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Information Literacy Grade of Secondary School Teachers in Spain – Beliefs and Self-Perceptions

Grado de alfabetización informacional del profesorado de Secundaria en España: Creencias y autopercepciones

Dr. Juan-Francisco Álvarez is Researcher at the Research Group ARGET and a PhD in Educational Technology and E-learning at the Rovira and Virgili University in Tarragona (Spain) (juanfratic@gmail.com) (http://orcid.org/0000-0002-9988-8286).

Dr. Mercè Gisbert is Professor and Head of the Research Group on Educational Technology at the Rovira and Virgili University in Tarragona (Spain) (merce.gisbert@urv.cat) (http://orcid.org/0000-0002-8330-1495).

ABSTRACT

Information Literacy is one of the dimensions of digital competence and, in today's information and media-based society, it should be a skill that everyone develops, especially secondary school teachers due to their influence on this crucial stage of student development. In this investigation we aim to determine the current level of information literacy of secondary school teachers in Spain. For this purpose we have designed a questionnaire (n=2,656) which is divided into two parts: the first asks questions related to belief and self-perception of information literacy indicators, and the second presents practical cases in which the teachers have to demonstrate their skills in information literacy. The results confirm that secondary school teachers' beliefs show rather high values but that, even if the level of information literacy that the teachers have is acceptable, there are certain aspects of the indicators related to assessment, management and transformation of information in which the teachers display serious shortcomings. This highlights the need to establish a training plan for information literacy for secondary school teachers in Spain.

RESUMEN

La alfabetización informacional es una de las dimensiones de la competencia digital y, como tal, debe ser tenida muy en cuenta dentro de las competencias asumibles por cualquier persona en nuestros días, inmersa en la sociedad de la información y la comunicación, pero más concretamente por el profesorado de Educación Secundaria dada la gran importancia que tiene esta etapa en la formación de los alumnos. En este estudio hemos querido conocer cuál es el grado de alfabetización informacional del profesorado de Secundaria del estado español. Para ello hemos construido y aplicado un cuestionario (n=2.656). En dicho instrumento hemos sometido al profesorado a dos partes bien diferenciadas, una con cuestiones de creencia y autopercepción sobre los indicadores de la alfabetización informacional, y por otra, con cuestiones de situación, casos prácticos en los que el profesorado ha tenido que poner en práctica las habilidades y destrezas que tiene sobre la alfabetización informacional. Los resultados obtenidos confirman que las creencias del profesorado de Educación Secundaria dan valores bastante elevados pero también nos muestran que si bien el grado de alfabetización informacional del profesorado consigue el aprobado, hay ciertos aspectos de los indicadores relativos a la evaluación, gestión y transformación de la información donde los docentes tienen graves carencias. Todo ello pone de manifiesto la necesidad de plantear un plan formativo en alfabetización informacional del profesorado de Educación Secundaria de España.

KEYWORDS | PALABRAS CLAVE

Digital competence, information literacy, perceptions, training, secondary, indicators, ICT, teacher.
Competencia digital, alfabetización informacional, percepciones, formación, Secundaria, indicadores, TIC, docente.

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1. Introduction

Secondary Education is located on the border between compulsory education and university education or on the threshold of a specialised technical profession. In our education system, Secondary Education is one of the fundamental pillars on which the education of our students is based, and Secondary Education school teachers play a key role in the educational process. In this paper we focus on the competence of these school teachers. In particular we aim to determine what level of information literacy (a component of digital literacy) Spanish Secondary Education school teachers have. A profession such as teaching must have identity and competence (Sarramona, 2007). Competent teachers must have the ability to use Information and Communication Technologies (ICTs) skilfully in the classroom (Fernández, 2003). We currently speak about Secondary Education school teachers being immersed in a new role (Espuny & al., 2010; Gisbert, 2002; Tejada, 1999) that compels them to develop skills and abilities in the world of ICTs. Numerous public and private international institutions and organizations have attempted to define indicators to describe teachers' digital competence. These attempts have included efforts by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2008) to set ICT standards for school teachers and work by the International Society for Technology in Education (ISTE, 2008). Numerous authors have also conducted research into the digital competences that contemporary school teachers must possess (Tejedor & García-Valcárcel, 2006; Suárez-Rodríguez & al., 2013). Some of these studies have focused on initial teacher-training (Ruiz & al., 2010; Roig & Pascual, 2012) while others have focused on continuous training (Cabero & al., 1999; Aznar & al., 2003). Other studies have analysed the beliefs and self-perceptions of Secondary Education school teachers regarding their use of the Internet in their classes (Ramírez & al., 2012) or their use of computers (Peinado & al., 2011). Digital competence comprises a series of dimensions (Vivancos, 2008). One dimension that recurs in every analysis of this basic competence is «information literacy» (IL).

Since the term «information literacy» was coined by Paul Zurkowski in 1974, several definitions of IL have been proposed. It is currently understood as the ability to treat information and to use this information to construct knowledge and lifelong learning in order to solve any problems we may encounter. This assumes the ability to recognise the need for information and know how to find it, analyse it, manage it and convert it into knowledge. Today, UNESCO is the international organization that most promotes information literacy in teaching institutions. It has established a curriculum for teachers (Wilson & al., 2011), attempted to establish indicators for this kind of literacy (Catts & Lau, 2008), and made numerous resources available for disseminating and studying it (UNESCO, 2013). Since possessing a certain level of IL is a fundamental need for both teachers and students (Wilson, 2012), we are interested in determining what level of IL Spanish Secondary Education school teachers have. Even though, as we mentioned earlier, previous studies have attempted to determine their level of digital competence, and even though studies on the information literacy of university students (Egaña & al., 2013) and the perceived information competence of future Secondary Education school teachers (Rodríguez & al., 2012) are available, no studies in Spain have been conducted on the level of information literacy of Spanish secondary school teachers. Although in different contexts to ours (Spain), the research on the IL of Secondary Education school teachers in other countries can provide examples and be useful for the purposes of comparison. Merchant and Hepworth (2002) compared the differences in the self-perceptions of IL levels between teachers and students in the United Kingdom. Smith (2013) analysed the self-perception of Canadian secondary school teachers with regard to their IL levels and the IL experiments they conduct in their classrooms. Williams and Wavell (2007) studied the perceptions that English secondary school teachers have of the IL levels of their pupils. Several studies on the IL levels of Secondary Education school teachers have also been conducted in South America. In Chile, for example, the Ministry of Education has established ICT competences and standards for the teaching profession in order to evaluate, among other things, how much their teachers have learned about strategies for searching, localizing, selecting and storing information resources available in electronic and online systems (Enlaces, 2011). The Colombian Ministry of Education has established five ITC competences for the professional development of teachers. With regard to IL, all of these competences, and in particular, research competence, emphasise the need for teachers to be able to: search, order, filter, connect and analyse the information available on the Internet; compare and analyse information from digital sources; and use information from the Internet critically and reflexively (MEN, 2013). In Spain, the National Institute of Educational Technology and Teacher Training (INTEF, 2014) has recently published a draft

report for a Common Framework for the Digital Competence of Teachers aimed at helping teachers to determine, develop, empower and evaluate their own digital competence as well as that of their pupils.

2. Material and methods

Having defined IL and discussed previous studies of IL in Spain and elsewhere, we now establish several IL indicators that will enable us to measure the extent to which secondary school teachers in Spain have acquired informational literacy. We have taken into account the above studies on indicators of digital competence as well as other indicators of IL: the UNESCO study, the study by Wen and Shih (2008), who sought to establish indicators of IL for primary school teachers and university lecturers in Taiwan, and the rules on IL indicators for future primary and secondary school teachers in the United States produced by the Instruction for Educators Committee of the Education and Behavioral Sciences Section (EBSS) (2011). Finally, to meet our objectives we also took as reference for our IL indicators those described by Larraz (2012) in the author's rubric for digital competence: recognize the need for information, locate it, evaluate it, organise it and transform it. We also analysed the various data collection instruments used in the numerous studies conducted so far in this area both in the general field of digital literacy (Covello, 2010) and in the specific field of IL. Since these instruments didn't fully convince us, we decided to construct and validate our own instrument, which is a questionnaire for measuring the level of information literacy of Secondary Education school teachers. In the following sections we present the first results of our research. We begin by assuming that, although the results for recognizing the need for information and locating information will be high, those for evaluating, organizing and transforming information will not.

2.1. Population and sample

The latest statistical data available from the Spanish Ministry of Education, corresponding to the 2011-12 academic year, shows that there were of 287,027 Secondary Education school teachers in Spain. Invitations to participate in the study were sent to every Secondary Education institution in the country and the questionnaire was available for online completion in 2013. A total of 2,656 valid responses were recorded. For this sample of 2,656 participants, the confidence interval was 1.9678, the sample error was 0.019, and the variability was 0.5. The characteristics of the sample are shown in table 1.

2.2. Instrument

To collect the data we used our self-compiled Secondary Education schoolteacher information literacy questionnaire (AIPS2013). This was based on the one used by Williams and Coles (2003) to measure the use and attitudes to IL of secondary school teachers in the United Kingdom, and the one used by the Digital Competence Assessment (DCA) research group of professor Calvani and al. (2010) to investigate the level of digital competence of secondary school pupils. We consider the interesting approach provided by the situation and practical case items of the latter questionnaire to be crucially important. Indeed, one of the objectives of our research was to investigate beyond the self-perceptions of teachers in order to obtain objective results for the true IL level of these teachers. Calvani also recognises that all Secondary Education school teachers should be able to meet the IL competency standards established in the suggested indicators for secondary schoolchildren, while Campbell (2004) concludes that the IL indicators are valid for all stages of human development.

The questionnaire is divided into two clearly distinct parts. In addition to questions aimed at identifying and describing the sample, the first part contains a series of closed questions on self-perception (Likert-scale questions), beliefs and attitudes regarding the indicators and the level of IL the teachers taking the questionnaire believe they have. The second part comprises questions on simulations or practical cases that test the teachers in order to obtain objective results for the indicators that will provide a more reliable estimate of IL levels. The questionnaire contains 13 descriptive questions and 32 questions on self-perception in the first part and 10 simulation/situation questions in

Table 1: Characteristics of the sample

Teachers	Total: 2,656 questionnaires received
	Gender: 44.5% male / 55.5% female
	Age: 3.2% between 21and 30 27.8% between 31 and 40 42.6% between 41 and 50 25.2% between 51 and 60 1.2% over 60
	Subjects taught: 23.2% Humanities and Social Sciences 28.0% Languages 42.5% Scientific and technological subjects 6.3% Artistic subjects
	Type of institution: 85% Public schools (state schools) 14% State-funded private schools 1% Private schools
	Teaching experience: 0.5% less than 1 year 9.5% between 1 and 5 years 15.9% between 6 and 10 years 74.2% over 10 years

the second part. The questionnaire can be found at http://goo.gl/57nst4.

Validation of this questionnaire involved an initial assessment by a committee of 10 experts comprising university professors of Educational Technology from several Spanish universities and Secondary Education school teachers. After relevant revisions and modifications had been made to the questionnaire, it was given to a pilot sample of 50 secondary school teachers in order to test reliability and detect any problems in understanding, accessing or using it. This first sample provided a Cronbach's Alpha reliability coefficient of 0.834 in the Likert-scale questions. According to Bisquerra (1987), values between 0.8 and 1 are considered excellent reliability indices. When the questionnaire was administered to our full sample of teachers, another excellent Chronbach's reliability coefficient of 0.811 was obtained. This demonstrates that our questionnaire was highly reliable. The data obtained from the questionnaire was codified and treated with version 21.0 of the SPSS statistical software package.

3. Results: Self-perceived information literacy (IL) level

Given the breadth of our questionnaire and the high number of responses recorded, in this first paper we will concentrate on the results from the questions on self-perception and the IL indicators. We will leave the evaluation and analysis of the practical questions for a future paper.

Teachers in Spanish Secondary Education have a high self-perception of their ability to recognize the need for information (indicator A). As we can see from table 2, the average percentage was 87.8% and in all cases the average scores exceeded 4.5. This means that Spanish secondary school teachers feel capable of searching for information on the Internet for work-related issues and locating the information they are seeking quickly and efficiently, and have no difficulty in identifying the objective, problem or reason for their search. Of these three concepts, the highest scores (mean=5.48; mode=6; and percentage=93.8) and least spread in the results (standard deviation=0.949) were obtained for finds information on the Internet for work-related issues. As we shall see later, these were also the highest scores of any question of any IL indicator. Table 2 shows the results for the questions for indicator A, on recognizing the need for information.

In the results for the next indicator (indicator B) on locating information, we begin to observe several important variations (see table 3). Although the results were still high (averages above 4, an average percentage of 80.2, and medians and modes of 5), there is a clear difference between, on the one hand, comparing information from several sources and visiting several types of information sources, and, on the other hand, quoting the source and author of the information obtained. While the averages for the first two items were high and similar (4.71 and 4.79), we can see that Spanish secondary school teachers did not agree on the third item, recording a wide range of scores (high standard deviation of 1.519) and an exceptionally low percentage (69.5%) compared to their scores for all the other items from the first two IL indicators.

The results for the third indicator (indicator C), on evaluating information, were similar to those for indicator B (table 4). While the average percentage for the responses was considerably lower (64.3%), we also find the lowest range of responses for one item and the widest range of those for another in the same indicator. For example, the responses of the secondary school teachers with regard to their ability to distinguish between important and non-important incoming email messages varied widely (with one of the highest standard deviations of the whole questionnaire (1.760), a median of 4 and a mode of 1). On the other hand, the same Spanish secondary school teachers

Table 2. Indicator A: Recognising the need for information

A. Recognising the need for information		%	Mean	Median	Mode	Standard deviation	Variance	Average %	
19. Finds information on the Internet for work-related issues.	1	0.5	5.18	5	6	.949	.899		87.8
	2	1.4							
	3	4.3							
	4	11.4						93.8	
	5	38.0							
	6	44.4							
20. Locates information on the Internet quickly and efficiently.	1	3.7	4.63	5	5	1.269	1.610		
	2	3.5							
	3	9.0							
	4	21.2						83.8	
	5	35.5							
	6	27.1							
21. Identifies the objective, problem or reason for their search.	1	0.7	4.61	5	5	1.024	1.048		
	2	2.3							
	3	11.1							
	4	25.6						85.9	
	5	42.0							
	6	18.3							

Table 3. Indicator B: Locating information

B. Locating information.		%	Mean	Median	Mode	Standard deviation	Variance	Average %	
35. Compares the information with information from other sources.	1	0.7	4.71	5	5	1.146	1.313	83.9	80,2
	2	3.8							
	3	11.5							
	4	19.8							
	5	36.1							
	6	28.0							
36. Visits several types of information sources.	1	0.7	4.79	5	5	1.093	1.194	87.1	
	2	3.4							
	3	8.8							
	4	19.4							
	5	39.4							
	6	28.4							
39. Quotes the source and the author of the information obtained.	1	5.0	4.21	5	5	1.519	2.307	69.5	
	2	13.4							
	3	12.0							
	4	19.1							
	5	25.9							
	6	24.5							

agreed on their ability to distinguish between important information and non-important information, recording one of the highest percentages on this item (89.3%) and the lowest standard deviations of the whole questionnaire (0.941). On the other hand, they failed to agree on whether to afford greater reliability and veracity to digital or analogical resources: just over half of those surveyed were in favour of information from digital sources, while the rest were in favour of information from analogical sources.

For the next indicator (indicator D), the results on self-perception were the lowest of all (table 5). Although the range of responses was wide (with standard deviations of 1.839 and 1.476), for the two questions on ability to organize information, the percentages (49.0% and 14.75%) and means (3.50 and 2.31) were the lowest results of the entire questionnaire. Less than half the teachers use a system for classifying and managing email and very few know or use any type of content reader or aggregator.

The results for the final indicator (Indicator E), on transforming information, show that only 74% of secondary school teachers in Spain are able to convert the information obtained from their Internet searches into their own content (table 6, see in next page).

After the teachers had answered all the questions from the five IL indicators, and after they had read our definition of IL, we added another question in order to obtain an overall assessment of the self-perception of the IL level of Spanish secondary school teachers. The results obtained from this question are shown in table 7.

Here we observe a certain tendency towards central scores, with an average of 3.70 and a percentage of 59.6%, which is slightly lower than would be expected from the results from each indicator individually. As we can see in table 8, the average self-perceived IL level from all the indicators (76.6%) was eight points lower than the estimated self-perceived IL level from the overall assessment.

4. Discussion and conclusions

Both the average score for the indicators used to define IL (67.6%) and the self-perception score recorded by the school teachers after reading a definition of IL (59.6%) show that these school teachers have a high self-perception of their information literacy. Our results also show that, although the IL level of the teachers seems to be high, some IL indicators are more indicative than others. The standard deviations for the various questions of these indicators are fairly homogeneous. This confirms that the range of responses is fairly narrow and reaffirms the validity of the responses.

Table 4. Indicator C: Evaluating information

C. Evaluating information.		%	Mean	Median	Mode	Standard deviation	Variance	Average %	
18. Distinguishes between important and unimportant incoming emails.	1	19.1	3.52	4	1	1.760	3.096	51.3	64.3
	2	13.8							
	3	15.8							
	4	16.9							
	5	16.0							
	6	18.4							
22. Distinguishes between important and unimportant information.	1	0.4	4.70	5	5	.941	.886	89.3	
	2	1.3							
	3	9.0							
	4	24.9							
	5	45.8							
	6	18.6							
38. Affords greater reliability and veracity to digital resources than to analogical resources.	1	5.1	3.61	4	3	1.297	1.681	52.4	
	2	14.9							
	3	27.6							
	4	26.2							
	5	18.3							
	6	7.9							

Table 5. Indicator D: Organising information

D. Organising information.		%	Mean	Median	Mode	Standard deviation	Variance	Average %	
17. Uses a system to classify and manage emails.	1	21.4	3.50	3	6	1.839	3.382	49.0	31.8
	2	13.3							
	3	16.3							
	4	13.5							
	5	13.7							
	6	21.8							
26. Uses an RSS reader or aggregator to manage content.	1	34.0	2.31	2	2	1.476	2.179	14.7	
	2	36.6							
	3	14.7							
	4	1.7							
	5	5.3							
	6	7.8							

A more detailed analysis of the IL indicators shows that although indicator A (on recognising the need for information) and indicator B (on locating information) obtain high teacher self-perception scores (87.8% and 80.2%, respectively), the other three indicators do not. Indicator E (on converting information) and indicator C (on evaluating information) obtain acceptable scores of 74% and 64.3%, respectively. However, indicator D (on organising information) obtains a worryingly average score of 31.8% and a score of less than 50% on both of the questions that make up this indicator (49% and 14.7%, respectively).

Secondary school teachers do recognise the need to search for information on the Internet for work-related issues (93.8%), find this information quickly and efficiently (83.8%), and identify the objective, problem or need precisely (85.9%).

They are also proficient at locating information, comparing it with information from other sources (83.9%) and visiting numerous sources to locate information (87.1%). However, only 69.5% of the school teachers who completed the questionnaire quote the source or author of the information. This figure is very low figure considering the importance attached to doing so.

The school teachers in the study present major deficiencies when it comes to evaluating the information they find. Although they distinguish fairly well between important and non-important information (89%), they find it extremely difficult to distinguish between truly important incoming emails and those that are not so important (51.3%). They also have severe doubts about whether to describe information they have obtained from the Internet as reliable and true in comparison with information they obtain from analogical sources (only 52.4% do).

The biggest problem school teachers have with regard to their self-perceived IL level undoubtedly concerns their ability to organise information. For example, only 49% of teachers use some form of system to classify and manage their email while, more worryingly, only 14.7% know and use a content reader, aggregator or indexer. Spanish school teachers, therefore, recognise that they are bad administrators of information: although they know they need information and they know how to find it, they are unable to organise or classify it.

Finally, it is worrying that 26% of the teachers surveyed admit that they still use the information they obtain from the Internet without modifying it or identifying its author, especially when the percentages for knowing how to localise and identify the object of their information search are, as we have seen, 83.8% and 85.9%, respectively. The quality of the information converted and later communicated is considerably diminished by these results.

In conclusion, Spanish secondary school teachers are less competent at producing and communicating information than one would think. When added to the other difficulties they have in evaluating and organising information, this leads us to suggest that our teachers require training both in producing and disseminating information (this has already been proposed by Area and Guarro (2012), in their analysis of information and digital literacy) and in evaluating and managing information. Clearly, teachers are not only better trained in digital competence nowadays but they are also more interested in it (Pérez & Delgado, 2012). However, the training they receive is often not of the best quality and it is not offered to every teacher who wishes to receive it. This presents us with an important challenge with regard to the promotion of learning and greater knowledge for all concerned. Other countries, even those with fewer deficiencies in the IL

Table 6. Indicator E: Transforming information

E. Transforming information.		%	Mean	Median	Mode	Standard deviation	Variance	Average %	
40. Does not simply copy and paste the information he or she finds on the Internet.	1	1.0	4.31	4	5	1.176	1.383	74.0	74.0
	2	5.8							
	3	19.2							
	4	25.2							
	5	33.0							
	6	15.8							

Table 7. Self-perceived IL level									
Self-perceived IL level.		%	Mean	Median	Mode	Standard deviation	Variance	Average %	
46. Self-perceived IL level.	1	3.6	3.70	4	4	1.156	1.336		59.6
	2	11.6							
	3	25.2						59.6	
	4	35.8							
	5	18.8							
	6	5.0							

levels of their teachers, are affording IL the importance it deserves and implementing improvement plans and training schemes in this area. In South Africa, for example (Fourie & Krauss, 2010), such programmes have become part of social education policy involving not just teaching institutions but whole cities. The United Kingdom has a programme to detect deficiencies in the IL levels of its teachers based on the already mentioned study conducted by Williams & Coles in 2003. And some states in the United States even provide specific IL information and courses for both teachers and pupils one month every year. These examples ought to encourage our country to also implement quality training measures aimed at improving the IL levels of our secondary school teachers and creating a correspondingly beneficial impact on the IL levels of our pupils at such a vitally important stage in their education, especially if we take into account observations over several years from the various educational computing programmes of the Spanish autonomous communities (Martín-Hernández, 2010) and the contents of the latest proposal from the Spanish Ministry of Education (INTEF, 2014).

Table 8. Overall self-perceived IL level		
	Mean	%
Self-perceived IL level (calculated)	4.11	67.6
Self-perceived IL level (estimated)	3.70	59.6

In light of these results and our analysis of them, our final conclusion is that Spanish education authorities need to be alerted to the fact that secondary school teachers require training to improve their information literacy. Such training should focus on the specific aspects and indicators we have mentioned in this study regarding the evaluation, organization, management and transformation of information.

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