

● Elena Ramírez, Isabel Cañedo & María Clemente
Salamanca (Spain)

<http://dx.doi.org/10.3916/C38-2012-03-06>

Attitudes and Beliefs of Secondary Teachers about Internet Use in their Classrooms

Las actitudes y creencias de los profesores de secundaria sobre el uso de Internet en sus clases

ABSTRACT

The work below examines the attitudes and beliefs that secondary teachers have about the use of Internet resources in their practices. It is presented results obtained from a questionnaire (n=1,721) with different dimensions, obtaining data about teachers' attitudes and reasons with respect to the use of Internet resources, respect to teachers' tasks employed for and respect to training teachers received about Internet resources. The study use descriptive and correlation data of answers percentages to questionnaire items. Results show that attitudes are very important to explain the use of these resources in classroom practices. Also, the role that teachers' perception about their digital competencies plays over the possibility to use Internet resources in their classroom practices. These results show differences between teacher in function of age and genre. Finally, teachers' training about Internet has a positive effect on self perception about digital competencies. The results point to the need of research on what beliefs could explain why teachers decide to use or not Internet resources, how they use them and which factors are included.

ABSTRACT (Spanish)

En este trabajo se estudian las actitudes y creencias que los profesores de secundaria tienen sobre la utilización de los recursos de Internet en sus prácticas. Se presentan los resultados obtenidos aplicando un cuestionario (n=1.721) que abarca diversas dimensiones, obteniéndose datos respecto de las actitudes de los profesores en relación al uso o no de recursos de Internet, a las tareas docentes para las que se emplean y con la formación recibida al respecto. Se ofrecen datos de los porcentajes de respuestas a los ítems del cuestionario e índices correlacionales. Entre los resultados destaca la relación entre las actitudes de los profesores y el que introduzcan estos recursos en sus prácticas, así como el papel que juega la edad y el sexo de los profesores en estas actitudes. También se pone de relieve la relación entre la creencia de los profesores en su competencia digital y la probabilidad de que utilicen los recursos de la Red en sus prácticas. Por último, los resultados destacan la relación que aparece entre la formación recibida sobre Internet y las diferencias en la percepción sobre competencia digital de los docentes. Los resultados subrayan la necesidad de estudiar en profundidad cuáles son las creencias que explican de forma específica la adopción o no de estos recursos digitales, cómo se conforman y qué elementos las definen.

KEYWORDS

ICT, Internet, resources, teacher's attitudes, beliefs, practices, digital competencies, training.
TIC, recursos, Internet, actitudes del profesor, creencias, prácticas, competencia digital, formación.

- ◆ Dr. Elena Ramírez is Professor in the Didactics and School Organization Department at the School of Education of the University of Salamanca (Spain) (ero@usal.es).
- ◆ Dr. Isabel Cañedo is Professor in the Development and Educational Psychology Department at the School of Education of the University of Salamanca (Spain) (icado@usal.es).
- ◆ Dr. María Clemente is Full Professor in the Didactics and School Organization Department at the School of Education of the University of Salamanca (Spain) (mcl@usal.es).

1. Introduction

The interest in investigating teachers' beliefs, conceptions and knowledge, which have been referred to as teacher thoughts or cognitions (Calderhead, 1996), is due to the key role these constructs play when explaining what teachers do in the classroom (Kagan, 1992; Pajares, 1992), as well as the changes they steadily embrace (Putnam & Borko, 1996). This same notion is shared by researchers into the incorporation of ICTs into educational processes, who posit that the beliefs and conceptions teachers hold regarding the use of ICTs have a key role to play when explaining the processes of deploying these resources in the classroom (Ertmer, 2005; Lawless & Pellegrino, 2007; Aguaded & Tirado, 2008; Mominó de la Iglesia, Sigalés & Meneses, 2008; Froufe, 2000). The aim of this paper is to study this issue, specifically attitudes and motivations regarding the use of ICTs associated with the Internet, as expressed by secondary teachers using these resources. This goal requires clearly delimiting the perspective from which the subject is to be addressed, as the present confusion on the study of teachers' conceptions and beliefs has meant that the results from research into the matter have not had a major explanatory impact on teachers' training and practices (Chan & Elliot, 2004; Pajares, 1992; Fang, 1996).

2. Teachers' beliefs - what are we referring to?

The term «beliefs» has been used in very different ways and with very different meanings in research involving teachers. As reported by Pajares (1992), terms such as beliefs, values, attitudes, ideologies, conceptions and pre-conceptions, personal theories and implicit theories have been difficult to differentiate in the array of standpoints adopted in research in this field.

For our purposes here, the most pertinent distinction is the one established between beliefs and knowledge. Beliefs have a more implicit nature and operate in a less consistent manner than knowledge, whereby they manifest themselves in specific practical situations or in episodes, aiming to be of use in the resolution of this specific situation rather than providing long-term efficacy and validation. Beliefs, which also have a cognitive component, do not seek «the truth» through scientific deduction, but utility instead (Poza, 2000), creating personal theories that are marked by the social and practical nature that defines them and renders them of such use to people as formal or scientific knowledge (Poza & Rodrigo, 2001).

According to Nespor (1987), beliefs are formed through experiences that are always linked to personal

events and circumstances, so they include feelings, emotions and assessments, memories of past personal experiences, suppositions on the existence of alternative beings and realities, which are not open to outside evaluation or to critical reasoning. They are gradually built up within a vast system that is constantly being reorganised according to the structure and framework of knowledge.

The power this framework of beliefs exerts upon teaching practices is extremely important, among other things because of the role beliefs play in each teacher's activities. Regarding the matter in question here, namely, the use of Internet resources by secondary teachers, the impact teachers' beliefs about their work has on classroom practice has been well reported (Lumpe, Haney & Czerniak, 2000; Mishra & Koehler, 2006), although it has yet to be made absolutely clear whether teaching beliefs have a direct influence on the use of ICTs in the classroom (Wozney, Venkatesh & Abrami, 2006). We can mention research results that reveal how different aspects related to teachers' beliefs and attitudes regarding these technologies are crucial to their use. For example, the beliefs that teachers hold about their own teaching performance are closely linked to their practices, so favourable attitudes towards technologies and a positive perception of one's own digital competence have proven to be prior conditions for the use of computers in teaching (Paraskeva et al., 2007). On the other hand, and in a study conducted by McGrail (2005), teachers referred to the disadvantages of the use of ICTs alluding to teaching considerations associated with the pupils, the teaching process, ethical issues... These teachers were not at all clear about how to adapt the technologies to their teaching styles or how to include them in the syllabus. Furthermore, in a study by Mueller et al. (2008), one of the critical features that distinguished those teachers who successfully used such technologies from those who did not was their attitude towards these resources, studied according to a scale measuring the degree to which teachers considered a computer to be a viable and productive technology and a cognitive tool that could make an appropriate contribution to their teaching activities. Generally speaking, studies on teachers' attitudes and beliefs regarding ICTs, and the Internet in particular, focus on three points:

- 1) Positive attitudes towards these resources increase the probability they will be used.
- 2) These positive attitudes are closely linked to the perception teachers have of their own digital competence.
- 3) Digital competence alone does not explain the

use of ICTs in practical contexts. This competence has to be linked moreover to the belief that teaching will be enhanced by the use of ICTs. In other words, digital competence increases the likelihood of using ICTs for professional purposes, provided this is consistent with the teaching beliefs held by the teachers themselves (Groves & Zemel, 2000).

Nevertheless, although it seems clear that teachers' beliefs about ICTs condition their use in practice, it is not obvious how to alter these beliefs with a view to extending the use of these technologies in the classroom. Along these lines, some of the more realistic proposals do not rely on changing the teachers, but rather on reconsidering the design of ICT resources (Groves & Zemel, 2000). This would involve, therefore, bringing the technological design closer to the syllabus content through such measures as producing digital materials similar to traditional ones to render them compatible with common teaching approaches to classroom subjects. Other authors (Ertmer, 2005), basing themselves on the principle that changes in beliefs can be triggered by personal experiences, vicarious experiences and socio-cultural influences, stress the need for teachers to experience for themselves or through colleagues the positive results of the use of technological resources in the classroom.

In sum, the preceding review points to the need to understand that the beliefs and attitudes teachers have regarding ICTs constitute one of the factors explaining the use of these resources in the classroom. The aim of this paper, therefore, will be to discover the beliefs held by secondary teachers regarding the use of ICTs related to the Internet. More specifically, we shall set out to use the data gathered using a questionnaire with Likert-type scale questions to analyse attitudinal considerations and the motivational ones informing these beliefs, as these aspects have a bearing on the use of digital resources in teaching methodologies, and whether the Internet training received impacts upon teachers' attitudes and beliefs regarding this medium. In short, we are therefore seeking to unravel the frame-

work of beliefs on ICTs as regards teachers and their relationship with the use or not of these resources.

3. Material and methods

3.1. Sample

In order to conduct this research, we sent out questionnaires, as described forthwith in the Procedure section, to 411 schools - just about all the schools teaching compulsory secondary education in the

We can affirm that the profile of beliefs among the secondary teachers in our sample is informed by two basic aspects: on the one hand, the educational value attributed to Internet resources and, on the other, the knowledge of these resources that is attributed to teachers. Regarding the former, age constitutes a differentiating factor between positive and negative attitudes, with negative ones being linked to older age groups. Regarding the latter, the knowledge of resources, the difference is marked by age and gender, with a lower attribution of digital competence among women and older age groups.

Spanish region of Castilla y León. The characteristics of the sample used are described in table 1 below:

3.2. Procedure

The first stage of the procedure involved preparing the data-gathering instrument. A questionnaire was drawn up that addressed a total of five dimensions. This paper presents data from three of them, as are: (a) attitudes towards Internet resources in relation to the teachers' professional duties; (b) methodological aspects of teaching with the Internet, and (c) Internet training received. Likert-type scales were used for dimensions a and b, with 4 and 5 levels of choice (Hinojo & Fernández, 2002).

The process of preparing the questionnaire was undertaken in several stages, with the last one involving a review of the same by ten secondary school teachers from different subjects. Once all the reviews had been made, the Cronbach's alpha for all the items on

Schools	149 schools (out of a total of 411) 36.4% of the total Type of school: 63.1% state-run, 36.9% private-direct grant
Teachers	Total: 1721 questionnaires received
	Gender: 44.9% male, 53.5% female
	Years of experience: 38.2% between 1 and 10 years of experience, 32.9% between 11 and 20 years, 18.8% between 21 and 30 years, 7.6% more than 30 years.
	Subjects taught: 13.02% humanities and social sciences (geography and history and philosophy), 26.79% languages (Spanish, French, English, Latin and Greek), 32.48% science and technology (mathematics, physics and chemistry, biology and geology and technology), 8.60% art (music and drawing) and 17.84% other subjects (physical education, psychology and pedagogy, and sundry others).

Table 1: Characteristics of the sample.

the Likert-type scales gave a result of 0.89. The questionnaires were sent to all the schools in the sample, and a check was made to ensure they had all been received correctly. Finally, the results received were encoded and loaded into a data matrix that allowed an analysis to be conducted through the SPSS 15.0 statistical program in order to provide the results presented here.

4. Results

The organisation of the results in this section responds to the goal we are pursuing. We therefore first present the percentage data from the answers on attitudes and reasons that the teachers have provided on Internet use in the classroom, together with the correlations of these two aspects according to gender, years of experience and subject taught, using chi-squared tests. Secondly, we present the correlation data that describe the impact the teachers' attitudes and reasons regarding Internet use have on their teaching methods. Thirdly, we provide data to show whether the Internet training received has a bearing on attitudes and reasons regarding the use of this resource among the teachers involved in our research.

4.1 Teachers' attitudes and reasons regarding Internet use

First, Figure 1 presents the results showing the extent to which teachers do or do not agree with the use that can be made

of the Internet in teaching, as well as the reasons explaining why they do or do not use these resources. We can see that the general trend indicates that the highest values correspond to positive attitudes towards this matter. Accordingly, over half the secondary teachers surveyed state that they agree or strongly agree with the fact that the resources provided by the Internet today are essential for teaching. Further-

more, 87.2% disagree or strongly disagree with the notion that Internet resources have little to offer and their usefulness has been overplayed. Therefore, according to these data, we can make the point that teachers have a positive attitude towards Internet resources for classroom use.

As for the motives or reasons teachers give for whether or not they use the Internet, it can be seen (Figure 1) that practically all the teachers agree (92.1%) that one of the reasons for using the Internet is its educational value for pupils. Another reason that appears to merit the agreement of over half the teachers is the lack of resources available to them (52.6%), although this notion contrasts with the disagreement (44.2%) that the teachers also record in this same item. Likewise, most of the teachers seem to disagree with the fact that Internet resources are of no use in teaching (83.7%) and that the legal obligation to

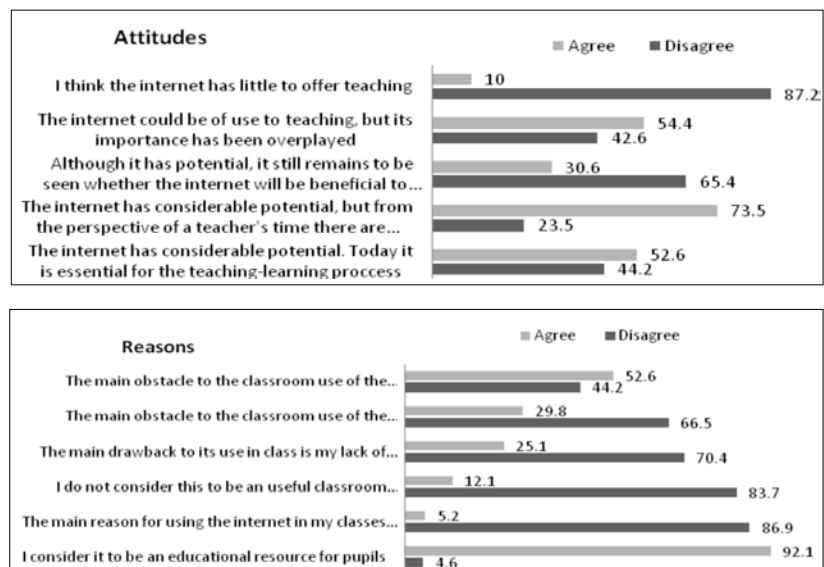


Figure 1: Percentage of agreements and disagreements in attitudes and reasons regarding Internet .

use them (86.9%) or a lack of training and experience (70.4%, 66.5%) are reasons or motives that explain the classroom use or not of the Internet. In short, the reasons that secondary teachers give as the ones carrying the most weight for the use of Internet resources in their classes involve mainly what they consider as favouring the pupils' learning experience, as well as being of use to their classroom practices. As we can see, these results are consistent with the positive attitude that most teachers have towards the Internet.

Once the data have been gathered on the teachers' attitudes and reasons regarding the use of the Internet's digital resources, our focus now turns to discovering whether there are differences in these attitudes and reasons according to the variables of gender, years of experience and the subjects taught by the teachers in the sample. The results obtained accordingly are shown in tables 2 (attitudes) and 3 (reasons).

The correlation analyses conducted through Pearson's chi-squared coefficient (table 2) reveal significant relationships between the attitudes variable and other teacher variables, such as years of experience and the subject taught. In this sense, regarding gender, the most significant result is that being male or female does not have a major impact on the attitudes teachers have towards the use of the Internet in the classroom. In terms of years of experience, all the attitudes items correlate significantly, with the exception of item 5, which is not significant. The significant and positive relationships between these two variables suggest that the more positive attitudes towards the Internet are even stronger among those teachers with fewer years of experience (under 10) than among those with more experience (over 15 years). The subject variable throws up significant differences for item 3, revealing a somewhat sceptical attitude towards the use of Internet in teaching solely in the subjects we have listed under science and technology.

Regarding the relationships between the reasons for use and other variables such as experience, gender and subject (table 3), we have found results that reveal important issues. In general, we find highly significant differences between the various items in the reasons dimension and the different levels of experience. All the answers to this dimension are significant at the 0.01 confidence level according to the years of experience, except for the item: «The main obstacle to the

classroom use of the Internet is a lack of technological resources». A detailed analysis of the results reveals that the longer a person has been in teaching, the more they will be in agreement regarding lack of experience, training and usefulness as reasons for not using the Internet in class. Furthermore, the groups of teachers with more experience are the ones who consider this resource has no educational use for pupils, as opposed to the younger ones who do consider it to be educational and useful, although they consider the lack of

Table 2: Correlations: Pearson's chi-square. Attitudes

	1	2	3	4	5
Gender	0.578	0.556	0.134	0.228	0.864
Years of experience	0.000**	0.000**	0.000**	0.007**	0.893
Subject taught	0.475	0.152	0.05*	0.057	0.240

** The correlation is significant at the 0.01 level *The correlation is significant at the 0.05 level.

1) I think the Internet has little to offer teaching. 2) The Internet could be of use to teaching, but its importance has been overplayed. 3) Although it has potential, it still remains to be seen whether the Internet will be beneficial to teaching. 4) The Internet has considerable potential, but from the perspective of a teacher's time there are other priorities. 5) The Internet has considerable potential. Today it is essential for the teaching-learning process.

resources to be an obstacle. On the other hand, the gender variable also marks significant differences regarding the reasons for using the Internet. Women are the ones who affirm they do not use the Internet for reasons of lack of resources, experience and training, and because they do not consider the Internet to be useful. Finally, the subject taught also leads to significant differences (0.01 confidence level) regarding the items of lack of resources, experience and training. This means that although the subjects of languages and humanities and social sciences are the ones with the closest agreement with the lack of experience and training as reasons for explaining the non-use of the Internet, in the case of «The main obstacle to the classroom use of the Internet is a lack of technological resources», the art subjects also use it as an argument, as opposed to science and technology subjects where there is disagreement with this statement.

4.2. Impact of attitudes and reasons regarding the use of the Internet on teaching methodologies

There follows a description of the results of the cross-analyses between the dimensions of teaching methodologies applied in class and the resources associated with the Internet, attitudes towards its use and reasons for such use. The data provided below are designed to study in greater detail the relationship between the attitudes and beliefs of the teachers in the sample and the methodology they apply in class.

Appearing first in table 4 are the results of the

	1	2	3	4	5	6
Gender	0.021*	0.000**	0.000**	0.007**	0.215	0.222
Years of experience	0.429	0.000**	0.000**	0.000**	0.002**	0.000**
Subject taught	0.000**	0.000**	0.000**	0.253	0.468	0.059

** The correlation is significant at the 0.01 level *The correlation is significant at the 0.05 level

1) The main obstacle to the classroom use of the Internet is a lack of technological resources. 2) The main obstacle to the classroom use of the Internet is my lack of experience. 3) The main drawback to its use in class is my lack of training. 4) I do not consider this to be a useful classroom resource. 5) The main reason for using the Internet in my classes is that I am legally required to do so. 6) I consider it to be an educational resource for pupils.

correlations between the methodology dimension (specifying the teaching tasks using Internet resources) and the attitudes held by teachers. The results are clear: practically all the correlations are significant at a 0.01 level. The indices have a negative sign when the attitudes item is formulated in this direction, which means that negative attitudes correlate with the non-use of the Internet for teaching activities, whereas the positive ones do so with the application of those activities in the teacher's classroom practices. The correlations have a positive sign when the items are formulated in a positive way, which corroborates the trend we have just explained: positive attitudes towards the Internet are associated with the application of Internet resources to teaching activities and vice versa. This general pattern is qualified, showing that attitude is what defines the methodology to be applied with the Internet in class, both for those activities involving the presentation and handling of information, where the greatest significant effects are to be found ($p = .376$), and for communication and teamwork methodology-

gies, with the smallest significant effects ($p = .169$).

Secondly, table 5 contains the correlation results obtained in the analysis of the reasons teachers allude to regarding their teaching methods involving the use of the Internet. It can be affirmed that the arguments carrying the most weight for

explaining the use or not of the Internet for their teaching activities are related to the perception teachers have of their experience and training, the usefulness of the Internet for their classes and legal requirements. This means that the correlations between the items we have just listed are all significant at a 0.01 level and negative. Therefore, those teachers that perceive themselves as having a lack of experience or a lack of training are the ones who least use the Internet in class. Likewise, those teachers who consider the Internet resource to be of no use for their classes do not include it in their work either. Those who do not agree that legal requirements are the main reason for using the Internet in their classes are the ones who most use this medium in their teaching activities. On

	1	2	3	4	5
Internet uses					
Accessing quick and direct sources of information		-.245**	-.246**	-.258**	-.145** .345**
Fostering skills in the handling and evaluation of information		-.189**	-.284	-.260**	-.240** .370**
Applying the skills pupils have acquired outside school					
within a classroom context		-.151**	-.246**	-.252**	-.222** .359**
Directing the pupils to a source of information for homework		-.178**	-.209**	-.224**	-.156** .330**
Encouraging pupils to work on their own		-.210**	-.257**	-.263**	-.212** .376**
Presenting information					
Illustrating or supporting specific aspects of my classroom explanations		-.211**	-.262**	-.278**	-.207** .339**
Communication and teamwork					
Creating discussion groups on current affairs during the					
development of topics		-.022	-.125**	-.096**	-.152** .196**
Arranging shared project work with other schools via the Internet		-.002	-.079**	-.072**	-.122** .169**
Individual tasks					
Providing materials and resources for further learning activities		-.176**	-.218**	-.247**	-.188** .348**
Providing materials and resources for remedial activities		-.153**	-.220**	-.197**	-.186** .351**

** The correlation is significant at the 0.01 level (bilateral) *The correlation is significant at the 0.05 level (bilateral)

1) I think the Internet has little to offer teaching; 2) The Internet could be of use to teaching, but its importance has been overplayed; 3) Although it has potential, it still remains to be seen whether the Internet will be beneficial to teaching; 4) The Internet has considerable potential, but from the perspective of a teacher's time there are other priorities; 5) The Internet has considerable potential. Today it is essential for the teaching-learning process.

Table 4: Correlations: Spearman's rho: Methodology-Reasons for use/non-use

	1	2	3	4	5	6
Internet uses						
Accessing quick and direct sources of information	.135**	-.290**	-.299**	-.354**	-.201**	.346**
Fostering skills in the handling and evaluation of information	.070**	-.285**	-.287**	-.349**	-.155**	.348**
Applying the skills pupils have acquired outside school						
within a classroom context	.053*	-.258**	-.266**	-.335**	-.128**	.319**
Directing the pupils to a source of information for homework	.089**	-.226**	-.238**	-.298**	-.163**	.298**
Encouraging pupils to work on their own	.094**	-.263**	-.264**	-.364**	-.189**	.359**
Presenting information						
Illustrating or supporting specific aspects of my classroom explanations	.074**	-.294**	-.281**	-.415**	-.195**	.331**
Communication and teamwork						
Creating discussion groups on current affairs during the						
development of topics	.022	-.122**	-.125**	-.109**	-.022	.131**
Arranging shared project work with other schools via the Internet	.018	-.080**	-.075**	-.088**	-.055*	.117**
Individual tasks						
Providing materials and resources for further learning activities	.066**	-.254**	-.254**	-.338**	-.182**	.314**
Providing materials and resources for remedial activities	.073**	-.233**	-.228**	-.315**	-.161**	.271**

** The correlation is significant at the 0.01 level (bilateral) *The correlation is significant at the 0.05 level (bilateral) 1) The main obstacle to the classroom use of the Internet is a lack of technological resources; 2) The main obstacle to the classroom use of the Internet is my lack of experience; 3) The main drawback to its use in class is my lack of training; 4) I do not consider this to be a useful classroom resource; 5) The main reason for using the Internet in my classes is that I am legally required to do so; 6) I consider it to be an educational resource for pupils.

the other hand, a lack of resources as an obstacle to the use of the Internet in class correlates significantly with practically all teaching practices, with the exception of communication and teamwork, which have an anecdotic impact on their application. Yet this result in relation to the item involving a lack of resources reveals that the ones most using the Internet for teaching practices are also the ones who place the most stress on the lack of resources. This means that a lack of resources is not the aspect with the most weight for explaining the reason whether or not the Internet is used in the teacher's work. Finally, a reason that clearly explains the use of the Internet made by teachers is the understanding that this resource has an educational role to play for pupils, as can be seen in the correlation indices listed in table 5.

4.3. Repercussion of the Internet training received on attitudes and reasons for use among teachers

Finally, table 6 contains the correlation results between teachers' attitudes and reasons and the Internet training received. Two aspects stand out in our analysis of the results in these dimensions. Firstly, regarding attitudes, although in general we have already indicated that teachers seem to share positive attitudes towards the Internet, those that have received training during their degree courses or their professional care-

ers at Spain's Teacher Training and Innovation Centres (CFIEs) and other institutions are the ones who by far reveal the most positive attitudes towards the use of the Internet. Secondly, those teachers who have received training, whatever its nature, are the ones who consider themselves to have a greater level of digital competence, as they are the ones who do not consider a lack of experience or a lack of training to be the main obstacle to Internet use in the classroom, and in most of the items this difference is significant at a 0.01 confidence level. It would be of greater interest to study these data in more detail in order to gain more comprehensive information on the type of training received in terms of content and the teaching methodologies used, as it appears to have been put to good use.

5. Discussion

In the light of these data, we can affirm that the profile of beliefs among the secondary teachers in our sample is informed by two basic aspects: on the one hand, the educational value attributed to Internet resources and, on the other, the knowledge of these resources that is attributed to teachers. Regarding the former, age constitutes a differentiating factor between positive and negative attitudes, with negative ones being linked to older age groups. Regarding the latter,

Table 6: Correlations: Chi-square: Attitudes-Reasons/Training							
	1	2	3	4	5	6	7
Attitudes							
1) I think the Internet has little to offer teaching	0.000**	0.233	0.628	0.008**	0.031*	0.001**	0.131
2) The Internet could be of use to teaching, but its importance has been overplayed	0.005**	0.004**	0.545	0.760	0.035*	0.020*	0.019*
3) Although it has potential, it still remains to be seen whether the Internet will be beneficial to teaching	0.005**	0.027*	0.644	0.001**	0.162	0.264	0.010*
4) The Internet has considerable potential, but from the perspective of a teacher's time there are other priorities	0.019*	0.000**	0.076	0.767	0.000**	0.835	0.595
5) The Internet has considerable potential. Today it is essential for the teaching-learning process	0.136	0.564	0.272	0.044*	0.033*	0.174	0.123
Reasons							
1) The main obstacle to the classroom use of the Internet is a lack of technological resources	0.009**	0.679	0.612	0.758	0.358	0.821	0.897
2) The main obstacle to the classroom use of the Internet is my lack of experience	0.000**	0.000**	0.160	0.009**	0.028*	0.004**	0.000**
3) The main drawback to its use in class is my lack of training	0.000**	0.005**	0.173	0.000**	0.059	0.000**	0.000**
4) I do not consider this to be a useful classroom resource	0.000**	0.086	0.017*	0.008**	0.015*	0.026*	0.227
5) The main reason for using the Internet in my classes is that I am legally required to do so	0.047*	0.835	0.531	0.042*	0.581	0.999	0.295
6) I consider it to be an educational resource for pupils	0.001**	0.203	0.034*	0.018*	0.012*	0.030*	0.409

** The correlation is significant at the 0.01 level *The correlation is significant at the 0.05 level. 1) Initial training: as an undergraduate; 2) Initial training: Master's degree; 3) Initial training: courses; 4) Lifelong training: CFIE courses; 5) Lifelong training: Master's degree; 6) Lifelong training: evening classes 7) Self-taught.

the knowledge of resources, the difference is marked by age and gender, with a lower attribution of digital competence among women and older age groups. Finally, training, especially at an initial stage, although also that provided by CFIE teacher training centres, has a positive impact on the assessment teachers make of their own digital competence.

These data ratify what other scholars have found, thereby enabling us to focus on certain aspects with major ramifications for classroom practices.

Firstly, it seems clear that attitudes have a fair degree of influence on the use of Internet resources in classroom practices. Although these attitudes are generally positive, those teachers who consider that these resources have no educational value do not use them in the classroom and this relationship is significant above all in older age groups, as is also reported in the work by Paraskeva et al. (2007). Yet in addition to attitude, the perception teachers have of their digital competence also seems to explain the likelihood they will use Internet resources in their teaching activities. In this case, moreover, the differences are due not only to age, but also to the teachers' gender. Nevertheless, although the role beliefs play in the attribution of the competence itself seems to be a crucial one for the adoption of the resources, the Internet training received is effective for improving this digital competence.

Secondly, these results show that the issue of beliefs and attitudes must necessarily be included on the agenda for research into the use of ICTs in teaching practices and, in particular, the use of the Internet as a teaching resource. An in-depth study is required to uncover the beliefs that specifically explain the adoption or otherwise of these innovations, how they are shaped and the elements that define them, as well as to investigate the training received regarding the Internet, content, educational approaches, as it is a reason that explains the change in the perception of professional competence in terms of these resources. Finally, it is important to pursue lines of research that connect the teaching approaches of teachers with beliefs on ICTs in general and the Internet in particular, given the link that appears to exist between the two factors, without losing sight of how it is all indeed implemented in the practical contexts in which teaching-learning processes actually take place.

Acknowledgements

This research has been conducted thanks to the funds provided by project SA060A06 of the Regional Government, the Junta of Castilla & León.

References

AGUADED, J.I. & TIRADO, R. (2008). Los centros TIC y sus repercusiones didácticas en primaria y secundaria en Andalucía. *Educar*, 41; 61-90.

- CALDERHEAD, J. (1996). Teachers: Beliefs and Knowledge. In BERLINER, D. & CALFEE, R. (Eds.), *Handbook of Educational Psychology*. New York: Macmillan; 709-725.
- CHAN, K-W. & ELLIOTT, R.G. (2004). Relational Analysis of Personal Epistemology and Conceptions about Teaching and Learning. *Teacher and Teaching Education*, 20 (2004); 817-831.
- ERTMER, P.A. (2005). Teacher Pedagogical Beliefs. The Final Frontier in our Quest for Technology Integration? *Educational Technology Research and Development*, 53(4); 25-39.
- FANG, Z. (1996). A Review of Research and Teacher Beliefs and Practices. *Educational Research*, 38 (1); 47-65.
- FROUFE, S. (2000). Análisis crítico de las actitudes bloqueadoras de la comunicación humana. *Comunicar*, 14; 97-102.
- GROVES, M. & ZEMEL, P. (2000). Instructional Technology Adoption in Higher Education: an Action Research Case Study. *International Journal of Instructional Media*, 27 (1); 57-65.
- HINOJO, J. & FERNÁNDEZ, F. (2002). Diseño de escala de actitudes para la formación del profesorado en tecnologías. *Comunicar*, 19; 120-125.
- KAGAN, D.M. (1992). Implications of Research on Teacher Belief. *Educational Psychologist*, 27(1); 65-90.
- LAWLESS, K. & PELLEGRINO, J. (2007). Professional Development in Integrating Technology into Teaching and Learning: Knowns, Unknowns, and Ways to Pursue Better Questions and Answers. *Review of Educational Research*, 77; 575-614.
- LUMPE, A.T.; HANEY, J.J. & CZERNIAK, C.M. (2000). Assessing Teachers' Beliefs about Their Science Teaching Context. *Journal of Research in Science Teaching*, 37; 275-292.
- MCGRAIL, E. (2005). Teachers, Technology and Change: English Teachers' Perspectives. *Journal of Technology and Teacher Education*, 13; 5-24.
- KOEHLER, M.J. & MISHRA, P. (2006). Technological Pedagogical Content Knowledge: A framework for Teacher Knowledge. *Teachers College Record*, 108; 1.017-1.054.
- MOMINÓ, J.M.; SIGALES, C. & MENESES, J. (2008). *L'escola a la societat xarxa: Internet a l'Educació Primària i Secundària*. Barcelona: Ariel y UOC.
- MUELLER, J.; WOOD, E.; WILLOUGHBY, T.; ROSS, C. & SPECHT, J. (2008). Identifying Discriminating Variables between Teachers who Fully Integrate Computers and Teachers with Limited Integration. *Computers & Education* (doi: 10.1016/j.compedu.2008.02.003) (01-07-2011).
- NESPOR, J. (1987). The Role of Beliefs in the Practice of Teaching. *Journal of Curriculum Studies*, 19; 317-328.
- PAJARES, M.F. (1992). Teachers' Beliefs and Educational Research: Cleaning up a Messy C Construct. *Review of Educational Research*, 62; 307-332.
- PARASKEVA, F. & AL. (2007). Individual Characteristics and Computer Self-efficacy. *Computers & Education* (doi: 10.1016/j.compedu.2006.10.006) (01-07-2011).
- POZO, J.I. (2000). Concepciones de aprendizaje y cambio educativo. *Revista Ensayos y Experiencias*, 33; 4-13.
- POZO, Y. & RODRIGO, M.J. (2001). Del cambio de contenido al cambio representacional en el conocimiento conceptual. *Infancia y Aprendizaje*, 24 (4); 3-22.
- PUTNAM, R., & BORKO, H. (1997). Teacher Learning: Implications of New Views of Cognition. In BIDDLE, B.; GOOD, T. & GOODSON, I. (Eds.). *The International Handbook of Teachers and Teaching*. Dordrecht, The Netherlands: Kluwer; 1.223-1.296.
- WOZNEY, L.; VENKATESH, V. & ABRAMI, P.C. (2006). Implementing Computer Technologies: Teachers' Perceptions and Practices. *Journal of Technology and Teacher Education*, 14; 120-173.