communication and word processing activities). They also more often claim that they can perform complex operations and that they have learnt on their own or with friends.' (p.8).

The finding that girls access computers with less frequency than boys, and that children with computers at home show greater interest in ICT than those without computers at home, illustrates the importance of ICT activities at schools to redress inequalities in ICT usage as between girls and boys. Moreover, the factors that produce less frequent usage in girls of school age, could be factors underpinning the finding that women are less frequent and less intense users of the web than men as well as being less frequent purchasers [4] [1] [37] [30] [31] [12] [34]. They could also be factors in the fact that in recent years there has been a sharp decline in the number of women pursuing first and second degrees in computer-related fields [20] and that the ICT profession offers a male-dominated landscape that operates to create separate spheres of activity for men and women [38].

Education, potentially, has an important role to play in equipping children of both sexes with the skills and attitudes necessary to cope with the outside world. As Allodi [2] has written, education should be fulfil a number of criteria two of which are that it should be *accessible* (based on equality and non-discrimination) and *adaptable*, e.g. responsive to the best interest of the child and adaptable to social changes and the development of knowledge. It should help citizens/individuals to have control over their life and avoid the systematic discrimination that can limit children's freedom to participate in the civic and social life of a country.

### The school environment: demographics of IT teachers

In the UK, most teachers and co-ordinators at school level tend to be male [16] and a more detailed breakdown from Scotland reveals 59% of ICT teachers to be male and 41% female [18]. An Equal Opportunities approach might concern itself with the structural elements that assist or obstruct the development of equal opportunities, whilst a Diversity approach might concern itself not only

with the visible manifestations of difference (gender, ethnicity and disability) but with the less visible manifestations embodied in personality [29], culture and structure [35]. This is a recognition that discrimination can be manifested in unintentional and subtle ways, making access to prestigious education and careers difficult [2]. A concern with discrimination at this subtle level might focus on deep-level characteristics such as attitudes, beliefs and values [14]. It is thought that elements such as these can create a male-dominated computer culture and male-biased educational programmes, discouraging women from entering or remaining in the ICT profession [3].

In a school context, factors in educational programmes that may serve to encourage one sex more than the other include the greater encouragement given to boys' as against girls' use of technology, the increased attention given by teachers to boys as against girls, the gender bias in software design [19] [13] [11] [38] and the focus in a teaching context on ICT as a purely software exercise, with every student completing the same assignment largely by rote, discouraging diversification and creativity through non-standard avenues [15]. A further factor is the role of webdesign in people's preferences and attitude to computer based activities such as e-commerce [6] [8]. The extent to which men and women's reactions to webdesign may differ is the focus of this paper.

### **The importance of webdesign**

Studies that study the impact of gender in relation to website design are beginning to emerge [34] [25] [28] [8] and the focus here is on the impact of gender on *production* and *preference* webdesign aesthetics. If the *production* and *preference* aesthetics of males and females are found to be similar, then the gender of teacher and pupil loses the potential to have an indirectly discriminatory impact on preferences. If, by contrast, they are different, then the gender of teacher and pupil could have an indirectly discriminatory effect on preferences insofar as research indicates that positive aesthetics consists of empathy between object, perceiver and artist [7], the so-called 'empathy principle'. This has its parallel in the field of design where research has shown that men and women have a statistically significant tendency to, unwittingly, prefer work designed by people of their own gender [23] [26] [27].

In an educational context, some of this work has shown the way that a finding of a differential male and female *production* and *preference* aesthetic could unwittingly intrude in the assessment of design work was put to the test in a study of art and design examination results at both secondary and tertiary level [27]. The tentative findings, based on a study of the gender of assessors and candidates in the UK at GCE and 'A' level examinations, were that the sex of the examiner may be an unwitting factor in the ratings ascribed by male and female examiners, and that an unconscious operation of 'same sex preference' might be taking place. Such a variation in the application of ratings could be accounted for not

just by a prejudice in favour of candidates known to be male [5] but by the finding of gendered differences in designs and design preferences [23].

The need to carry out this work is pressing since the study of webdesign aesthetics is rooted largely in the universalist paradigm [21], with attempts to identify single models of excellence in webdesign [32] [36] [22]. There is a paucity of research [22] in what might be termed the interactionist tradition in which aesthetic judgements are assumed to be a function of individual perception [24], and therefore varying from respondent to respondent. Where such research exists, the tendency is towards small and inadequate sample sizes [25], limiting the scope for the generalisability of findings.

## **METHODOLOGY**

In order to compare male and female-produced websites and obtain a measure of men and women's web production aesthetic, a comparison was made of a randomly selected set of male and female-produced websites in the UK. Furthermore, in order to obtain a measure of men and women's web preference aesthetics, a sample of these male and female-produced websites were then rated by a further group of men and women. Details of these two phases of research are provided below.

### **A. Production aesthetic**

It was considered that a reliable measure of the male and female production aesthetic could be obtained by analysing the personal websites of students. Key criteria in the selection of these student websites were that the websites should not be produced by design specialists (since the design training they receive could influence their response) and that a large number of websites should be available. This would permit the establishment of a normal sample of 30 male and 30 female-originated websites from which results could subsequently be generalised. Both criteria pointed to the selection of websites from an academic institution that (a) did not have a design faculty and (b) afforded access to large numbers of student websites. A University which met these criteria was Oxford University which afforded access to large numbers of personal student websites. Even randomising the sample and taking just every other available website, 30 male and 30 female-originated websites could easily be found.

The method consisted of rating these sites against a number of variables and then comparing the ratings achieved by the male and female-originated sites using a T-test and a chi-square test of association with one degree of freedom (with  $p < 0.05$  considered as the threshold for significance). All the criteria used derived either from research on design or from research on web site aesthetics and were divided into those criteria relating to navigation issues, language and visual elements. All the criteria used were amenable to objective rating and the selection

of criteria was researcher neutral to the extent that it was derived from earlier work.

**B. Preference aesthetic**

A critically important element within this research is to discover whether there were websites or component variables within websites which might or might not be preferred by males or females. In order to determine this, a random sample of respondents (38 male and 26 female students) were given a copy of the home page of 6 websites and asked to rate these individually. It was decided to use 6 websites since that number should and proved to be sufficient to measure any preferences that might be present since the sample size of 64 was a statistically sound sample size. As in the telephone survey the authors were responsible for administering this phase in the research process since both researchers wished to ensure a uniformity of approach. The participants who were selected were only asked to rate each of the 6 sites according to the features they contained. They were not briefed on the factors prompting this research, being asked merely to assign a mark in the range 0 to 20 for each of the 6 categories listed above. It was only upon completion of the task that an explanation was offered as to the purpose of this exercise. The zero mark reflected the complete dislike of that particular variable and 20 represented a huge liking.

This methodology allowed that:

1. Respondents could equally score two sites to be the same
2. Respondents could score sites differently in which case it would be possible to establish whether there are statistically significant differences in preferences for individual sites.

The use of a t-test revealed any such differences.

In order to determine which of the websites were preferred by females the mean of the three websites classified as having a strong female aesthetic and which were produced by females, was calculated for each of the variables. The same process occurred for the male sites. It was decided not to test the impact of asking the respondents to rate neutral websites since the issue was really about the view that male/females had upon male/female sites. This then allowed the researchers to use the t-test to see whether or not any significantly different preferences were evident between the genders.

**RESULTS**

**A. Production aesthetics**

Where navigation is concerned, the results showed links to a significantly larger range of topics in the female than the male-produced sites (at the  $p < 0.03$  level). Where language is concerned, the results revealed statistically significant differences on four of the five language elements, with females showing a statistically greater tendency than the males to employ abbreviations (significant at the  $p < 0.005$  level), self-denigration

(significant at the  $p < 0.000$  level), non-expert (significant at the  $p < 0.000$  level) and informal language (significant at the  $p < 0.005$  level). These differences suggest greater overt competitiveness on the part of the males in the sample than the females.

Regarding visual features, and thematic features in the first instance, there is a significant tendency for males to use a crest (at the  $p < 0.02$  level), and for each gender to depict images of its own gender (at the  $p < 0.01$  level). Where non-thematic elements are concerned, there is a statistically significant tendency for females to use rounded rather than straight shapes (at the  $p < 0.005$  level), to avoid a horizontal layout (at the  $p < 0.000$  level), to use more colours for typography (at the  $p < 0.000$  level), informal typography (at the  $p < 0.05$  level), and more of certain specific colours (white, yellow, pink and mauve) for typography ( $p < 0.000$ ).

**B. Preference aesthetics**

The t-test was used to determine whether or not there was a difference in the preferences of men and women as between websites showing a male and female production aesthetic. Results are shown in Table 1 (below):

	<b>M</b>	<b>F</b>
<b>Overall preference for website</b>	0.01	0.01
<b>Language</b>	0.01	0.01
<b>Pictures</b>	Prefer the female prod aesthetic	0.01
<b>Shapes</b>	No sig preference	0.01
<b>Layout</b>	0.01	0.01
<b>Typography colours</b>	0.01	0.01

**Table 1: Preference test results: the significance levels show the extent to which each gender prefers websites (or elements of the websites) produced using the production aesthetic of their own gender**

These results show that females prefer all aspects of web pages which have highly rated female coefficients. By contrast, males are not as strongly drawn to male sites with a high male gender coefficient as females are to equivalent female sites, and men have no strong preference as between shapes with a male or female gender coefficient. Of even greater interest is the fact that males prefer the pictures that females place in their web sites to those in male-produced sites.

**DISCUSSION**

Tests were conducted to compare male and female production and preference webdesign aesthetics. The results yield preliminary evidence of differences in both

the male and female web production aesthetic, and in the male and female web preference aesthetic.

Where the first of these is concerned, 23 features were rated in the websites and slightly more than half of these (13) yielded statistically significant differences in the extent to which between these features were used by males and females. Most of the differences concerned language and visuals, with one difference in the area of navigation. The results are suggestive of major differences in the factors underpinning male and female-designed websites particularly where language and visual factors are concerned. On the first, statistically significant differences concerned the use of expert and formal language (with males using these more than females), abbreviations, and self-denigration (with females using both of these more than males). Three factors - self-denigration, the use of particular text colour and the use of horizontal layout - produced the biggest statistical difference between the 2 sexes, with  $p < 0.001$  as the average level of significance.

On visuals, the main differences concerned shapes (greater use of round shapes in the female web sites and greater use of straight lines in the male sites), colours (significant tendency for females to employ more colours and particular colours). Where typography was concerned, there was a statistically significant tendency for females to use non-regular, less conventional typography. On navigation issues, there was a significant tendency for the female websites to show a greater array of subjects than the male sites.

How are these differences in production aesthetic translated into preferences? Preference tests showed a strong tendency for each gender to prefer websites, and the elements of those websites, produced using the production aesthetic of people of their own gender. The exceptions concern layout, where men are neutral in their preferences as between a male and female aesthetic, and pictures where men prefer pictures typifying the female production aesthetic.

The implications for teaching and assessment? ICT teachers, many of whom are male, when assessing commercial websites for the classroom or websites created by students, are likely to favour websites produced using the male production aesthetic. The one exception to this concerns the male evaluation of layout and pictures where the male preference appears to be neutral or predisposed to the female style respectively. This tendency to favour websites produced using the male production aesthetic is likely to have a number of implications. It is likely firstly to influence the selection of websites used in the classroom in favour of those displaying the male production aesthetic, a fact that could serve to make these more appealing to the male than female pupils in the class.

It is likely, secondly, to have an impact on the assessments teachers make of the webdesigns created by their pupils with male teachers more positively disposed

to webdesigns created using the male production aesthetic and female teachers more positively disposed to webdesigns created using the female production aesthetic. This is not to suggest, *pace* Bradley [5], that assessors consciously discriminate in favour of one gender, but rather to suggest that the discrimination may operate in a manner that is beyond the discernment or control of the assessors. The research suggests that male and female ICT teachers are likely to be unconsciously predisposed to the production aesthetic associated with their own gender. This gendered outlook could well impact on the way they assess work, as well as on the paradigms of good design that they present to students and pupils. Analysis of the web production aesthetic of websites produced by students in three countries [25] showed that of the twelve areas in which significant differences emerged as between male and female responses, ten overlapped with the significant differences obtained in the UK-only sample. This overlap suggests that the conclusions advanced here on the basis of a UK-only sample, could have application also for a wider audience.

## CONCLUSIONS

Earlier research has shown how boys in Europe use ICT more frequently than girls [9] and how, where employment is concerned, a number of practices in the IT field might serve to discourage or prevent women from entering or remaining in the profession [3]. This last piece of research suggests that these barriers might include 'male-biased educational programmes and a male-dominated computer "culture"'.

The finding presented here of statistically significant differences in the websites produced and preferred by men and women is suggestive of the operation of gendered success criteria. This leaves the door open to the exercise of indirectly discriminatory practices by one gender towards the other as well as the exercise of aesthetic choices in the selection of websites that might have more appeal to one gender than the other.

An extended interpretation of EO would concern itself with Diversity and the invisible differences operating between groups. This paper has laid bare some of the hidden differences operating between males and females. It is hoped that a growing awareness of the effects of diversity on Web design preferences will lead to a willingness to reverse or moderate any biases present in the teaching and assessment of IT, as well as in the selection of educational tools and e-learning.

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