

# Factors influencing teachers' professional use of ICT in primary and secondary schools in Spain

Georgeta Ion<sup>1</sup>; David Rodríguez<sup>1</sup> ; Sergi Fàbregues <sup>2</sup>; Julio Meneses<sup>2</sup>  
1.Universitat Autònoma de Barcelona; 2. Universitat Oberta de Catalunya

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# Introduction

- In the recent decades, there has been a wide academic interest in the implementation of **ICT in schools** (Law, Pelgrum & Plomp, 2008; UNESCO, 2005).
- Much of the research has focused on the role of computers in the classroom, specifically on the process of **teaching and learning**.
- These studies **have highlighted how ICT** reconfigure classroom practice, create new varieties of learning practices, change teachers' and students' roles, and improve students' engagement and outcomes (OECD, 2005; Crook et al., 2010).
- An illustration of this is the preparation and use of more complex teaching activities and materials, and an increase in the encouragement of student-centred cooperative learning.

## Introduction - cont'd

- Considerable attention has also been given to the **factors that influence teachers' use of ICT** in schools (Mumtaz, 2000; Somekh, 2008).
- In this literature, a classification that divides these factors between teacher and school level has been made:
  - **Factors that operate at the teacher level:** Demographic attributes; experience with the use of computers; attitudes to teaching with technology; and approach to teaching.
  - **Factors that on the school level:** Availability of infrastructure and connectivity; technical support from the school administration; ICT policy; and school culture.
- Teachers' **attitudes to the utility of ICT as an educational tool** have been considered to be either a significant facilitator or barrier to their successful introduction to schools and high schools (Afshari et al., 2009).

# The problem

- However, factors influencing ICT use as a professional tool outside the classroom **have received little attention**.
- This research addresses this gap by examining the **factors that affect teachers' professional use of ICT**, particularly, the internet, in schools and high schools.
- This study focuses on **two types of professional use** of the internet:

<i>Supportive use</i>	<i>Management use</i>
<ul style="list-style-type: none"><li>•Classroom preparation's activities such as finding supplemental information for lessons.</li><li>•Preparing worksheets for the pupils</li></ul>	<ul style="list-style-type: none"><li>•Performing administrative and management tasks.</li><li>•Communicating with colleagues and experts.</li><li>•Interacting with parents and students.</li></ul>

## Approach and aim of the study

- The study uses a **digital inequalities (DI) framework** which reconfigures the dichotomous focus of the “digital divide” into a **complex, dynamic and multi-dimensional** phenomenon (DiMaggio & Hargittai, 2001).
- By doing this, the framework contemplates not just differences in access but also **inequalities in four dimensions: motivations, abilities, access, and effective use** (Meneses & Mominó, 2010).
- Adopting the focus of the DI, the **aim** of this study is to construct and empirically test an **exploratory model for the unequal appropriation** of the internet for professional purposes outside the classroom.
- We analyse the differences in attitudes and effective use by exploring the contribution of selected factors (i.e. **internet access and educational ICT training, among others**). We also take account of the specific effects of the **organisational development** on both variables.

# Method

## ■ PARTICIPANTS:

- 1,405 teachers from a random sample of 809 schools in Spain completed a self-administered questionnaire in 2007.

## ■ MEASURES:

- *Socio-demographics and school-level information.*
- *School internet access.*
- *Educational ICT training.*
- *Digital literacy* (KMO=0.843,  $p=0.000$ ; 72.33% of total variance explained;  $\alpha=0.921$ ).
- *Organisational development* (KMO=0.773,  $p=0.000$ ; 50.31%;  $\alpha=0.747$ ).

## Method – cont'd

- **MEASURES (from PCA):**

- ***Attitudes to professional uses of ICT*** (KMO=0.786,  $p=0.000$ ): **Positive** (30.16%;  $\alpha=0.769$ ) and **negative** (30.11%;  $\alpha=0.780$ ) attitudes.
- ***Use of the internet in professional practices*** (KMO=0.0.831,  $p=0.000$ ): Supportive (37.17%;  $\alpha=0.867$ ) and management use (25.53%;  $\alpha=0.695$ ).

- **DATA ANALYSIS:**

- **Multivariate analysis: 4 multiple regressions** were ran to determine the relationship between teachers' attitudes and effective professional uses of the internet and every independent variable, testing for separate effects and controlling for the other measures considered in the models.

# Findings

	Positive Attitude	Negative Attitude
	Beta	Beta
<b>Stage of education</b>		
Comp. Primary	-	-
Comp. Secondary	-0.002	0.002
<b>Funding</b>		
Public	-	-
Private	0.060*	-0.043
<b>Location of school</b>		
Under 5,000 hab.	-	-
5,001 – 50,000 hab.	0.074*	0.007
50,001– 100.000 hab.	0.057*	0.003
100,001 – 500.000 hab.	0.046	0.006
500.001 hab. and over	0.056	-0.029
<b>Age</b>	-0.011	-0.037
<b>Gender</b>		
Female	-	-
Male	0.076*	0.041

- Positive attitudes are statistically **higher** among **male teachers** that belong to **private schools**, mostly located in **medium-size municipalities**.



## Findings – cont'd

	Positive Attitude	Negative Attitude
	Beta	Beta
<b>Internet use at school</b>		
Never or almost never	-	-
Monthly	-0.032	-0.060
Weekly	0.012	-0.081
Daily	0.144*	-0.160*
<b>Educational ICT training</b>		
Not in the last 3 years	-	-
Yes, but hardly useful	-0.021	0.023
Yes, strongly useful	0.121*	-0.104*
<b>Digital Literacy</b>	0.180*	-0.161*
<b>Organizational Develop.</b>	0.100*	0.049*
<b>Model summary</b>		
R <sup>2</sup> (Adjusted R <sup>2</sup> )	0.143 (0.133)	0.070 (0.060)
F for the model	14.750*	6.692*
Sample size	1,405	1,405

- Being a **daily user of the internet at school** and having attended useful **educational ICT courses** are significantly associated with **higher positive attitudes**.
- Higher levels of reported **digital literacy** and, especially, better **organisational development** are two other significant predictors of **positive attitudes**.

## Findings – cont'd

	Supportive Use	Management Use
	Beta	Beta
<b>Stage of education</b>		
Comp. Primary	-	-
Comp. Secondary	-0.034	0.025
<b>Funding</b>		
Public	-	-
Private	0.031	-0.021
<b>Location of school</b>		
Under 5,000 hab.	-	-
5,001 – 50,000 hab.	0.037	0.046
50,001– 100.000 hab.	-0.022	0.013
100,001 – 500.000 hab.	-0.011	0.073*
500.001 hab. and over	-0.010	0.010
<b>Age</b>	0.009	0.025
<b>Gender</b>		
Female	-	-
Male	-0.016	0.020

- Sampling variables such as **stage of education, funding and location of the school** are not associated with **professional uses**.

## Findings – cont'd

	Supportive Use	Management Use
	Beta	Beta
<b>Internet use at school</b>		
Never or almost never	-	-
Monthly	0.058	0.032
Weekly	0.163*	0.063
Daily	0.305*	0.246*
<b>Educational ICT training</b>		
Not in the last 3 years	-	-
Yes, but hardly useful	0.036	0.027
Yes, strongly useful	0.129*	0.084*
<b>Digital Literacy</b>	0.342*	0.179*
<b>Organizational Develop.</b>	0.098*	0.177*
<b>Model summary</b>		
R <sup>2</sup> (Adjusted R <sup>2</sup> )	0.283 (0.276)	0.158 (0.149)
F for the model	36.625*	17.435*
Sample size	1,405	1,405

- More frequent **access to the internet**, useful-rated **educational ICT courses**, and higher **digital literacy** levels make a positive contribution to the appropriation of the internet in **supportive and management uses**.
- Increase in **organisational development** account for slightly more **management uses** of the internet.

# Conclusions

- Teachers' professional practices outside the classroom are a key but also **under-researched area** for understanding the ICT integration in schools.
- This area **complements** the more traditional approach focused on the teaching and learning practices that usually occur during class.
- This study suggests that **technological issues** as well as **organisational practices** are involved in **higher positive attitudes** to educational uses of ICT.
- The findings also show an interesting connection between **daily organisational practices** and the **specific appropriation of ICT** beyond classroom's walls that requires further attention among scholars and practitioners.

## Limitations and future research

- **More specific measures** taking into account some of the specific traits of organisational development theory may be helpful in developing more in-depth approaches to the introduction of the internet to teachers' professional practice (Thoonen et al., 2011; Tondeur et al. 2009).
- A **qualitative approach** may be considered to explore why teachers include ICT in their professional practices as well as the perspectives and beliefs in which the professional use is enacted (Jehn & Jonsen, 2010; Vitale et al., 2008).
- Additionally, **qualitative methods** could also be useful for exploring the wider picture of the factors affecting ICT use in relation to school cultures and subcultures (Mars & Ginter, 2007; Somekh, 2008).

## Implications for policy and practice

- Our findings may help to **promote a managerial perspective** to enrich educational policies in the integration of ICT in schools and high schools.
- Policies may be orientated at **promoting a suitable leadership style** among school principals to improve the on-going process of implementation of ICT.
- Strategies may be implemented to **create an organisational culture** that favours ICT appropriation, as well as developing internal marketing programs, that promote organisational commitment in this process.

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Georgeta Ion  
E-mail: [Georgeta.Ion@uab.cat](mailto:Georgeta.Ion@uab.cat)

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