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IT stereotypes in television shows

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Abstract

Despite over 20 years of Information Technology (IT) intervention programs, the proportion of females in the discipline has decreased this century. The depiction of the IT profession on television is a significant source of information about IT careers and may influence student career decisions. In this study, the ways in which male and female IT expert characters were portrayed in five television shows were examined and compared. While many existing stereotypes were challenged, all IT expert characters displayed some stereotypical characteristics, with IT technicians portrayed in the most stereotypical way. Female characters were not as stereotypical as males; but also not well recognised. We posit that the male "geek" technician stereotype overshadows any alternative depictions of IT professionals and reinforces masculinization of the discipline. We suggest that parents and influential adults, the primary audience of these shows, should be included in any future discussions to break down IT media stereotypes.

Keywords

Gender and diversity, Computers and Society, Community attitudes, K-12 education

INTRODUCTION

In this paper the portrayal of computing professionals in popular television shows is investigated to determine if they perpetuate the stereotypes which may make careers in computing and information technology unattractive to females. The proportion of females currently working in the computing industry in Australia is low. In 2011 the proportion of female Computer Network Professionals was only 11%, IT support Technicians were at 19%, down from 25% in 2008, and IT managers were 21%, down from 25% in 2008 (DEEWR 2008; DEEWR 2011). In the United States the number of women in the industry was similar with 25% of all professional computing jobs going to women in 2011 (NCWIT 2012). Similar statistics can be found in most other western countries (Bovee et al. 2007; Corneliussen 2004).

Added to this low representation, females are often concentrated in the lower status, lower paid jobs. From 2001 to 2007, 82% of managers, 79% of professionals and 83% of technicians or trades jobs were taken by males while 70% of IT sales assistants were female (Shah et al. 2008). In Australia in 2011, for example, the largest proportions of females in the IT industry were found among trainers (55%) and sales assistants (32%) (DEEWR 2011).

Computing and IT jobs are not disappearing, but females are disappearing from the IT workforce as fewer females are undertaking IT courses (DEEWR 2010; VCAA 2009). If these trends continue unabated, then the percentage of females in IT may fall to single digits in the not too distant future. This is a concern for three reasons: women are more than half the population yet have declining representation in this very influential industry; the absence of women leaves the creativity to the other half of the population (Margolis and Fisher 2002); and the perception of the IT industry as male will become a self-perpetuating prophecy (Sandberg 2011).

Local statistics further demonstrate this alarming trend. In Victoria, the Australian state where the research was conducted, the number of female applicants for tertiary IT courses dropped from 24% in 1999-2000 to 15% in 2008-2009 (DIIRD 2010). In the final year of high school two IT subjects are offered for the Victorian

Certificate of Education. Female enrolments were 21.4% in IT Applications and only 8.1% in the more technical Software Development course (VCAA 2009).

To encourage more females into computing and IT tertiary courses, intervention programs such as single sex classes, one-day promotional events and non-residential and residential IT camps have been run in various parts of the world for over 20 years (Cohoon et al. 2006) as well as in Victoria (Craig et al. 2008). While these programs may have had some positive short term effects, the statistics previously cited demonstrate that they have had minimal impact on the uptake of IT courses at university or school, and subsequently the proportion of females in the IT industry.

When students are asked what influences their career choice, the media is usually included in the responses (Adya and Kaiser 2005; Berry et al. 2006; Thomas and Allen 2006). The research reported in this paper sought to explore whether the way IT careers were portrayed on television provides some answers to the continuing decline in attractiveness of this career with female students.

This raises these questions that guided this research:

1. Is there a difference between the portrayal of male and female IT experts on television?
2. Does this then provide an insight into why the percentage of females in IT is falling?

THE MEDIA INFLUENCE

On average, Australians spend over 21 hours per week watching television, more time than any other form of media (Morgan 2010). Television has a wide reach in the community. There is evidence that the media does have an influence on career and subject choices (Clayton et al. 2009; Davis et al 2010; White and Kinnick 2000). We suggest that if television portrays IT professionals and jobs in a masculine geeky stereotypical way, then this exposure may be discouraging people from entering the profession.

Several other research studies have highlighted the importance of the media in affecting the proportion of students attracted to certain career paths. In the mid-80s the "Maths multiplies your choices" advertising campaign, run by the Department of Labour in Victoria, Australia, was aimed at raising parents' awareness of the importance of mathematics for their daughters' future career options and encouraging girls into maths. The campaign evaluation identified that of all the media used in the campaign, television was the one with the highest penetration (Dept of Labour and Mattingly Advertising, 1989). The campaign was also found to have had measurable impact, in that mathematics enrolments increased in the year after it ran and it was so successful, it seems, that it was not run in the following year (Dept of Labour and Mattingly Advertising, 1989). Similarly, the positive, socially friendly way vets were portrayed in the television series "All Creatures Great and Small" and the female character of a vet in the Australian series "A Country Practice" have been credited with making Veterinary Science a gender neutral career for girls (Byrne 1994). More recently, an increase in enrolments in Forensic Science degrees and an increase in the number of courses offered in this field at university is credited to the popularity of television programs such as CSI (Jackson 2009).

RESEARCH METHOD

In order to determine how closely IT characters shown on television conform to the societal stereotype of an IT professional, a review of five television shows shown on Australian television was conducted.

This is part of a wider PhD study which focuses on two high schools in Melbourne where the intervention program "Digital Divas" (Lang et al. 2010) was running. For the PhD, which researched attitudes held in the community toward females and IT, a media review was conducted, and 242 Year 8 and 9 Victorian students and their parents were surveyed with a smaller cohort participating in group interviews. The purpose of the media review was to gain insight into the influence of media on the community's perception of females and IT. The results of the media review prompted the inclusion of the following questions in the surveys:

1. Which TV shows do you watch that involve computer experts?
2. Can you name any females on TV who are computer experts or need computers for their jobs?

Following this, a clip from one of the shows that was selected because the researcher believed it best identified stereotypical gender behaviours (Kriozere, 2011) was shown to participants in the two focus group interviews. They were then asked their impressions about the IT expert characters in the clip.

The criteria used to select the television shows for the media review were:

- one of the characters was identifiable as an IT expert. For the purpose of this study, an IT expert was defined as a character specifically referred to in the show or promotional material as an IT expert, or one who was portrayed in the show as an expert through their activities, such as hacking into a

database, writing a program, recovering data from destroyed hard drives, or developing hardware in their job.

- it was shown in Melbourne during prime time
- it ranked highly with audiences (Roy Morgan Research 2011)
- it was available on free to air television

Using these criteria, the researchers discussed the inclusion or exclusion of potential shows for the study and three shows yielding three female and one male IT expert were identified. It was decided that more male experts were needed to balance the gendered comparison, so two more television shows known to have clearly defined male IT expert characters, but shown on pay (cable) television, were added. The television shows included in this review and the corresponding IT experts are shown in Table 1. The third column (Ranking) indicates where the show is positioned out of the top 10 shows for 2011 by Australians aged 14 and over (Roy Morgan Research 2011).

Table 1: IT shows and experts

Television show	IT expert characters	Ranking
NCIS – drama	Abby Scuito (Female) and Tim McGee (Male)	5
Criminal Minds - drama	Penelope Garcia (Female)	8
Bones – drama	Angela Montenegro (Female)	9
The IT crowd – comedy	Roy Trenneman (Male) and Maurice Moss (Male)	Not ranked
Leverage – drama	Alec Hardison (Male)	Not ranked

The following criteria, gleaned from previous studies investigating the IT stereotype (Chambers 1983; Clayton et al. 2009; Martin 2004; Mercier et al 2006; Rashid 2008; Steele 2010;) were examined and informed the categorisation used in this research:

1. Appearance – The stereotype is of a young unattractive Caucasian male who wears glasses and may be weak and thin, or overweight, usually with poor dress sense. Indicated by S = stereotypical; N = not stereotypical
2. Background – The qualifications, if any, each character had and any other pertinent background information about the character. IT = IT Quals or similar N = no IT Quals
3. Personality – Nerdiness or geekiness is often cited by students as a reason for not wanting to be an IT professional (Anderson et al. 2007; Margolis and Fisher 2002). Whether the characters were portrayed as boring, unhealthy, messy, obsessively neat, socially awkward, unable to form relationships, interested in science fiction or comics (or not) indicate how closely they conformed to the stereotype. S = stereotypical; N = not stereotypical
4. Employment Role – The stereotypical IT job is one requiring someone stuck in a dark office all day in front of a computer with paraphernalia such as Sci Fi posters or junk food littered around the room. Investigating the workplace and the day-to-day tasks of the expert's job may give an indication of how closely linked to the stereotype the portrayal of IT experts is on the television shows. S = stereotypical; N = not stereotypical

At least one season of each show was viewed, and fan blogs and official websites were scanned to gather more information about the characters (CBS 2012; Channel 4 2012; Fox 2012; Turner Entertainment Digital 2010; Wetpaint Entertainment 2012). The shows and official websites provided visual data and data on background, personality and employment role. The fan blogs provided data on how the characters were perceived by the public, for example, whether the characters were considered attractive.

RESULTS

In this section the findings from the media review and survey and interview questions related to the media and stereotypes are presented before the research question is revisited and preliminary conclusions drawn.

Media Analysis

The television shows, fan blogs and official websites were examined by one researcher, using these characteristics as a guide, to determine how stereotypical the IT experts in the shows were portrayed in the various mediums. The results were then discussed with the other researchers and are presented in Table 2.

Table 2: Results of analysis

	Appearance	Background	Personality	Employment Role
Abby Scuito (NCIS) *Drama*	Female, Caucasian, late 30s, slim, goth with tattoos, long black hair worn in pigtails, wears a lab coat **N**	Degree in sociology, criminology and psychology, masters in criminology and forensic science Deaf parents, knows sign language **N**	Quirky, fun, hyperactive, loyal, single, likes junk food can be too technical, childish Hobbies: Online games, music, the occult **S**	Forensic scientist who also has IT expertise. Works in a forensics lab, in the basement full of scientific paraphernalia /equipment, stuffed toys around the lab. **S-partial**
Penelope Garcia (Criminal Minds) *Drama*	Female, mid 30s, Caucasian, glasses, overweight, wears frilly, fluffy clothes/ accessories, feminine **N**	Hippy parents died in car crash when 18, on FBI's hackers list which is how she got recruited **N**	Flamboyant, fun, emotional, feminine, single Hobbies: Acting, online games **S**	Computer technician. In a dark lab, rarely leaves, surrounded by computer screens, lots of fluffy pens and toys. **S**
Angela Montenegro (Bones) *Drama*	Female, mid 30s, Chinese mother, Caucasian father, attractive. **N**	Degree in visual arts with a minor in computer science. **IT**	Very good social skills, father is rock guitarist, party girl background, married, one child, best friend of 'Bones', Hobbies: Painting, sculpting **N**	Forensic artist. Reconstructs victim's faces or simulations of their deaths, computer room dark, one very large screen on a wall, not in the field **S**
Tim McGee (NCIS) *Drama*	Male, Early 30s Caucasian, chubby in earlier series but has slimmed down, wears suit and tie **S-partial**	Bachelor of science in biomedical engineering from John Hopkins, Master of science in computer forensics from MIT **IT**	Fair social skills, detail oriented, single, too technical, teased - "McGeek", likes: Computer games, writing, the outdoors **S**	NCIS special agent. open office. Hacking, information gathering, tracking mobile phones, fixes boss's computer and helps in the forensics lab, goes out in the field. **S-partial**
Roy Trenneman (The IT Crowd) *Comedy*	Male, early 30s, Caucasian, a slob, usually unshaven and wearing geeky T-shirts **S**	Went to university – course unknown **Not known**	Lazy, laid back, pessimistic, selfish junk food, "not a real man", bullied Single, Limited social skills Hobbies: Building gadgets, computer games **S**	IT technicians. Provide computer support for large company Answer questions over the phone Install and update new software Fix computer problems Located in basement covered in Sci Fi and comic paraphernalia and junk food wrappers **S**
Maurice Moss (The IT Crowd) *Comedy*	Male, early 30s, non Caucasian background, wears short sleeved checked shirt with clip on tie **S**	Was academically bright at school and bullied by other kids **Not known**	Up tight, control freak emotional, asthmatic, scared,bullied, childish, lives with mother Hobbies: Computer games, inventing **S**	
Alec Hardison (Leverage) *Drama*	Male, mid 20s, African American, the least stereotyped of the males in appearance, appears cool and casual **N**	Foster child, no formal training, criminal – computer hacker. **N**	Very good social skills, single, self proclaimed geek, science fiction fan, computer games, teased, retained African American identity Hobbies: Dog, violin. **S**	Computer specialist and hacker. Communications, special effects, hacking, and information gathering, lounge room office, also works from a van, lots of field work. **N**

As can be seen clearly in Table 2, the three females are portrayed as more individualistic than the four males. Of the males, the two in the comedy are portrayed in the most stereotypical fashion. While it is understood that the genre of a show is important to the interpretation and extremes of behaviour, dress and attitude intrinsically hold more comedic value, the other males from dramas are also portrayed in more stereotypical fashion that the females, i.e. more geeky. This implies that it is possible that even comedic stereotypes can perpetuate a negative image.

The findings of the media review show that while all IT expert characters displayed some of the assumed IT stereotypes, (these are the areas highlighted in the table), it can be clearly seen that the prevalent IT stereotypes related to age, relationship status, narrow outside interests, preference for working alone, and physical attributes were challenged and no character displayed them all. Even more pertinent is the finding that females were less likely to be stereotyped for example Angela Montenegro (*Bones*) displayed the least stereotypical characteristics and even Penelope Garcia *(Criminal Minds)* with the most stereotypical characteristics for a female had less than Alec Hardison (*Leverage*), the least stereotypical male. Furthermore, many experts, including Angela, were told by colleagues that they spoke too technically; junk food was consumed by Abbey, Roy, Moss and Alec; all except Angela were single; and dark or basement laboratories were a common theme.

Female characters were not referred to by other characters in the show as 'nerdy' as frequently as male characters were, and there was more evidence of bullying with male characters. Male experts, however, were shown outside their offices more often than females, thus the males' jobs were less stereotyped. The clearest finding was that stereotypes were more likely to be applied to IT technicians than other IT experts. The characters that were most stereotyped were Moss and Roy from *The IT crowd*. This is definitely because of the comedic value of the geeky stereotype. The least stereotyped character was Angela from *Bones*.

Survey Questions

Teachers and students were asked to indicate which shows they watched that involved computer experts and any female characters who were computer experts or needed computers for their jobs. Their answers are presented in Figures 1 and 2.

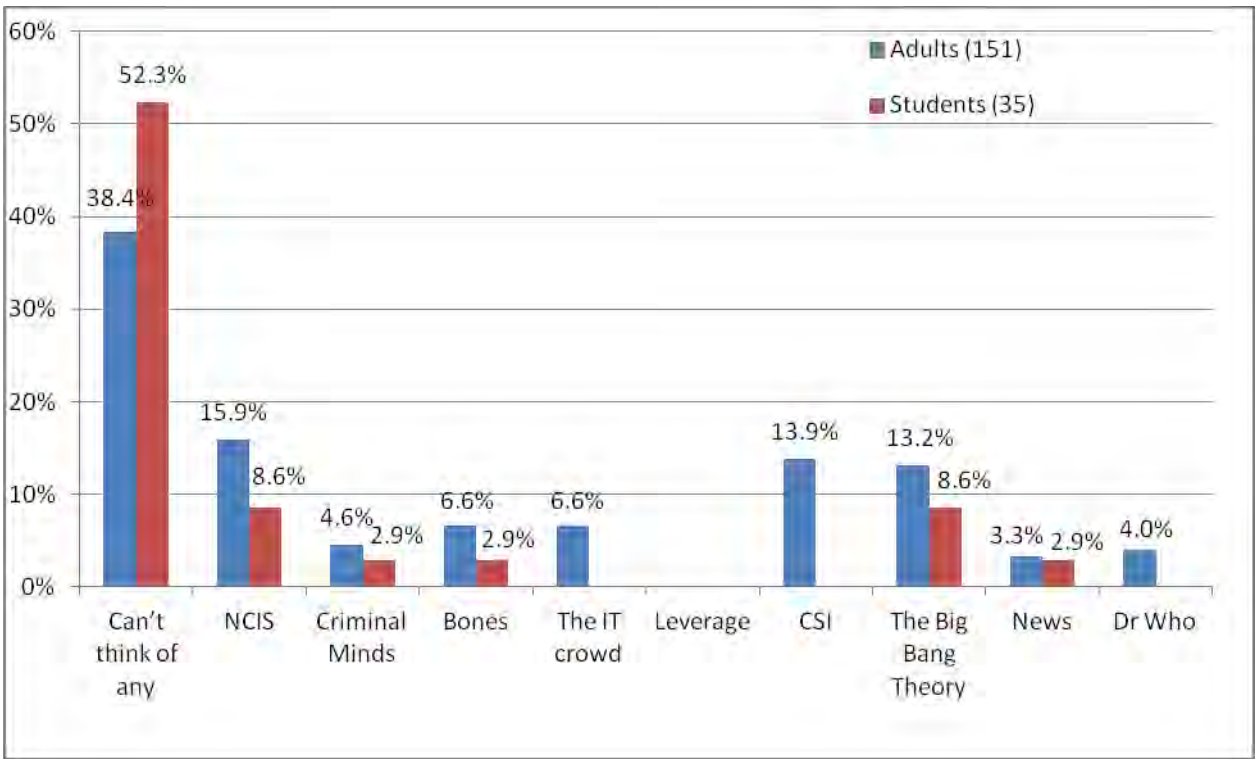

Figure 1: Percentage of respondents who mentioned each show

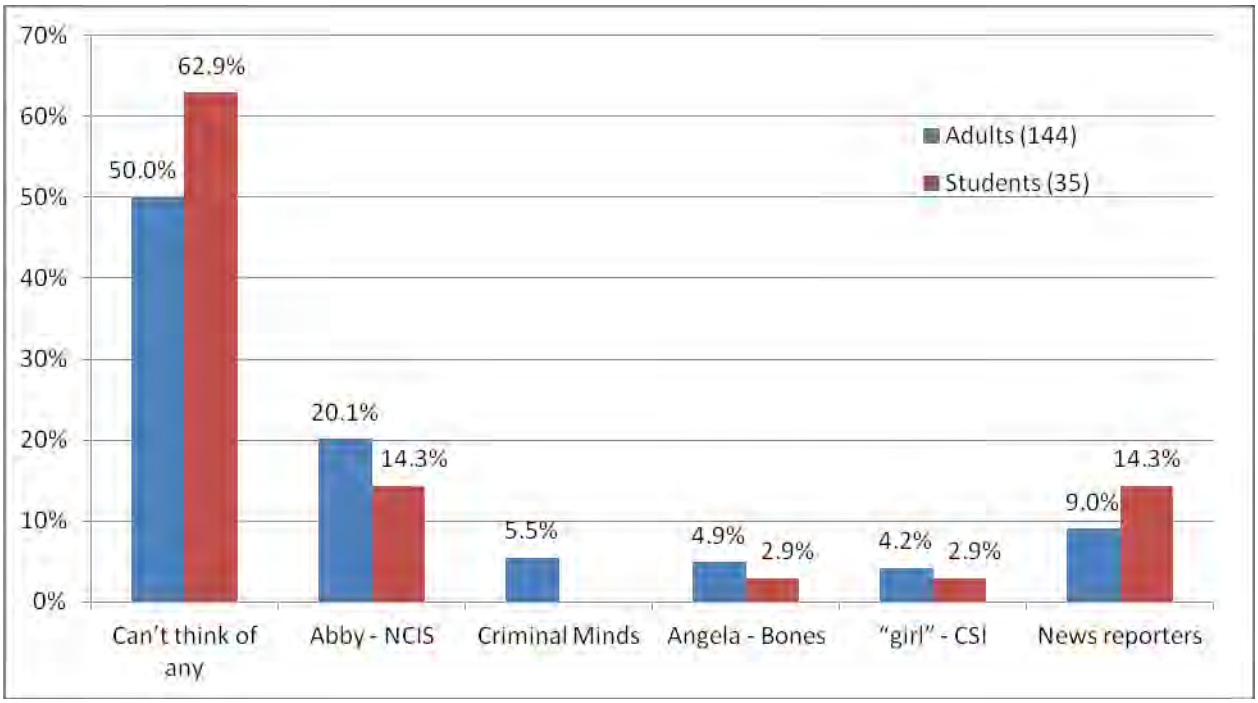

Figure 2: Percentage of respondents who also mentioned each character

Note that respondents named more than one show or character in their answer.

Figure 1 shows that of all the survey participants who responded to the question (parents, teachers and year 8 and 9 students), 38% of adults and 52% of students could **not** name any television shows that involved computer experts

Figure 2 shows that 50% of adults and 63% of students could not think of a female IT expert character.

The findings from the survey analysis provided an insight into how far limited the influence of these television shows was. This lack of recognition, and the absence of respondents' ability to identify strong IT characters currently on television, may indicate that the profession itself is not perceived as entertaining.

These results seem to indicate that although *NCIS, Criminal Minds* and *Bones* were all rated in the top ten shows, people did not recognise that IT experts were involved in these shows. Surprisingly, more adults identified *The IT crowd* than *Criminal Minds*, even though it was not shown on free to air television in 2011, perhaps because of its clearly recognisable IT characters, reinforced by the name of the show. Results from the surveys yielded another interesting result. In response to the question about shows involving computer experts, a number of people listed *The Big Bang Theory* or *CSI*. In *CSI* computers are used by all characters, but there is no specific IT expert character. In *The Big Bang Theory*, Australia's most popular TV show in 2011 (Roy Morgan Research 2011), the characters often use computers in their spare time and Amy Farrah Fowler from the show, a neurobiologist, was mentioned by one adult as a female in response to question two. This show had not been included for analysis in this study because none of the characters' jobs were in IT. In addition, while *Abby* was the most often mentioned female IT character, the second most common response when asked to name female IT experts was journalist or news reporter. Two inferences may be drawn from this:

- Firstly, computers have become so commonplace in every job that it may be difficult for the public to distinguish between expert and user. Perhaps they have become so used to IT that they no longer consider it a specialised skill.
- Secondly, while some confusion between *NCIS* and *CSI* may account for the high percentage of recall of *CSI* with answers such as:

  the girl from CSI with the black hair and ridiculous clothes - (Abby?)

  Characters on NCSI etc,

> *The Big Bang Theory* and *CSI* both involve science, indicating a confusion between science and IT. Indeed, it was difficult in shows like *NCIS* and *Bones* to distinguish what was science and what was IT as computers were used for scientific tests, and monitors were used to display the scientists' findings.

Responses from both adults and students reinforced findings from the analysis of television shows that while female IT characters were not as stereotyped as males, they were geeks, or at least not as "normal" as other female characters on television with their descriptions of female IT characters when they did not know the characters' names – for example:

> the goth one from NCIS, and the "zany" one from Criminal Minds. can't remember their names
>
> Most of the scientist and police shows these days incorporate female "geeks". :)

Interviews

In face to face interviews participants were asked their impressions of the two IT expert characters from *NCIS* - Abby and McGee. These characters were chosen as survey questions indicated *NCIS* was the most recognised show and Abby the most recognised character, as it was possible that the participants were not familiar with other shows or characters and would not have formed an opinion about the characters. Participants watched an excerpt from *NCIS* showing the two characters talking in Abby's lab. When asked to tell what they thought of each character the following responses were given:

Typical comments about Abby:

> I like her, she's feisty, she's got a personality and she's an individual.
>
> She's smart, it's obvious that she's smart she doesn't care that everyone knows that she's smart and I think it's cool.
>
> She's a great character but it is kind of going if you're going to be a girl and that geeky then you have to be pretty wacky too.
>
> In her own way yes [she is a geek], but she's a Goth, cool, she's an individual caffeine swallowing hyperactive person so they're both driven by their passion I suppose in their own area.
>
> All the women on their television is usually quite glamorous, she's kind of made out to be, you know, a bit different from the norm.

Typical comments about McGee:

> I like him as a character, he is very much focused on finding things through, you know, the electronic methods and that, he has difficulty relating to people on the same sort of level.
>
> He's a dork, McGeek, ha!

These comments reflected the findings of the media review, suggesting that males were thought of as traditional nerds or geeks, while females were considered "cool" geeks who were definitely different to other female characters on television. In the light of these findings, the research questions are revisited in the conclusion.

CONCLUSION

The first research question that guided this research was "Is there a difference between the portrayal of male and female IT experts on television?" This media analysis found that the media did not stereotype women in IT as heavily as males. Furthermore, while students may never have the opportunity for the spectacular jobs presented in the television series, the variety in television jobs could show students that IT is not all programming and fixing computers and that IT professionals can be feminine and "cool".

The answer to the second research question, "Does this then provide an insight into why the percentage of females in IT is falling?" is more complex. These are very highly ranked shows, yet a large number of those surveyed did not recognise IT jobs as presented on television, or confused them with science. It could be construed that although television may be a strong influence on student career choices in general, IT careers do not have a strong enough profile to be recognised when presented as anything other than the stereotype. Many professions such as veterinarians or lawyers have distinct stereotypes (Byrne 1994; Lang 2003) that are both attractive and influential in society.

This media analysis infers that because these "cool" female IT experts with exciting jobs are not widely recognised in television shows, the distinct stereotype for IT professionals does not extend beyond the unpopular geek who is left to represent the whole industry. IT stereotypes may be reinforced through the media because positive portrayals of females in IT careers are not recognised. Perhaps, then, the media cannot be directly blamed for the decreased popularity of this profession among young women.

Further, the survey results appear to indicate that students are even less likely to recognise female IT experts on television than their parents and other influential adults. This implies that many intervention programs aimed at encouraging females into IT may have a greater influence if parents, teachers and careers counsellors were the focus along with students. A larger study, or perhaps one extended to other popular media, is needed to further expand upon these findings.

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