ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/344418570

Digital and information literacy inside and outside Spanish primary education schools

Article *in* Learning Culture and Social Interaction · March 2021

DOI: 10.1016/j.lcsi.2020.100455

CITATIONS
42

READS
399

3 authors:

Celia Moreno-Morilla
Universidad de Sevilla
20 PUBLICATIONS **81** CITATIONS
SEE PROFILE

Fernando Guzmán-Simón
Universidad de Sevilla
73 PUBLICATIONS **329** CITATIONS
SEE PROFILE

Eduardo Garcia-Jimenez
Universidad de Sevilla
113 PUBLICATIONS **1,414** CITATIONS
SEE PROFILE

Some of the authors of this publication are also working on these related projects:

Literacy as a social practice in Early Childhood and Primary Education (5-7 years): Research and intervention design in children at risk of social exclusion in urban contexts View project

MON-CLIL View project

All content following this page was uploaded by Fernando Guzmán-Simón on 29 September 2020.

The user has requested enhancement of the downloaded file.

Moreno-Morilla, C., Guzmán-Simón, F., & García-Jiménez, E. (2021). Digital and information literacy inside and outside Spanish primary education schools. *Learning, Culture and Social Interaction, 28 (preprint)*. https://doi.org/10.1016/j.lcsi.2020.100455

Digital and information literacy inside and outside Spanish primary education schools

Abstract

This paper addresses the use of digital and information literacy with primary pupils and its relationship with the development of literacy inside and outside school. Information and Communication Technologies have created new opportunities for reading and writing texts in social spaces that have modified the way children learn. This study was a non-experimental, explanatory design. 1540 Spanish primary school pupils completed a self-report questionnaire based on the literacy, digital and information events developed by pupils. The data obtained were analysed through a Categorical Principal Component Analysis (CATPCA) that identified two components related to the events "inside school" and "outside school". These components were later used as variables to classify the socioeconomic status and type of school, curricular preferences, as well as age, sex and year of study. The results obtained show two spaces for literacy: one was promoted inside school and was based on printed texts; the other developed outside school and favoured digital and information literacy. This work concludes with the need to establish bridges which connect digital competence inside and outside school through the creation of a third literacy space.

Keywords: digital competence, digital literacy, information literacy, school curriculum, informal learning, web 2.0 technologies, Primary Education, quantitative analysis

1. Introduction

Changes in the nature of communication have transformed the way children interact inside and outside school. Web 2.0 applications, technologies and digital texts have promoted social interaction through new forms of literacy (Chaudron, 2015; Gillen, 2014; Schamroth Abrams & Merchant, 2013). Kucirkova, Wells Rowe, Oliver, and Piestrzynski (2017), Kumpulainen and Gillen (2017), Marsh et al. (2017a) and Marsh et al. (2017b) have presented a wide overview of the different research studies carried out to date regarding children's digital literacy. Other reports, such as the ones written by Chaudron (2015) and Gillen et al. (2018), have compared children's digital literacy events between different European countries. Overall, these research studies have highlighted the dynamism and heterogeneity of the events related to the digital competence and have motivated the study and analysis of these events from multiple perspectives, as it is presented by Erstad, Flewitt, Kümmerling-Meibauer, and Pires Pereira (2020), and Kucirkova, Rowsell, and Falloon (2019).

The concept of *literacy* covered in this paper has inhibited a perspective which goes beyond the alphabetic script (Burnett & Merchant, 2018). With regard to this, *literacy* acquires a metaphorical characteristic which refers to the competence level of using certain codes and

technology of the social communication acquired by a subject (Barton, 2007). Thus, this paper approaches the topic from a complex perspective of the literacy acquisition, that is, as being part of the social and cultural development in a specific context (e.g. financial literacy, emotional literacy, digital literacy, etc.). Particularly, digital literacies are used in numerous research studies focused on the emergent development of several skills (Marsh et al., 2015) related to the use and management of screen-based communication (Erstad et al., 2020; Eshet-Alkalai, 2004), and for purposes such as entertainment, learning or communication (Chaudron, Di Gioia, & Gemo, 2018; Gillen et al., 2018).

These changes in social communication have also transformed the role of teachers in relation to literacies inside and outside school (Davies & Merchant, 2009). However, studies based on the use of mobile phones and other technologies (Ditrendia, 2018) warn about differences regarding formal and informal learning models (Gee, 2013). Web literacies lead us to think about the education, which is being carried out in 21st century classrooms, where the social and interactive nature of the internet has created new forms of learning (Bigum, 2003; Jenkins, 2006; Shirky, 2008).

Our research addresses the use of digital competence among primary education (hereinafter PE) pupils and its relation with the development of literacy inside and outside school. “Digital” refers to a set of activities related to new information and communications media (Goodfellow, 2011). “Competence” is defined as the set of knowledge, skills and attitudes necessary for individuals’ development in different contexts (e.g. home, school, library, office, etc.).Therefore, the definition of “digital competence” (Ala-Mutka, 2011; Bawden, 2001) gathers a set of knowledge and skills that PE pupils develop inside and outside school in relation to ICT:

> (…) the set of knowledge, skills, attitudes, abilities, strategies, and awareness which are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming and empowerment (Ferrari, 2012, p. 30).

From this perspective, digital competence (as a key competence for lifelong learning as mentioned by the European Parliament and Council [2006]) is composed of several literacies (see figure 1) which schoolchildren have to develop in different spaces. Ala-Mutka (2011) has defined *digital competence* as “a complex landscape of definitions and concepts” (p. 15), based on Bawden’s (2001) conceptual review. Thus, Ala-Mutka starts from that review in order to describe four elements/literacies which form digital competence and are defined as follows:

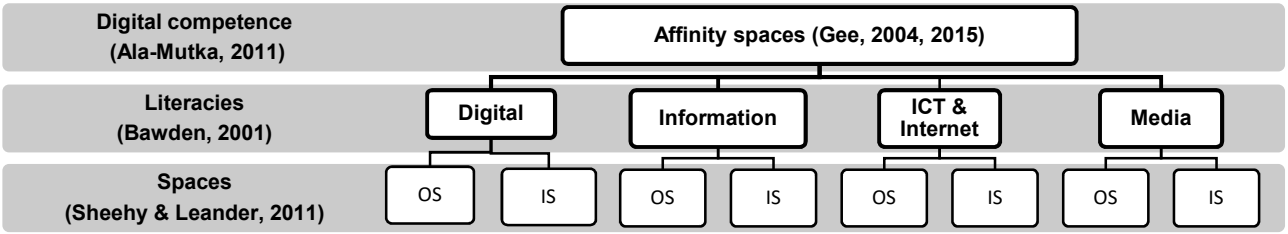
> **Digital literacy**: This literacy refers to the skills required for “navigating with networked technologies and interpreting the meaning of digital messages” (Ala-Mutka, 2012, p. 28). In addition, Bawden (2008) insists on rising awareness on the digital technology as an efficient tool of communication.
>
> **Information literacy**: This literacy involves searching on the web, critically analyzing its content and using “media materials” or the computer for a specific purpose (Livingstone et al., 2005; CILIP, 2012).

ICT and Internet literacies: This section covers two different literacies. ICT literacy is related to the knowledge which enables the use of a computer or software and the understanding of their use (Bawden, 2001; Beetham et al., 2009). Internet literacy is often included within the concept of "digital literacy". However, it is related to the use of different sources of information, searching for information related with a specific objective and the use of such a non-lineal information through *hyperlinked* (Van Deursen, 2010).

Media literacy: Initially, this literacy was related to "information literacy". However, this literacy presents a relevant role as participant in the digital media. Such a participation includes elements of creation, access and interpretation of *digital media* (Buckingham, 2007; Martin, 2006).

The use of digital competence in daily life has redefined the traditional concept of "space", highlighting the coexistence of numerous physical and virtual spaces. Several authors, such as Lefebvre (1984), Soja (1996) or Massey (2005) studied this new creation of "space" and redefined it as a space for social interaction. Space is the place where pupils interact physically inside school (a classroom as a real space, for instance) as well as virtually (where ICT is used). Both spaces have different *contents* (about what a space is) and promote *interaction* at different levels, transforming these contents into *generators* of new ones (Gee, 2004). The spaces which children share can be *generators* of new contents, a Web *portal* or a textbook *portal.* The degree of generation of new discourses is determined by their use in a particular space, inside and outside school. Schools, today, have some characteristics in which space is limited from a physical and temporal perspective. Nevertheless, by using digital literacies, tasks are organised in different ways. They are developed at different moments. They are not exclusive, and do not present the same learning sequence for all pupils (Lankshear & Knobel, 2008). These differences are clearly defined within the concept of *affinity spaces* by Gee (2004). According to Gee (2015), classrooms are unlikely to include these characteristics in a deep and systematic way. As a result, space becomes a product and a process of dynamic social relationships, where everyday literacies (Barton & Hamilton, 1998) are developed in all its complexity. Discourse practices are developed in a space and, similarly, this space is also created by discourse practices inside and outside school (Sheehy & Leander, 2011).

Consequently, digital competence makes certain communicative events possible which take place in *affinity spaces* where children learn the literacies through digital tools (Gee, 2015). *Affinity spaces* are based on children's interests, purposes and literacy events. The latter is defined as "any occasion in which a piece of writing is integral to the nature of the participants' interactions and their interpretative processes" (Heath, 1982, p. 50). There is no differentiation between expert or novice users; intensive and extensive knowledge are encouraged; and there are different ways of participation and status within the same space. According to Gee (2015), the term *affinity spaces* gathers the different spaces of children's communicative interaction through digital competence and how such spaces, mediated by digital tools, develop literacies' learning. The characteristics of Gee's *affinity spaces* (2015) are those which are organized around a common interest. Within them, the expert and novice users share the same space (where leadership rises from the information shared and which is a reciprocal and interchangeable role), the information is transformed by the interaction, a general or specialized knowledge is developed from the own subject (without excluding the help of another member of the community), and there are different ways of participating in the same affinity space.



OS: Outside school. IS: Inside school
Figure 1. Digital competence spaces and literacies
Source: Adaptation of Pourbaix (2000), Bawden (2001), and Ala-Mutka (2011).

Digital literacies have created new opportunities for reading and writing texts in social spaces (Gillen, 2014). However, the development of digital literacies inside school has not taken into account much of their communicative sense, focusing exclusively on aspects related to information technologies (Davies & Merchant, 2009). This fact has led several researchers, such as Green and Beavis (2013), Hannaford and Beavis (2018), Marsh et al. (2018) and Moje (2013), to affirm that a large part of literacy learning about digital competence has been developed outside school through new, hybrid discourse genres. These new skills have emerged especially in Web 2.0 technologies, which has enabled the development of learning and knowledge strategies in the literacy process through cooperative learning on the net (Bryant, 2007).

Social and situated uses of digital literacies has transformed the learning style of PE pupils into a non-formal or informal one (Levy, Yamada-Rice, Marsh, 2013; Meyers, Erickson, & Small, 2013), creating a new setting in which a school does not have full control of the literacy processes developed in society (Pahl & Burnett, 2013). The school space traditionally started with printed books and the control of information was carried out through pupils' use of such material at school (Burnett & Merchant, 2018; Gillen & Kucirkova, 2018). These texts were determined by the criteria of those in authority; and they were stable texts which provided relevance to certain discourse genres. Texts in digital media present a new concept of space, in which printed texts are not hegemonic and discourse genres are unstable and hybrid (Hannaford, 2016; Merchant, 2009). Furthermore, in digital literacies the criteria used by those in authority are replaced by disseminations and personal relationships (Lankshear & Knobel, 2008).

The study of the digital and information literacy, from the creation of spaces, represents a new view about the way children interact with the digital technology. Thus, the following research questions are formulated regarding literacy developed by primary education pupils inside and outside school:

a) In what spaces do children develop their digital and information literacy?
b) What events inside and outside school are related to digital and information literacy?
c) Do digital and information literacy explain individual and contextual differences?

2. Method

This study was carried out through a non-experimental, explanatory design to describe the statistical relationship between two or more variables obtained from each subject or phenomena of interest (Punch & Punch, 2005). The value of this kind of study (traditionally named as ex post facto research) lies in their "exploratory or suggestive character for, as we have seen, while they are not always adequate in themselves for establishing causal

relationships among variables, they are a useful first step in this direction in that they do yield measures of association" (Cohen, Manion, & Morrison, 2007, p.266).

2.1. Sample

The sample was composed of PE pupils (8-12 years old) registered in state and private schools in Seville. 1,834 children belonging to years 4, 5, 6 and 7 of PE were invited to participate, representing 2.10% of the total population, with a sampling error of 2.14%. 1,624 pupils agreed to participate, representing 88.55% of the invited sample. The data analysis included 1,540 responses, with 4.58% of the participants (84 cases) being excluded because they did not answer all the questions of the self-report. The sample was balanced in terms of sex (51.8% boys; 48.2% girls), age and year of study in which they were registered (26.4% in Year 4, 23.6% in Year 5, 24.4% in Year 6 and 25.6% in Year 7 of PE). Participation in the study was voluntary and followed the informed consent rules, which limits the use of the information uniquely to research purposes and ensures the anonymity and confidentiality. This work has followed the Social Sciences Internal Regulation by the Ethics Committee of Experimentation of the University of Seville.

2.2. Instruments and data collection

Data were collected by means of a self-report questionnaire based on PE pupils' literacy, which was completed inside the classroom. This self-report consisted of 40 items divided into two dimensions: *Information Literacy* and *Digital Literacy*. The values of the items were provided through a Likert scale between 1 (never) and 6 (always). The self-report has been empirically validated through a multidimensional scaling (PROXSCAL) process which determined its reliability and construct validity (Authors, 2017).

Table 1.
Questions and items included in the self-report questionnaire

Questions (Self-report questionnaire)	Items
Q1. When reading on the Net, I tend to interpret the text better when there is…	1.Only a written text
	2.An image or audio-visual element
	3.A link to other web pages
Q2. When you read, what is your favourite type of reading?	4.Narration, poetry or drama
	5.Encyclopaedia, information books
	6.Newspapers and magazines
	7.Blogs and Web pages
Q3. When beginning to read a text, do you read the document…?	8.Completely
	9.A fragment of the text
	10.Through a quick and superficial reading
	11.Looking for interesting information
Q4. In what format or media do you usually write?	12.On paper
	13.On the computer
	14.On your mobile phone
	15.On your tablet
Q5. When writing in a digital media, which one do you normally use?	16.Social networks
	17.Blogs
	18.Forums, chats, etc.
	19.E-mails, WhatsApp, etc.
Q6. When writing in a digital media, the text generally includes…	20.Visual elements (Photographs and images)
	21.Videos

	22.Animations
	23.Music
Q7. Where do you usually buy books?	24.In a bookshop
	25.On the internet
	26.In shopping centres
Q8. What do you use libraries for?	27.As a reading room
	28.To do group work
	29.As a book lending service
	30.To access the Internet
Q9. What documents do you borrow from the public or school library?	31.Books (per month)
	32.Magazines (per month)
	33.Games (per month)
	34.DVDs or CDs (per month)
10. What type of text do you most often read at school?	35.Textbooks
	36.Magazine articles
	37.Readers
	38.Class notes
	39.Photocopies
	40.Internet

2.3. Data analysis

Data analysis was carried out through a Categorical Principal Component Analysis (hereinafter CATPCA) with Varimax rotation. This procedure simultaneously quantified the self-report items, while reducing them into a smaller set of uncorrelated components or dimensions that represent most of the information found in the items. By reducing the dimensionality, it was possible to interpret two components rather than the 40 items of the self-report. Regarding the items which were assigned to each component they could be named as “inside school” and “outside school”. These components were subsequently used as classification variables of socioeconomic status (hereinafter SES), type of school, curricular preferences, age, sex and year of study.

3. Findings

3.1. Spaces where pupils develop their digital and information literacies

The descriptive analysis shows how pupils develop different literacy events depending on the space, which could be related to reading, writing, cultural consumption and the use of libraries. One of those spaces is school, where events related to learning are generated. The results presented in Table 2 show that, in order to foster such learning, school promotes reading through textbooks ($\bar{x}$=4.05) and readers ($\bar{x}$=4.18). Children’s preferences for narration, drama or poetry ($\bar{x}$=3.73), show the social value they give to school learning. This social value underlines children’s preferences towards reading complete texts ($\bar{x}$=3.71) on paper ($\bar{x}$=4.72). Children use libraries as reading rooms ($\bar{x}$=2.78) and as a lending service mainly for books ($\bar{x}$=2.64). The purchases carried out by children are preferably in bookshops ($\bar{x}$=3.93). These preferences reveal that books are the main learning references for children, through which school space extend beyond classrooms.

The Internet is another space where children’s literacy takes place. Such a space promotes a type of reading in which the text includes images or audiovisual elements ($\bar{x}$=3.72). Children prefer to type E-mails or WhatsApps ($\bar{x}$=3,45), which include music ($\bar{x}$=2.70), audiovisual elements such as videos or images ($\bar{x}$=2.55). Reading and writing on the

Internet create events which children do not associate with learning, but with leisure time. The results obtained could point out that the social values promoted by the Internet are different from those promoted by the school. At school, the Internet is one of children's preferences ($\bar{x}$=1.94), as well as the use of blogs and web sites ($\bar{x}$=2.68). Similarly, at school, searching for specific information ($\bar{x}$=2.80) or reading fragments of texts ($\bar{x}$= 2.13) on a computer, a mobile phone or tablet are not among children's preferences of literacy events.

Table 2

Descriptive analysis of spaces where children develop their digital and information literacy

Questions (Self-report questionnaire)	**Items**	**$\bar{x}$**
Q1. When reading on the Net, I tend to interpret the text better when there is…	1.Only a written text	2.65
	2.An image or audio-visual element	**3.72**
	3.A link to other web sites	2.58
Q2. When you read, what is your favourite type of reading?	4.Narration, poetry or drama	**3.73**
	5.Encyclopaedia, information books	2.23
	6.Newspapers and magazines	1.94
	7.Blogs and Web pages	**2.68**
Q3. When beginning to read a text, do you read the document…?	8.Completely	**3.71**
	9.A fragment of the text	2.13
	10.Through a quick and superficial reading	1.77
	11.Looking for interesting information	2.80
Q4. In what format or media do you usually write?	12.On paper	**4.72**
	13.On the computer	2.71
	14.On your mobile phone	3.08
	15.On your tablet	2.61
Q5. When writing in a digital media, which one do you normally use?	16.Social networks	1.63
	17.Blogs	1.15
	18.Forums, chats, etc.	1.37
	19.E-mails, WhatsApp, etc.	3.45
Q6. When writing in a digital media, the text generally includes…	20.Visual elements (Photographs and images)	2.55
	21.Videos	2.41
	22.Animations	2.05
	23.Music	**2.70**
Q7. Where do you usually buy books?	24.In a bookshop	**3.93**
	25.On the Internet	0.54
	26.In shopping centres	2.34
Q8. What do you use libraries for?	27.As a reading room	**2.78**
	28.To do group work	2.20
	29.As a book lending service	2.64
	30.To access the Internet	1.50
Q9. What documents do you borrow from the public or school library?	31.Books (per month)	1.38
	32.Magazines (per month)	0.49
	33.Games (per month)	0.89
	34.DVDs or CDs (per month)	0.76

Q10. What type of text do you most often read at school?	35.Textbooks	**4.05**
	36.Magazine articles	1.12
	37.Readers	**4.18**
	38.Class notes	3.43
	39.Photocopies	2.97
	40.Internet	1.94

3.2. Digital and information literacy events developed inside and outside school

The CATPCA analysis allowed us to identify two main components: "outside school" (Component 1) and "inside school" (Component 2). The former explains more variance (λ=6.756) than the latter (λ=3.816). Component 1 explains the existing variability in pupils' responses to items related to PE literacy through different digital media. This component's items, which carry a higher factor weight, are those referring to reading practices in blogs and web pages (Item 7, Table 3), to a quick and superficial reading (10) and to a reader-centred reading (11). Pupils' opinions on writing on computers (13), mobile phones (14) or tablets (15) are better represented in this component. Additionally, high factor weights are identified in items related to writing in social networks (16), blogs (17), forums and chats (18), e-mails and WhatsApp (19). The multimodal and hybrid text appears in both reading and writing. Thus, pupils' discourses include pictures (20), videos (21), animations and music (23). Items referring to cultural consumption, which are better explained in this component, point out that pupils prefer to buy on the internet (25), use public libraries for group work (28) and access the internet (30). Items related to the libraries' lending service are fully explained in this component and refer to the process of lending books (31), magazines (32), games (33), and CDs or DVDs (34). Finally, this component also includes items describing a type of classroom project which mainly relies on reading magazine articles (36) and using the internet (40).

Component 2 (inside school) best explains items which show pupils' preferences for reading a written text (1) or a text with pictures (2) in any discourse genre (4) through encyclopaedias or information texts (5). The item referring to reading a text completely (8) gets higher scores, without identifying sections or interesting information (9). In this regard, pupils usually write on paper (12) and buy books in bookshops (24) and shopping centres (26). Items related to libraries, which are included in this component, highlight the exclusive use of libraries as reading rooms (27), excluding other possible cultural uses. Similarly, this component includes items referring to a printed school literacy, in which textbooks (35), readers (37), class notes (38) and photocopies (39) are the most common.

Table 3.
Saturations of the items in the main components relative to literacy events inside and outside school

Questions (Self-report questionnaire)	Items	Component	
		Outside school	Inside school
Q1.When reading on the Net, I tend to interpret the text better when there is…	1.Only a written text	0.177	**0.356**
	2.An image or audio-visual element	0.205	0.291
	3.A link to other web pages	0.259	0.194
	4.Narration, poetry or drama	0.103	**0.547**

Q2.When you read, what is your favourite type of reading?	5.Encyclopaedia, information books	0.104	**0.415**
	6.Newspapers and magazines	0.280	0.280
	7.Blogs and Web pages	**0.506**	0.099
Q3.When beginning to read a text, do you read the document…?	8.Completely	-0.071	**0.653**
	9.A fragment of the text	0.242	-0.374
	10.Through a quick and superficial reading	**0.365**	-0.285
	11.Looking for interesting information	**0.376**	-0.170
Q4.In what format or media do you usually write?	12.On paper	-0.068	**0.485**
	13.On the computer	**0.517**	0.175
	14.On your mobile phone	**0.536**	0.081
	15.On your tablet	**0.487**	0.185
Q5.When writing in a digital media, which one do you normally use?	16.Social networks	**0.569**	-0.065
	17.Blogs	**0.553**	0.100
	18.Forums, chats, etc.	**0.600**	-0.076
	19.E-mails, WhatsApp, etc.	**0.549**	0.078
Q6.When writing in a digital media, the text generally includes…	20.Visual elements (Photographs and images)	**0.562**	0.169
	21.Videos	**0.661**	0.070
	22.Animations	**0.573**	0.102
	23.Music	**0.599**	0.141
Q7.Where do you usually buy books?	24.In a bookshop	0.026	**0.468**
	25.On the internet	**0.328**	-0.027
	26.In shopping centres	0.244	**0.310**
Q8.What do you use libraries for?	27.As a reading room	0.226	**0.523**
	28.To do group work	**0.463**	0.237
	29.As a book lending service	0.128	**0.450**
	30.To access the internet	**0.552**	0.066
Q9.What documents do you borrow from the public or school library?	31.Books (per month)	0.310	0.268
	32.Magazines (per month)	**0.420**	0.099
	33.Games (per month)	**0.497**	-0.041
	34.DVDs or CDs (per month)	**0.460**	-0.032
Q10.What type of text do you most often read at school?	35.Textbooks	-0.021	**0.535**
	36.Magazine articles	**0.357**	0.257
	37.Readers	0.046	**0.597**
	38.Class notes	0.073	**0.424**
	39.Photocopies	0.266	**0.409**
	40.Internet	**0.416**	0.168

A projection in the dimension of factor loadings show the spatial distribution of the correlations of the items with each identified main component (Figure 2). The observed variability of the items of Component 1 (“outside school”) is best explained in the horizontal axis, while the variability of the items of Component 2 (“inside school”) is best arranged in the vertical axis. In order to interpret the position of the items, it is important to mention that the extreme scores in both axis are the most relevant ones. On the left side of Component 1, the items refer to reading class notes on paper at school and buying books in a bookshop.

On the right side of this Component 1, there are items which explain the literacy developed through digital media (writing on tablets and mobile phones) using the Internet (chat rooms) or apps (WhatsApp, email). The digital texts written included music, videos and visual elements. Most of these literacy events are developed outside the school.

Regarding Component 2, most of the items explain that literacy happens at school. On the top, items report that children read textbooks completely, class notes or readers on paper. At the bottom, items from Component 2 show that children read fragments of texts, through a quick and superficial reading on the Internet.

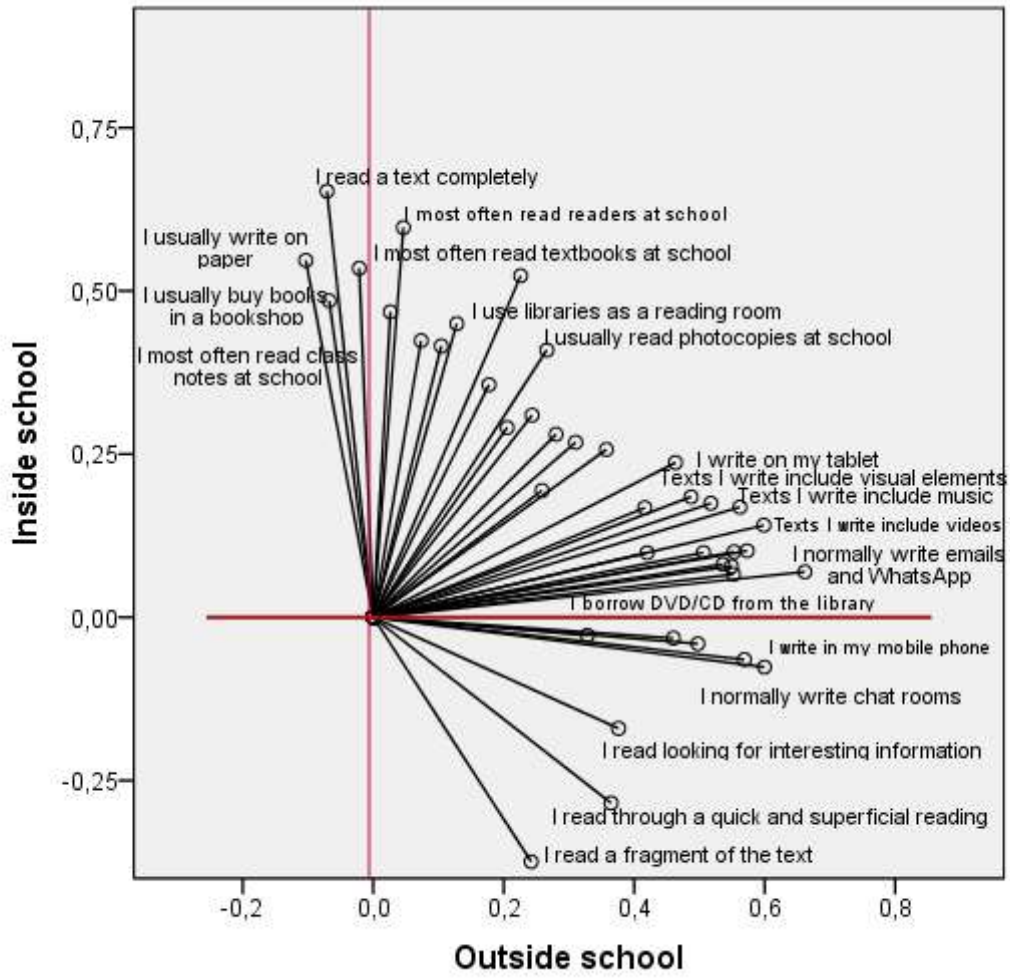


Figure 2. Projection in two-dimensional space of rotated component loadings

3.3. Literacy events and contextual and personal variables

The “inside/outside school” construct enables explanation of some contextual variables, such as pupils’ SES and the type of school where they study (size effect, δ=0.20). Figure 3 shows how the SES variable presents a higher variability in the “outside school” axis, with a tendency in which the values “outside school” increase when SES decreases. Thus, the highest value of the “outside school” construct (1.158) corresponds to low SES centres (x=0.148), while the lowest value (-1.002) corresponds to high SES centres (x=0.085) or medium-high centres (x=-0.146). According to this axis, pupils demonstrate their preference for reading on the net and writing texts with visual and musical elements in digital media.

However, the type of school variable is scarcely explained from the inside/outside school construct.

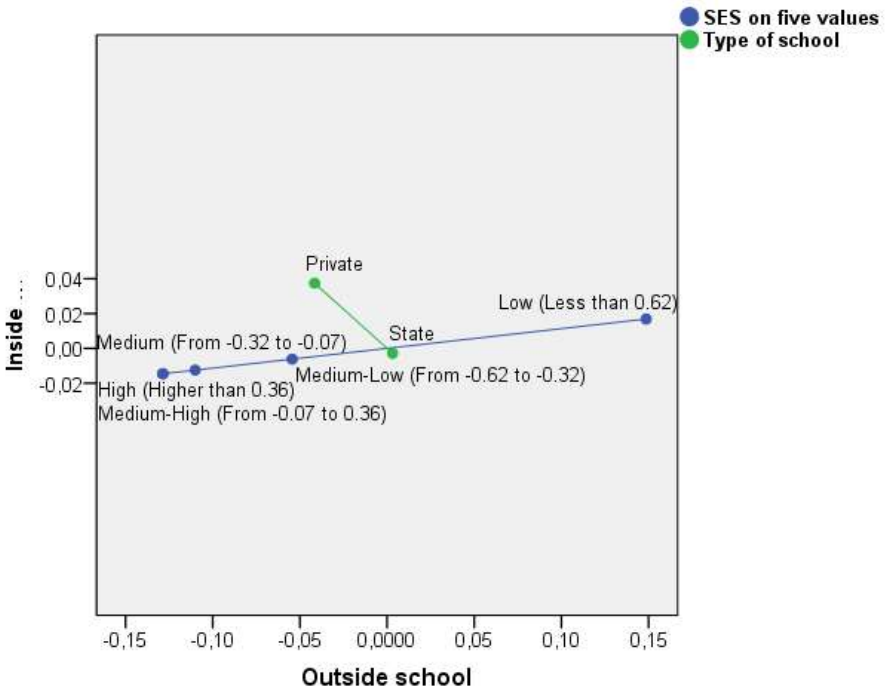


Figure 3. Combined chart of the points of SES categories and type of school

Compulsory subjects established by the PE curriculum show a clear difference regarding the two main components obtained in the CATPCA analysis. The “inside school” component presents pupils’ preferences for these subjects along the vertical axis (the highest values appear in quadrant 1 and the lowest, in quadrant 4). From this projection, positions in the ordinate axis range from y=0.466, with a 1.225 quantification (value 6), to y=-0.614, with a -1.670 quantification (value 1) for the Spanish language. Pupils’ preferences for Physical Education are explained from both axes, inside and outside school, and are preferentially placed in quadrant 3. In this subject, positions in the abscissa’s axis range from y=0.057 (value 6) with a 0.453 quantification, to y=-0.723, with a 3.541 quantification (value 1); while positions in the ordinate axis range from x=0.058 (value 6) to x=-0.716 (value 2). Pupils whose preferences are related to Spanish, Social Sciences, Natural Sciences and Foreign Languages score higher in items of the “inside school” component. This relationship is statistically significant with *contingency* C values between 0.319 and 0.159 ($p<0.05$). Thus, pupils who show higher preferences for these subjects also score higher in items of the “inside school” component. Pupils’ preferences for Physical Education do not always maintain a statistically significant relationship with most of the items of both components.

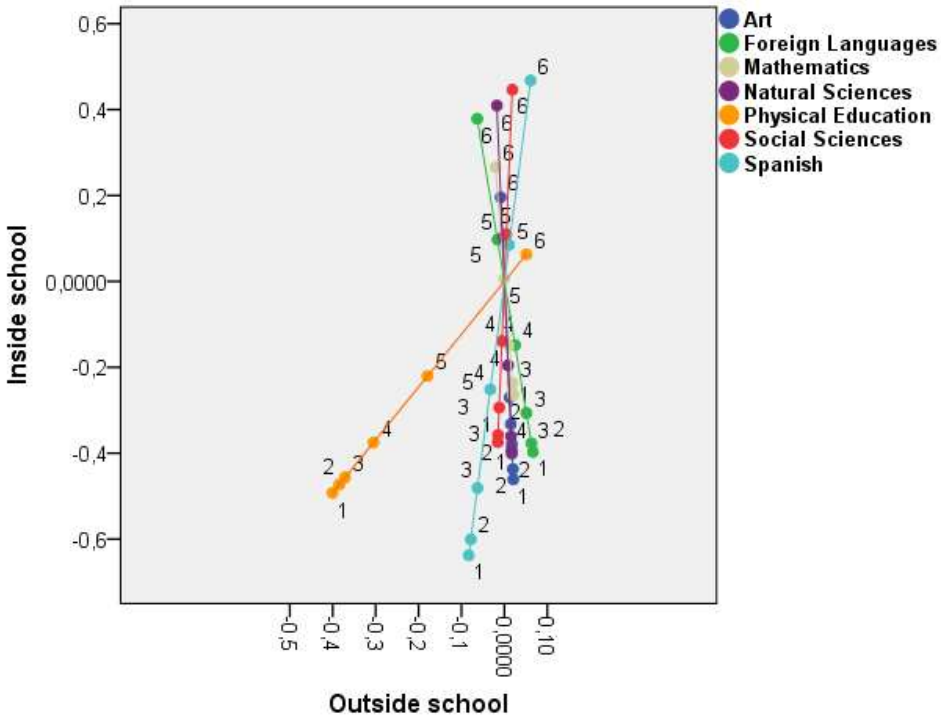


Figure 4. Combined chart of the points of pupils' favourite curricular categories

Variability in pupils' age and sex are represented in Figure 5. The sex variable is well arranged in the "inside school" axis. Female pupils are located in quadrant 2, and male pupils in 4. Female pupils are placed on the ordinate axis y=-0.205, with a -0.899 quantification. The tendency observed shows that the highest scores for "inside school" items belong to girls. This relation is statistically significant but *contingency* C values are below 0.2. These results, although not conclusive, indicate that girls fit best into the school literacy model. On the other hand, the age variable is represented with a greater variability on the "outside school" axis. Children aged eight to nine are placed in quadrant 1 whereas those aged nine to thirteen are in quadrant 4. Thus, positions on the abscissa axis range from x=-0.166, with a -1.512 quantification (8 years old), to x=-0.356, with a 2.034 quantification (13 years old). The progressive growth of the quantification value according to age shows that PE pupils' digital preferences increase as their education progresses. This happens mainly in boys. This relationship is statistically significant with *contingency* C values between 0.236 and 0.143 ($p<0.05$).

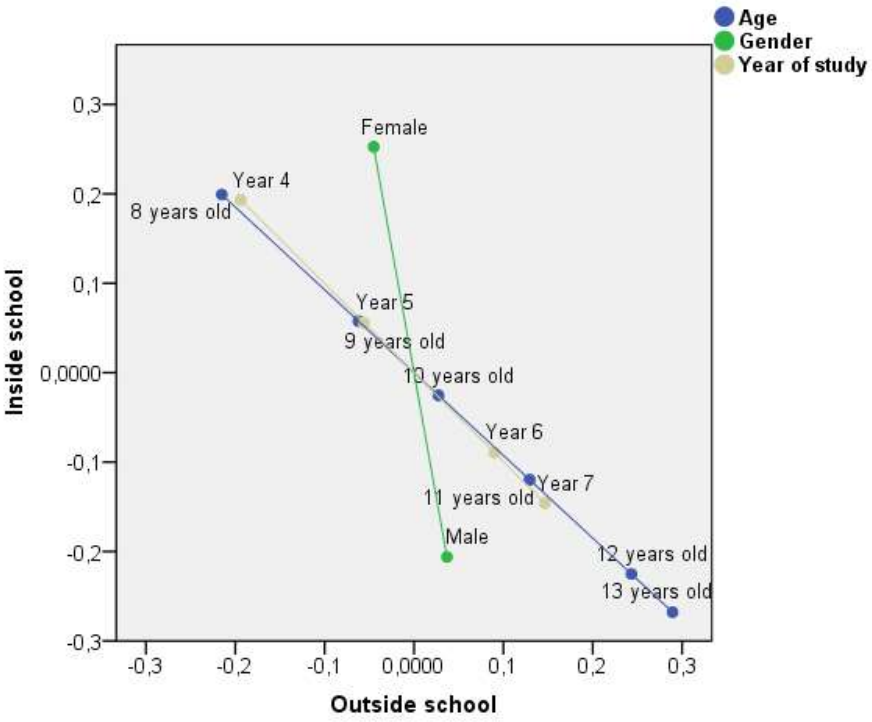


Figure 5. Combined chart of the points of sex, year of study and age categories

4. Discussion

4.1. Digital and information literacy in affinity spaces

Currently, pupils' literacy is more complex and diverse than before. Kalantzis and Cope (2016) point out that literacy obeys different goals and uses a variety of resources. The results presented in this paper show that pupils read books, photocopies and class notes, but they also read on the Internet. They read narration, poetry or drama and look for information in an encyclopaedia, but they also read and look for information in blogs and websites. Similarly, pupils handwrite as well as they use tablets and smartphones. However, pupils' access, gather, process, generate and recover information in a different way when they use a tablet, a smartphone or a printed text, as pointed out by Chaudron (2015). The use of digital technologies also claims a kind of skills necessary for searching on the Internet and interpreting digital texts information. These results coincide with the contributions on new technologies presented by Wolfe and Flewitt (2010), and show, as in the research studies carried out by Burnett and Merchant (2018), how the new technologies have quickly developed among children in the last decade, although digital and text-based literacies coexist in pupils' lives.

In school, pupils read and write on demand (school tasks, homework) to fulfil school goals. Most of the communicative interactions performed in this space are between pupils and teachers, and they are developed following school regulations and classroom rules. The use of digital technologies also fosters a kind of communicative interaction between pupils and information which is different from the one promoted with the use of printed texts at school. The communicative interaction between pupils -without teachers- takes place through the Internet, where pupils use their digital competence to develop their own literacies in order to achieve their personal and social goals. The research studies carried out by Burnett (2014) and Gillen and Kucirkova (2018) at school coincide with ours regarding the fact that these

authors present how the use of digital literacies inside the classroom is so different from the ones performed out of them. In fact, these affinity spaces develop authentic communities that join pupils by sharing a common interest (e.g. Tik Tok, Mewe, Youtube). Affinity spaces are used interchangeably depending on the information that is shared by novice and expert users of the community. Consequently, pupils can participate in different affinity spaces where the information about a topic is modified during their interaction so that new literacies are generated (Gee, 2015).

Digital and information literacy is not children's preferred literacy event. In our study, most of the pupils' report that they handwrite and read on printed books (narration, poetry or drama), because they associated reading and writing with school activities when answered the items of the questionnaire. Pupils are less interested in reading blogs or web sites and they are not aware of their literacy events take part of digital and information literacies. Regarding information literacy, the results of our study show that children also use school strategies, e.g. they read the document completely when they are beginning to read a text. According to these results, it could be said that children prefer a kind of literacy generated in an affinity space mainly shared with their teachers at school and their families at home (Kumpulainen & Gillen, 2017).

The results of our research may indicate that children could have accepted that literacy based on printed texts has a higher social value than the one based on ICT. As mentioned by Livingstone, Mascheroni, Dreier, Chaudron, and Lagaee (2015), there is a perspective on the use of ICT in the classrooms which presents several opposing views among parents and teachers.The research carried out by the European Commission (CELEX, 2013), indicating that Spanish teachers of eight to twelve years old pupils do not control or encourage digital technologies at school. Their use of digital literacies is somewhat haphazard and they have difficulties incorporating it for learning purposes (European Commission, 2013). One reason for explaining our results could be related to the fact that teacher training on the use of ICT in the classrooms has not changed yet.

In conclusion, digital and information literacy depicts an emergent way of literacy that is developed in affinity spaces. In this kind of spaces, pupils create literacy events shared with their peers and families.

4.2. Digital and information literacy inside and outside school

The data obtained in this research exemplify the development of complex literacy in primary education which is not always related to the school curriculum. Luke, Sefton-Green, Graham, Kellner, and Ladwig (2018) highlighted the difficulties in the following way: "as a moral panic is not to understate the very real difficulties that digital technology raises for families, schools, and teachers. It is, however, to acknowledge popular discourses and widespread generational frustration about the effects of digital technology on everyday life" (p. 252). Nevertheless, these difficulties differ depending on the reading and writing skills, which pupils develop in the literacy events, but also on the space where they are performed, which are not always school spaces.

The CATPCA results obtained from the pupils' responses enable identification of two type's affinity spaces, one related to events developed inside school and another related to the ones developed outside school. Similar results have been found by Prinsloo (2020), who carried out a study about digital literacies in a Southern and African context, whose results show how children participated in different events depending on the place they were

performed. Our study presents how digital and information literacy is not relevant inside school. The participating children prefer to interact with printed texts, so they mainly read textbooks and readers and, occasionally, on the Internet, and they usually handwrite. These results are similar to Buckingham's study (2007), which reports that digital technologies are limited to searching for information (Web 1.0) and reading texts in different digital media. This separation between the activities carried out inside and outside school, which does not guarantee the development of digital competence, is considered in some works as a form of educational injustice. Vasudevan, Rodriguez Kerr, and Salazar Gallardo (2018) affirm that "digital youth is of vital importance to the pursuit of understanding, enacting, and cultivating educational justice" (p. 266).

Outside school, digital and information literacy is carried out through social networks via tablets and smartphones. The children of our study write E-mails and WhatsApps to communicate with their peers and families, using pictures, videos, music and animations. They read blogs and web pages through a quick and superficial reading while looking for interesting information. Consequently, our research reveals that digital competence is currently developed outside school and is of an interactive and informational nature. This is the same conclusion used by Burnett and Merchant (2020) as a starting point in one of their last works, in which they consider not only the different literacies inside and outside school, but also the gradual transformation of children's social and cultural life in their daily interaction with technology.

Our findings pointp out that schooling (Lankshear & Knobel, 2008) raises several misalignments between the events promoted by schools (eminently informational) and those developed in virtual spaces (based on interaction). The institutional pedagogical principles that articulate literacy through printed texts has led to new technologies being introduced into schools as superficial changes in school practices. Consequently, this kind of schooling has prevented the new technologies from bringing about a substantial change in the daily literacy practices of children in school.

Literacies inside and outside school leads to suggestions similar to those presented by Green and Bigum (1993) based on the need to exceed the physical limits of spaces in Spanish classrooms and to pay attention to new forms of school literacy. In line with the conclusions drawn by Gillen and Merchant (2013), the pupils expect spaces which favour individualization and collaboration, as well as the relationship between formal and informal learning inherent in digital and information literacy. The contrast of our research with results obtained by the *Survey of Schools ICT in Education* (European Commission, 2013*),* confirms that the problems of digital competence development in classrooms do not rely on the absence of ICT but in the lack of change in teaching methods in these learning contexts (Smeets, 2005).

In conclusion, our analysis present for the Spanish school some of the conclusions presented by Merchant (2007) in the United Kingdom. The school curriculum addresses the development of digital competence in the different dimensions of Web 2.0, although the methods used in classrooms have not changed the learning styles of Web 1.0 and pupils do not normally use digital books, software with activities or learning games (CELEX, 2013) at school. These data concern the European Union as the gap widens between those who have access to an innovative culture based on ICT and those who do not. In this sense, Gee (2015) emphasizes the inequality of not including inside the school curriculum the digital and information literacies developed outside school.

4.3. Digital and information literacy and the contextual and individual variables

The main components taken from CATPCA analysis show a distinctive behaviour in relation to contextual and individual variables. The inside and outside school construct allows us to explain the differences found in contextual variables such as socioeconomic status (SES), type of school, age and curricular preferences (Warschauer & Matuschniak, 2010). Our study highlights the different social values related to digital competence according to different SES. This paper corroborates the results of the research study carried out by Warschauer and Xu (2018), who highlighted the inequalities in children's learning and use of digital technologies depending on their families' SES.

In schools with low SES contexts, where digital and information literacy prevails outside school, a conflict is created with a school literacy based on printed texts. Nevertheless, high SES private schools were identified with a type of literacy based on printed texts. So, a social role is not attributed to the digital technology by pupils. Our data cannot determine the role of families as intermediaries in the development of digital competence, as suggested by Marsh, Hannon, Lewis and Ritchie (2015) in their research. In none of the previously mentioned contexts has digital and information literacies become a source of learning and knowledge for primary education pupils in the terms presented by Säljö (2010).

The inside school construct allows us to explain the differences found in pupils' curricular preferences. However, the outside school construct has little explanatory power regarding their preferences. The CATPCA results show that pupils' preferences cover the whole range measured through the self-report. Thus, the pupils who most prefer subjects such as Spanish, Social Sciences, Natural Sciences and Foreign Languages give more value to printed reading and writing. A reasonable explanation for these results is that the pupils who identify with print-based literacy show a higher preference for curriculum subjects and vice versa. These results also reveal that literacy based on printed media prevails in the curricular subjects. Therefore, the presence of digital and information literacy is scarce in the school curriculum. The predominance of the textbook can be explained by its capacity as a classroom organizer, since it enables delimitation of the literacy process, content and events. Our data corroborate, in line with the conclusions made by Fernández Enguita (2018), that the Spanish school do not give a relevant role to the development of digital competence within children's teaching-learning process.

5. Limitations and implications

Most of literacy studies are developed following an ethnographic approach that enables a deep comprehension of the literacy events in a small group of cases. Our study has used a different approach based on pupils' self-reports, that pursues the understanding of literacy events using a wider sample. The results presented in this paper mainly support the ones obtained through other ethnographic studies. To some extent, emic and ethic views should allow us to reach a better comprehension of digital and information literacies.

Regarding a qualitative approach of literacy, the use of self-report questionnaires does not allow to create links between each subject's events and practices, on the basis of the artefacts and the context that mediate their literacy, and the opinions of the same subject. On the contrary, a quantitative approach provides, to a large extent, pupils' opinions involved in the literacy processes, which reduces the bias attributed to the qualitative samples.

However, it would be convenient to complete the development of this quantitative study with an ethnographic study that would allow the analysis of the meaning that literacy events have in pupils' daily life.

Our results imply that there is little permeability between inside and outside school spaces. The creation of a third literacy space would represent one way to connect literacy events developed in both spaces (Cook, 2005; Pahl & Kelly, 2005). This third space exceeds the physical limits of classrooms and has both a social and situated dimension (Gutiérrez, Baquedano-López & Tejeda, 1999; Soja, 1996); it is formed by the intersection of school, neighbourhood and home spaces, among others, where each one promotes different discourses (Gee, 2004). This suggestion would enable the creation of an affinity space based on the interaction between different spaces, where discourses created by popular culture, virtual spaces or school are included (Hannaford, 2016; Levy, 2008). The third space in school should assume the development of knowledge and critical discourse through purposeful use of digital literacies (Abrams & Merchant, 2013). One solution is that of Lankshear and Knobel (2003) who suggest the following principles which would allow the introduction of digital literacies in order to create knowledge in formal school learning: effective learning (connected to discourses which refer to individual motivation and relevance), integrated learning (social, contextualized and related to the individual) and critical learning (spaces to experiment and interact through different discourses). This type of knowledge requires a significant change of teaching methods related to the use of digital literacies in classrooms (Luke, 2008).

Our paper highlights the need to change teaching-learning methods in order to introduce Web 2.0 in primary education and improve the development of pupils' literacies in classrooms (Cervetti, Damico, & Pearson, 2006; Luke, 2000). However, our research presents certain limitations. One of the most relevant ones is related to the instrument used. Our data are the result of perceptions of subjects' own behaviour. However, the wide sample participating in this study could be highlighted as a strong point. Future ethnographic research could be carried in order to complement our results and broaden the focus based on digital competence towards the analysis of media and ICT literacy.

7. Support

This research has been carried out within the framework of I+D project [information available in the documents added to the main manuscript].

8. References

Abrams, S.S. & Merchant, G. (2013). The Digital Challenge. In K. Hall, T. Cremin, B. Comber, & L.C. Moll, *International Handbook of research on children's literacy, learning, and culture* (pp. 319-332). London: Wiley-Blackwell. Doi: 10.1002/9781118323342.ch4

Ala-Mutka, K. (2011). *Mapping digital competence: Towards a conceptual understanding*. Luxembourg: Publications Office of the European Union. Retrieved http://ftp.jrc.es/EURdoc/JRC67075_TN.pdf

Alvermann, D.E., Moon, J.S., & Hagood, M.C. (1999). *Popular culture in the classroom. Teaching and researching critical media literacy*. Chicago, IL: National Reading Conference.

Autores (2017)

Bawden, D. (2001). Information and digital literacies: a review of concepts. *Journal of Documentation, 57*(2), 218-259.

Bawden, D. (2008). Origins and concepts of digital literacy. En C. Lankshear & M. Knobel (Eds.), *Digital literacies: Concepts, policies & practices* (pp. 17-32). New York: Peter Lang.

Beetham, H., McGill, L., & Littlejohn, A. (2009). Thriving in the 21st century: Learning literacies for the digital age (LliDA project). http://www.jisc.ac.uk/media/documents/projects/llidareportjune2009.pdf.

Bigum, C. (2002). Design sensibilities, schools, and the new computing and communications technologies. En I. Snyder (Ed.), *Silicon Literacies* (pp. 130-140). London: Falmer-Routledge.

Bigum, C. (2003). The knowledge producing school: moving away from the work of finding educational problems for which computers are solutions. *Computers in New Zealand Schools, 15*(2), 22-26.

Buckingham, D. (2007). *Beyond technology: Children's learning in the age of digital culture.* Cambridge, MA: Polity.

Bryant, L. (2007). Emerging trends in social software for education. En AA.VV., *Emerging technologies for learning* (Volumen 2) (pp. 9-18). Coventry: Becta. Available at: www.mmiweb.org.uk/publications/ict/emerging_tech02.pdf

Burnett, C., Davies, J., Merchant, G., & Rowsell, J. (2014). *New literacies around the globe. Policy and pedagogy*. London: Routledge.

Burnett, C. & Merchant, G. (2018). *New media in the classroom. Rethinking primary literacy*. London: Sage.

Burnett, C. & Merchant, G. (2020). *Undoing the digital. Sociomaterialism and literacy education*. London: Routledge.

CELEX (2013). *Comunicado de la Comisión Europea al Parlamento Europeo, al Consejo, al Comité Económico y Social Europeo y al Comité de las Regiones. Apertura de la educación: Docencia y aprendizaje innovadores para todos a través de nuevas tecnologías y recursos educativos abiertos*. Bruselas, 25.9.2013. Retrieved http://ec.europa.eu/transparency/regdoc/rep/1/2013/ES/1-2013-654-ES-F1-1.Pdf

CILIP (2012). Information literacy skills. Retrieved January 11, 2016, from http://www.cilip.org.uk/cilip/advocacy-campaigns-awards/advocacy-campaigns/information-literacy/information-literacy.

Cervetti, G., Damico, J., & Pearson, P.D. (2006). Multiple literacies, new literacies, and teacher education. *Theory into Practice, 45*(4), 378-386.

Chaudron, S. (2015). *Young children (0-8) and digital technology: a qualitative exploratory study across seven countries*. Luxembourg: Publications Office of the European Union. Retrieved from http://publications.jrc.ec.europa.eu/repository/handle/JRC93239

Chaudron S., Di Gioia R., Gemo M., Young children (0-8) and digital technology, a qualitative study across Europe (2018). Luxemburg: European Union. doi:10.2760/294383

Cook, M. (2005). "A place of their own": Creating a classroom "third space" to support a continuum of text construction between home and school. *Literacy, 39*(2), 85-90.

Davies, J. & Merchant, G. (2009). *Web 2.0 for schools. Learning and social participation.* New York: Peter Lang.

Ditrendia (2018). *Informe mobile en España y en el mundo 2017*. Retrieved https://ditrendia.es/informe-mobile-espana-mundo-2017/

European Commission (2013). *Survey of Schools: ICT in Education. Benchmarking Access, Use and Attitudes to Technology*. Bruselas: European Union. https://ec.europa.eu/digital-agenda/en/pillar-6-enhancing-digital-literacy-skills-and-inclusion.

European Parliament and the Council. (2006). Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning. *Official Journal of the European Union*, L394/310.
Erstad, O., Flewitt, R., Kümmerling-Meibauer, B., & Pires Pereira, S. (2020). *The Routledge handbook of digital literacies in early childhood*. London: Routledge.
Ferrari, A. (2012). *Digital competence in practice: an analysis of frameworks.* Luxembourg: Publications Office of the European Union.
Fernández Enguita, M. (2018). *Más escuela y menos aula. La innovación en la perspectiva de un cambio de época.* Madrid: Morata
Gee, J.P. (2004). *Situated language and learning: a critique of traditional schooling*. New York: Routledge.
Gee, J.P. (2013). *The anti-education era: Creating smarter students through digital learning*. New York: Palgreve/MacMillan.
Gee, J.P. (2015). *Literacy and Education*. New York: Routledge.
Gillen, J. (2014). *Digital literacies*. London: Routledge.
Gillen, J. & Kucirkova, N. (2018). Percolating spaces: creative ways of using digital technologies to connect young children's school and home lives. *British Journal of Educational Technology, 49*(5), 834-846. Doi: 10.1111/bjet.12666
Gillen, J. & Merchant, G. (2013). From virtual histories to virtual literacies. En G. Merchant, J. Gillen, J. Marsch, & J. Davies, *Virtual literacies. Interactive spaces for children and Young people* (pp. 9-26). New York: Routledge.
Gillen, J. et al. (2018). *A day in the digital lives of children aged 0-3: Summary report by DigiLitEY COST Action IS1410 Working Group 1*. http://digilitey.eu (accessed 24 June 2020).
Goodfellow, R. (2011). Literacy, literacies and the digital in higher education. *Teaching in Higher Education, 16*(1), 131-144.
Green, B. & Bigum, C. (1993). Aliens in the classroom. *Australian Journal of Education, 37*(2), 119-141.
Green, Bill. & Beavis, C. (2013). Literacy education in the age of new media. In K. Hall, T. Cremin, B. Comber, & L.C. Moll, *International Handbook of research on children's literacy, learning, and culture* (pp. 42-53). London: Wiley-Blackwell. Doi: 10.1002/9781118323342.ch4
Gutiérrez, K.D., Baquedano-López, P., & Tejeda, C. (1999). Rethinking diversity: hybridity and hybrid language practices in the third space. *Mind, Culture, and Activity, 6*(4), 286-303. Doi: 10.1080/10749039909524733
Hannaford, J. (2016). Digital worlds as sites of belonging for third culture kinds: a new literacies perspective. *Journal of Research in International Education, 15*(3), 253-265. Doi: https://doi.org/10.1177%2F1475240916677442
Hannaford, J., Beavis, C. (2018). When will the Internet be connected? Digital worlds and belonging in the lives of globally mobile children. *Literacy, 52*(1), 47-54. doi: https://doi.org/10.1111/lit.12123
Heath, S.B. (1983). *Ways with words. Language, life, and work in communities and classrooms*. Cambridge: Cambridge University Press.
Ito, M., Baumer, S., Bittanti, M., Boyd, D., Cody, R., Herr, B., et al. (2010). *Hanging out, messing around, geeking out: Living and learning with new media*. Cambridge, MA: MIT Press.
Jenkins, H. (2006). *Fans, bloggers and gamers: Exploring participatory culture*. New York: New York University Press.
Knobel, M. (1999). *Everyday literacies: Students, discourse, and social practice*. New York, NY: Peter Lang.

Kucirkova, N., Wells Rowe, D., Oliver, L., & Piestrzynski, L. (2017). *Children's writing with and on screen(s): a narrative literarure review*. COST Action IS1410 Report. http://digilitey.eu (accessed 24 January 2020).

Kucirkova, N., Rowsell, J., & Falloon, G. (2019). *The Routledge international handbook of learning with technology in early childhood*. London: Routledge.

Kumpulainen, K. & Gillen, J. (2017). *Young children's digital literacy practices in the home: a review of the literarure*. COST Action IS1410 Report. http://digilitey.eu (accessed 24 January 2020).

Lankshear, C. & Knobel, M. (2003). *New literacies: Changing knowledge and classroom learning*. Buckingham and Philadelphia: Open University Press.

Lefebvre, H. (1984). *The production of space*. Oxford: Blackwell.

Levy, R. (2008). 'Third spaces' are interesting places: Applying 'third space theory' to nursery-aged children's constructions of themselves as readers. *Journal of Early Childhood Literacy, 8*(1), 43-66.

Levy, R., Yamada-Rice, D., & Marsh, J. (2013). Digital literacies in the primary classroom. In K. Hall, T. Cremin, B. Comber, & L.C. Moll, *International Handbook of research on children's literacy, learning, and culture* (pp. 333-343). London: Wiley-Blackwell. Doi: 10.1002/9781118323342.ch24

Luke, C. (2000). Cyber-Schooling and technological change. In B. Cope and M. Kalantzis (Eds.), *Multiliteracies. Literacy learning and the design of social futures* (pp. 67-88). London: Routledge.

Luke, A. (2008). *Digital innovation in schooling: Policy efficacy, youth cultures and pedagogical change*. Brisbane, Australia: Queensland University of Technology.

Marsh, J., Hannon, P., Lewis, M., & Ritchie, L. (2015). Young children's initiation into the family literacy practices in the digital age. *Journal of Early Childhood Research, 15*(1), 47-60. Doi: 10.1177/1476718X15582095

Marsh, J., Kumpulainen, K., Nisha, B., Velicu, A., Blum-Ross, A., Hyatt, D., Jónsdóttir, S.R., Levy, R., Little, S., Marusteru, G., Ólafsdóttir, M.E., Sandvik, K., Scott, F., Thestrup, K., Arnseth, H.C., Dýrfjörð, K., Jornet, A., Kjartansdóttir, S.H., Pahl, K., Pétursdóttir, S. and Thorsteinsson, G. (2017) *Makerspaces in the Early Years: A Literature Review.* University of Sheffield: MakEY Project.

Marsh, J., Mascheroni, G., Carrington, V., Árnadóttir, H., Brito, R., Dias, R. et al. (2017a). *The online and offline digital literacy practices of Young children: a review of the literature*.

Marsh, J., Plowman, L., Yamada-Rice, D. Bishop, J., Lahmar, J., & Scott, F. (2018). Play and creativity in young children's use of apps. *British Journal of Educational Technology, 49*(5), 870-882. Doi: 10.1111/bjet.12622

Massey, D. (2005). *For space*. London: Sage.

Merchant, G. (2007). Writing the future in the digital age. *Literacy, 41*(3), 118-128.

Merchant, G. (2009). Literacy in a virtual world. *Journal of Research in Reading, 32*(1), 38-56. Doi: 10.1111/j.1467-9817.2008.01380.x

Meyers, E.M., Erickson, I., & Small, R.V. (2013). Digital literacy and informal learning environments: an introduction. *Learning, Media and Technology, 38*(4), 355-367.

Moje, E. B. (2013). Hybrid Literacies in a Post-hybrid World: Making a Case for Navigating. In K. Hall, T. Cremin, B. Comber, & L.C. Moll, *International Handbook of research on children's literacy, learning, and culture* (pp. 359-372).

Pahl, K. & Burnett, C. (2013). Literacies in Homes and communities. En K. Hall, T. Cremin, B. Comber, & L.C. Moll (Eds.), *International handbook of research on children's literacy, learning and culture* (pp. 3-14). Oxford: Wiley-Blackwell.

View publication stats

Pahl, K. & Kelly, S. (2005). Family literacy as a third space between home and school: some case studies of practice. *Literacy, 39*(2), 91-96.

Pourbaix, R. (2000). Emergent literacy practices in an electronic community. En D. Barton, M. Hamilton, & R. Ivanic (Eds.), *Situated Literacies. Reading and Writing in Context* (pp. 125-148). London and New York: Routledge.

Prinsloo, M. (2020). Children's divergent practices and access to digital media in home, school and neighbourhood communities. In O. Erstad, R. Flewitt, B. Kümmerling-Meibauer, & S. Pires Pereira (Eds.), *The Routledge handbook of digital literacies in early childhood* (pp. 146-157). London: Routledge.

Säljö, R. (2010). Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning. *Journal of Computer Assisted Learning, 26*, 53-64.

Schamroth Abrams, S. & Merchant, G. (2013). The digital challenge. En K. Hall, T. Cremin, B. Comber, & L.C. Moll (Eds.), *International handbook of research on children's literacy, learning and culture* (pp. 319-332). Oxford: Wiley-Blackwell.

Sheehy, M. & Leander, K.M. (2011). Introduction. En K.M. Leander & M. Sheehy (Eds.), *Spatializing literacy research and practice* (pp. 1-13). New York: Peter Lang.

Shirky, C. (2008). *Here comes everybody. The power of organizing without organizations*. New York: Penguin Book.

Smeets, E. (2005). Does ICT contribute to powerful learning environments in primary education? *Computers and Education, 44*(3), 343–355. Doi: 10.1016/j.compedu.2004.04.003

Soja, E.W. (1996). *Thirdspace: Journeys to Los Angeles and other real-and-imagined places*. Malden, MA: Blackwell.

Warschauer, M. & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education, 34*(1), 179–225. Doi: 10.3102/0091732X09349791

Warschauer, M. & Xu, Y. (2018). Technology and equity in education. In J. Voogt et al. (Eds.), *Second Handbook of Information Technology in Primary and Secondary Education* (pp. 1063-1079). London: Springer.