

## 1. INTRODUCTION

Young students are not as much interested in pursuing technology-related studies as they used to be in the past (Instituto de la Mujer, 2009). The geeky image of computer scientists and IT professionals discourages students and particularly women from pursuing studies in the field (Margolis & Fisher, 2002; Sáinz, 2007; Wyer et al., 2010; Sáinz & López-Sáez, 2010; Zarrett & Malanchuk, 2005; Zarrett et al., 2006).

In addition, there is also empirical evidence showing that girls hold more positive attitudes towards IT professionals than their male counterparts. However, girls do not identify themselves with the image of the IT professionals, which discourages them from pursuing ICT studies (Creamer, Lee & Meszaros, 2006; Sáinz & López-Sáez, 2010).

Parents and secondary teachers often report stereotypical beliefs about ICT professionals and the best occupational choices available for men and women (Sáinz, Palmen & García, 2011). The image of an IT professional seemed to be frequently associated with a programmer, lacking social skills' and having difficulties communicating with other people, given their 'boring', 'solitary' and 'antisocial' character. In addition, some parents even saw the IT profession as something that they personally would not like to pursue.

## 2. OBJECTIVES

- To analyze young men's and women's stereotypical misconceptions about ICTs and people working in the ICT field

## 3. DESIGN

### Sample

900 secondary students enrolled in the last course of the Spanish compulsory secondary system (mean of age=15 years old; s.d.=.65).

### Instruments: Open ending questions

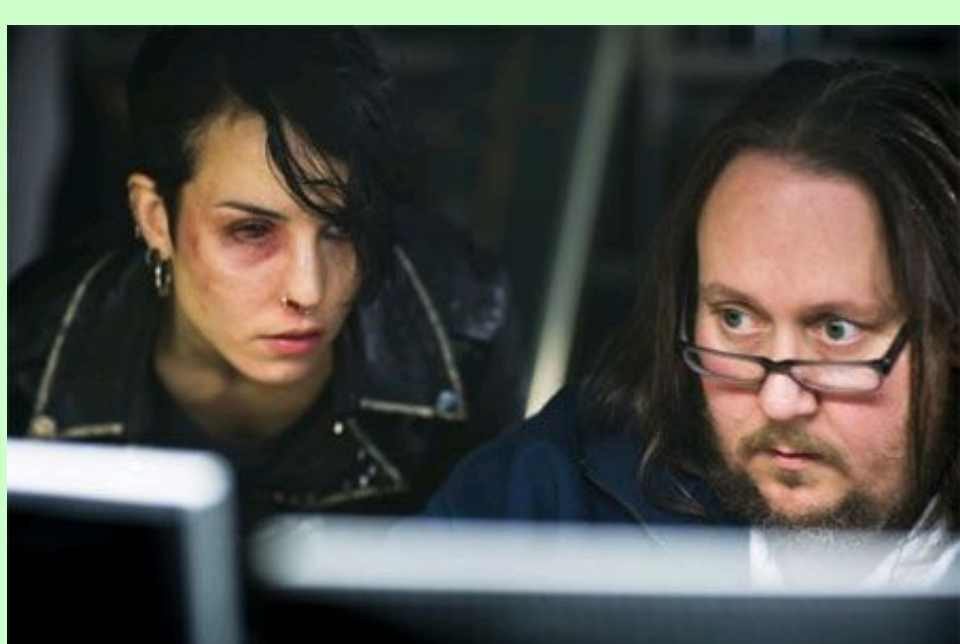
- What comes to mind when thinking about ICTs? (Zarrett and Malanchuk, 2006)
- What type of person comes to mind when thinking about someone working within the ICT field?
- Which professions come to mind when thinking about ICT professionals?

### Procedure

A survey was delivered in class in order not to interfere with normal school dynamic.

The open questions were codified and Krippendorff's interrater reliability was computed:

- The mean for the dimensions for question 1 is  $\alpha = .83$
- The mean for the dimensions for question 2:  $\alpha = .91$
- The mean for the dimensions for question 3:  $\alpha = .80$



# Why secondary students hold misconceptions about ICTs? A study with a sample of Spanish adolescents.

Milagros Sáinz\*, Julio Meneses\*\* and Beatriz López\*

\*Internet Interdisciplinary Institute, UOC. \*\*UOC

## 4. RESULTS

TABLE 1. DISTRIBUTION ACROSS GENDER AND GENDER DIFFERENCES ASSOCIATED WITH ICTS AND ICT FIELD

Q1	What is the first thing that comes to mind when thinking about ICTs?	Boys (365)	Girls (406)	Total (771)	$\chi^2(1)$
	General aspects of technology and technological uses	157	193	350	1.586
	Programs (videogames, computer software, etc.)	25	31	56	.176
	Technological artifacts (computer, dvd players, etc.)	193	206	399	.352
	The profession of computer science, electrical engineering, etc.	4	7	11	.539
	Professionals in computer science, electrical/telecommunications engineering, etc	30	24	54	1.572
	School related aspects (teachers, subject areas, etc.)	4	16	20	6.157**
Q2	What comes to mind when thinking about someone working within the ICTfield?	Boys (337)	Girls (359)	Total (696)	$\chi^2(1)$
	Physical appearance	41	35	76	1.044
	Intellectual Aptitudes (intelligent, creative, etc.)	106	107	213	.223
	Social skills (geek, socially isolated, freak, etc.)	32	38	70	.228
	Status	13	10	23	.625
	Professions related to the design and provision of ICT services (computer science, electrical/telecommunication engineering, etc.)	95	101	196	.000
	Professions using ICTs (clerical jobs)	46	79	125	8.237***
	Models de Reference (family, friends, teachers, Bill Gates, etc.)	107	115	222	.006
Q3	What type of profession do you associate with ICTs?	Boys (362)	Girls (393)	Total (755)	$\chi^2(1)$
	Computer Science	249	251	500	2.037
	Telecommunications/Electrical Engineering	46	22	68	11.621***
	Engineering and Architecture	54	52	106	.444
	Journalism. Image and Sound. Publicity	78	87	165	.038
	Clerical occupations (office and administrative)	25	76	101	25.134****
	Occupations within Social Sciences: Learning. History. Law.	7	14	21	1.848
	Science – related occupations (Physical Science and Chemistry)	11	14	25	.161
	Other occupations (school teacher or any other profession)	46	77	123	6.551***

\*\*\* $p < .001$ ; \*\* $p < .05$  \* $p < .01$

**QUESTION 1 (FIRST THING THAT COMES TO MIND WHEN THINKING ABOUT ICTS):** the aspects more frequently commented with regard to this question are related to general uses of technology and technical artifacts. The less commented aspects are related to school and the professionals and profession within the field. More girls than boys informed about school related aspects associated with ICTs [ $\chi^2(1, 20)=6.157$ ].

**QUESTION 2 (TYPE OF PERSON WORKING IN THE ICT FIELD):** different professionals, intellectual aptitudes concerning ICT professionals, models of reference or professionals who use ICTs as a mean to carry out their jobs. The majority of models of reference (school teachers, family, acquaintances, famous scientists or celebrities) referred by the participants were masculine. More girls than boys referred to clerical jobs professionals [ $\chi^2(1, 125)=6.237$ ].

**QUESTION 3 (PROFESSIONS AND OCCUPATIONS THEY COME TO MIND),** computer science is the most frequently reported profession. Engineering and architecture along with clerical occupations were also mentioned by the participants. More boys than girls referred to Electrical engineers [ $\chi^2(1, 68)=11.621$ ], whereas more girls than boys informed about clerical occupations [ $\chi^2(1, 101)=25.134$ ] and to any other kind of occupation [ $\chi^2(1, 123)=6.551$ ].

## 5. CONCLUSION

Our findings indicate that adolescents hold misconceptions about the type of person who is involved in the ICT field. They report different aspects related to the ICT professional's personality traits, using in most of the cases positive attributes related to their intelligence. On the other hand, they also refer to the geeky and freak image of IT professionals. This geeky portrait of the IT professional is frequently reinforced by mass media, for instance in the TV series IT crowd.

In general terms, there are few discrepancies among boys and girls in the type of details they associate with the ICT field. For both groups, the majority of people working in the ICT field were masculine models of reference.

In spite of the fact that computer science is the profession more frequently associated with the ICT field, Journalism and mass media – related occupations along with clerical occupations (above all young women) are also considered as ICT occupations. These findings also suggest that the divisor line between people who use ICTs in their occupations and people who design and produce ICTs from a technical point of view is not clear. This may also have an effect on their choices of studies and occupations.

As a concluding remark, some of these findings suggest that intervention strategies should target young students' misconceptions about ICT professionals and occupations. For instance, as these professionals are often considered to lack social skills, awareness of the social impact of ICTs should be raised in order to increase the participation of young males and females in the profession of computer science.

This study has been funded by the Catalanian Women's Institute of the Generalitat de Catalunya (ICD)

Corresponding author: [msainzi@uoc.edu](mailto:msainzi@uoc.edu)