Examining the influence of ICT-related school and teacher conditions in teachers' perceived effectiveness of digital technology

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Introduction

- In recent years, **factors that influence the integration of ICT** in classrooms and the ways digital technologies are used in teaching and learning have become central topics.
- The potential **positive impact** of digital technology on teaching and learning in schools has been widely acknowledged (Voogt, Knezek, Cox, Knezek, & Brummelhuis, 2013).
- According to Bilbao-Osorio & Pedró (2009), **two types of positive impacts** of digital technologies can be identified:
  1. Enhancement of the student performance.
  2. Improvement and introduction of new processes of teaching and learning.

Literature review

- To date, only Perrotta (2013) has explored the **influence of individual and school-level factors** on teachers' perceived effectiveness of digital technology (i.e., access to wider learning content and resources; motivation for learning).
- This study concluded that there is a **positive** influence of both factors on teachers' perceived effectiveness.
- However, the study had three main **limitations**:
  1. It approached benefits solely from a learning standpoint.
  2. It left out important individual ICT-related conditions such as digital literacy and internet access.
  3. It did not address the influence of ICT policy and infrastructure.

Rationale and aim of the study

- **Little is known** about the factors that affect teachers' perceived effectiveness of digital technology.
- This state of affairs is **problematic** since we know that teachers' perceptions have an impact on their teaching practices.

The **aim** of this study is to develop and test a model of the **individual and school-level factors** affecting primary and secondary school teachers' **perceived effectiveness of digital technology** in their teaching practices

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Method

PARTICIPANTS

Survey conducted at the 2006-2007 academic year and developed with the support of the Telefónica Foundation (Spain).

Sample of **356 educational centres, 356 school principals** and **702 teachers.** Compulsory primary and compulsory secondary education. Spain.

MEASURES

Perceived effectiveness of digital technology

(KMO=0.857, p=0.000; 64.50% of total variance explained; α=0.861).

Socio-demographics and school-level information

ICT-related school conditions

Availability of ICT support:

Ratio of computers to students in classrooms

ICT policy (KMO=0.714, p=0.000): Teaching (48.35%; α=0.901) and management (16.97%; α=0.790) use.

ICT infrastructure (KMO=0.688, p=0.000; 50.63% of total variance explained; α=0.675)

ICT-related teacher conditions

Educational ICT training

Digital literacy (KMO=0.843, p=0.000; 72.33% of total variance explained; α=0.921).

School internet access

Outside school internet access

DATA ANALYSIS

A hierarchical multiple regression analysis was performed, testing for separate effects and controlling for the other variables included in the models, to assess the contribution of socio-demographic and school-level information, ICT-related school conditions, and ICT-related teacher conditions.

Findings: Multiple regression

		Beta
Stage of education	Compulsory primary	-
	Compulsory secondary	0.021
School's type of funding	Public	-
	Private	-0.027
Town population	Less than 10,000	-
	10,001 – 50,000	0.036
	50,001– 100.000	0.059
	100,001 – 500.000	0.023
	500,001 or more	-0.003
Age		-0.006
Gender	Female	-
	Male	0.059
Teaching area	Spanish language	-
	Co-official Spanish language	0.026
	English language	**0.146**
	Mathematics	0.039
	Humanities	**0.098**
	Science	**0.129**
	Arts	-0.026
	Technology	**0.088**

		Beta
ICT policy	Management	0.060
	Teaching	0.023
ICT infrastructure		0.017
Computer to student ratio		-0.023
ICT Support	No	-
	Yes	-0.046
Digital literacy		**0.137**
Educational ICT training	Did not receive any	-
	Rec. a hardly useful one	0.001
	Rec. a very useful one	**0.191**
School Internet access	Never or hardly ever	-
	Monthly	-0.041
	Weekly	-0.011
	Daily	**0.113**
Outside school Internet access	Never or hardly ever	-
	Monthly	0.059
	Weekly	**0.150**
	Daily	**0.153**

Model summary		
R^2 (Adjusted R^2)		0.451 (0.165)
F for the model		**5.328**

- Only the **teaching subject** is a significant predictor of the perceived effectiveness of digital technology; is statistically higher among **English language**, **Humanities**, **Science**, and **Technology** teachers.
- Only having higher levels of reported **digital literacy**, having **received useful educational ICT training**, and being a **weekly** or a **daily user** of the internet are significantly associated with the perceived effectiveness of digital technology.

Conclusions

- The **teaching area** is the only contributing factor among the **socio-demographics** and the **school-level information** measures considered.
- **ICT-related school conditions** (i.e. ICT policy, ICT infrastructure, computer to student ratio, and ICT support) **do not improve the explained variance** of the model.
- **ICT-related teacher conditions** (i.e. digital literacy, education ICT training, and frequency of Internet access) **are the best predictors** among the measures included in the hierarchical regression analysis.

Future research

- A **qualitative follow-up component** may be considered to explore more in–depth under which conditions teachers have a positive perception of the effectiveness of digital technology for their teaching practices
- Additionally, **qualitative methods** could also be useful for exploring the wider picture of the factors affecting the perceived effectiveness of digital technology in relation to school cultures and subcultures
- **More research is needed** to understand the contribution of ICT-related school conditions, in light of its observed relationship with teachers' use of ICT

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