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Why secondary students do not tend to pursue ICT-related studies?

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1. INTRODUCTION

The participation of women in ICT-related studies remains scarce worldwide. In Spain, women represent respectively 17% and 26.59% in the studies of Computer Science and Telecommunications Engineering (Instituto de la Mujer, 2009). These data are especially interesting when observing the high rate of women enrolled in female dominated studies in the fields of education or health.

According to Eccles' *Model of task achievement*, expectancies for goals and task values explain the choice of studies. These expectancies for goals and task values are under the influx of gender roles and of certain social and cultural pressures present in our society (Eccles, 1984; Eccles, 1994; Eccles, Frome, Suk Yoon, Freedman-Doan and Jacobs, 2000; Eccles, Wigfield and Harold, 1993).

The research in this field has consistently proved that female secondary students are less interested in computing and technology-related domains than their male counterparts (Eccles, 2007; Sáinz, 2006). Women hold lower computer attitudes than men (Whitley, 1995; Sáinz and López-Sáez, forthcoming).

Other studies simultaneously highlight that girls have a lower perception of their Math and Computer abilities than boys (Hackett, 1997; Ma and Johnson, 2008, Sáinz, 2006; Zarrett and Malanchuk, 2006), which is associated with girls' lower participation in studies that are highly demanding in math and computing skills.

Finally, women have a higher desire for a family-flexible and interpersonally oriented job (Eccles, 1987; Frome, Alfeld, Eccles and Barber, 2008).

2. OBJECTIVES

❑ To analyze the role played by different psychosocial variables in the prediction of the intention to pursue ICT-related studies.

3. DESIGN

Sample

900 secondary students enrolled in the last course of the Spanish compulsory secondary system (mean of age=14 years old; s.d.=.65).

Instruments

❑ Perceived utility of computers for the future (Zarrett and Malanchuk, 2006)

❑ Self-concept of math ability (Jacobs and Eccles, 1995)

❑ Self-concept of computer ability scale (Zarrett and Malanchuk)

❑ Math performance scale (self-elaborated)

❑ Motivations and interests in future occupationa scale (Eccles and Harold, 1991)

❑ Intention to pursue ICT related studies (1=yes; 0=no)

All continuous predictors were standardized prior to the analysis

4. RESULTS

TABLE 1. ODDS RATIOS RESULTING FROM THE STEPWISE LOGISTIC REGRESSION TO PREDICT THE INTENTION TO PURSUE ICT STUDIES

VARIABLE	MODEL 1	MODEL2	MODEL 3	MODEL 4
GENDER (Female)	1,875***	1,859***	1,6983***	1,4901**
PLACE OF ORIGIN (Rural)	,946	,946	1,099	1,081
SOCIOECONOMIC STATUS (High)	,674	,667	,658	,618
SOCIOECONOMIC STATUS (Intermediate)	,779	,771	,754	,729
SOCIOECONOMIC STATUS (Low)	,609	,606	,562	,530
ADVICE TO CHOOSE ICT STUDIES (No)	4,4821***	4,4356***	3,9544***	4,0155***
SELF-CONCEPT OF MATH ABILITY		1,011	1,002	1,001
MATH GRADES		,994	1,000	1,002
SELF-CONCEPT OF COMPUTER ABILITY			1,0576***	1,0563***
COMPUTER ATTITUDES (EMOTIONAL)			1,008	1,009
COMPUTER ATTITUDES (COGNITIVE)			,992	,991
COMPUTER USE (BEHAVIOR)			1,003	1,001
PERCEIVED UTILITY OF COMPUTER CLASSES			1,0241**	1,0249**
OCCUPATION COMPATIBLE WITH PERSONAL LIFE				,996
OCCUPATION OF RESPONSIBILITY				1,008
SOCIALLY ORIENTED OCCUPATION				0,977**

***p<.01; **p<.05

As observed in the above table, the effect of gender remains significant thorough the 4 models, but its direct effect is slightly reduced when entering different variables to the original model.

• In MODEL 1, being a boy (OR=1.875, p<.000) and receiving advice to pursue ICT-related studies (OR=4.4821, p<.000) increase the probability of pursing ICT-related studies.

• In MODEL 2, the inclusion of the variables self-concept of math ability and math grades does not increase significantly the probability of pursuing ICT-related studies. Nevertheless, it reduces the effect of gender (OR=1.859, p<.000) and of the advice received to choose ICT-related studies (OR=4.4356, p<.000).

• In MODEL 3, the inclusion of the variables self-concept of computer ability (OR=1,05, p<.000) and perceived utility of computing classes (OR=1.0241, p<.000) increases the probability of pursuing ICT-related studies. It also decreases slightly the effect of gender (OR=1.6983, p<.000) and of the advice received to pursue ICT-related studies (OR=3.9544, p<.000).

Nonetheless, the inclusion of different dimensions of computer attitudes (computer use and emotional attachment towards computers) does not increase significantly the probability of pursuing ICT-related studies.

• In MODEL 4, the inclusion of the variables related to occupational motivations reduces the effect of gender (OR=1.4901, p<.029) and of self-concept of computer ability (OR=1.0563, p.<000). Nevertheless, it increases the effect of the advice received to pursue ICT-related studies (OR=4.015, p.000). The interest in a socially oriented occupation reduces the probability of pursuing ICT-related studies (OR=0.977, p<. 027).

5. CONCLUSION

Our findings conclude that boys are more likely to pursue ICT-related studies than girls. This may involve that women scarcely participate in the design and development of technologies within the field of Information and Communication Technologies.

Being encouraged or discouraged to enroll in ICT studies seems to be crucial in the prediction of these studies. This confirms how parental and societal influence shapes individuals' occupational preferences (Eccles, Barber and Jozewoficz, 1999; Eccles, 2007).

Adolescents who have a high desire for a socially oriented occupation (specially girls) are less likely to pursue ICT-related studies. The information that adolescents gather regarding the lack of interconnection between computer science and social purposes leads them to conclude that ICT studies are not socially oriented.

Contrary to the literature in this field, the variable self-concept of math ability does not play a significant role in the prediction to pursue ICT-related studies. In Spain, there are more females than males in the studies of Mathematics, which could partly explain why Mathematics does not play a crucial role in the prediction of ICT-related studies.

On the other hand, the higher the self-concept of computer ability and the perceived utility of computing classes for the future, the higher intention to pursue ICT-related studies. Consequently, if girls continue having a lower perception of their computer ability they will be less likely to pursue those studies.

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