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Informationalism and informalization of learnings in 21st century. A qualitative study on meaningful learning experiences

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Informationalism and Informalization of Learnings in 21st Century. A Qualitative Study on Meaningful Learning Experiences

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Abstract

Recent work on education, based on sociocultural principles, suggest an expansion of the traditional boundaries of learning research that takes into account the multiple spaces and life trajectories that make up experience across our life-worlds. This article focuses specifically on young people's significant learning experiences in order to illustrate empirically what learning means - i.e. where, with whom and how - in the 'new ecology of learning' based on the informalization and informationalization of learning in XXI century. 43 significant learning experiences were identified from four young students who recorded their specific learning experiences during a week by means of a significant learning experiences journal and photographs they took themselves. The results show the presence of informal, everyday, spontaneous activities among the significant learning experiences detected and the use of digital technologies as learning resources; they also reveal the assistance of friends and family in the learning process. In conclusion, this study illustrates how young people in XXI century are involved in a whole range of different activities across different sites and over time.

Keywords: Lifelong learning, Learning experience, Qualitative research, Informational society, Mobile-centric society



La Informalización e Informacionalización de los Aprendizajes en el Siglo XXI. Un Estudio Cualitativo sobre Experiencias Significativas de Aprendizaje

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Resumen

Recientes trabajos en la perspectiva sociocultural sugieren la necesidad de expandir las tradicionales fronteras en la investigación sobre el aprendizaje a partir de tener en cuenta los múltiples espacios y trayectorias de vida que constituyen experiencias de aprendizaje. Este artículo centra su análisis en las experiencias significativas de aprendizaje de jóvenes estudiantes con el fin de ilustrar, empíricamente, qué significa aprender en términos de dónde, con quién y cómo en la llamada ‘nueva ecología del aprendizaje’, basada en la informalización e informacionalización de los aprendizajes en el siglo XXI. Se identifican 43 experiencias significativas de aprendizaje (EsigA) a partir de 4 jóvenes estudiantes quienes documentaron sus particulares experiencias de aprendizaje durante una semana a través de fotografías y un diario personal. Los resultados muestran la presencia de actividades informales, espontáneas o cotidianas, la utilización de dispositivos digitales como recursos de aprendizaje, así como la ilustración de la asistencia de amigos/as y familiares en los procesos de aprendizaje. En conclusión, el estudio ilustra cómo los jóvenes en el siglo XXI se implican en un amplio y diverso rango de actividades que suceden en distintos momentos y espacios.

Palabras clave: Aprendizaje a lo largo de la vida, Experiencias de aprendizaje, Investigación cualitativa, Sociedad informacional, Sociedad móvil-céntrica

According to the LIFE Center (Learning in Informal and Formal Environments), 19% of school-age children's time is spent in formal settings, while the rest is spread among informal activities. In the case of adults, almost all of their learning takes place in informal situations, for example in the work-professional sphere. These figures illustrate the spontaneous nature of much of the educational process, that is to say, the fact our learning is life-long and life-wide (Banks, Au, Ball, Bell, Gordon, Gutiérrez, Heath, Lee, Lee, Mahiri, Nasir, Valdés & Zhou, 2007) and stems from participation in a multitude of activities, many of which are, today, mediated by digital technologies.

According to Spain's Instituto Nacional de Estadística (INE), in 2014, around 75% of Spanish households (almost 11.9 million in total) had an Internet connection available, which was nearly five percentage points more than in 2013 and, for the first time, the percentage of the population who were Internet users (76.2%) was greater than that of computer users (73.3%). In fact, according to the same survey, 77.1% of all Internet users accessed the Internet via mobile phone. Furthermore, ownership of mobile phones increases significantly from the age of 10, reaching 90.3% among the population of 15 year-olds (INE, 2014).

At the same time, international studies estimate that 90% of our interactions with the media take place via device screens (tablets, smart phones, computers) leaving just 10% for screen-free sources (radio, printed newspapers, magazines, etc.). This amounts to about 4.4 hours of our free time being spent looking at screens, every day, either sequentially or in parallel (multitasking) (Google, 2012).

The penetration in society of digital mobile devices, associated with their use in everyday life, has led some authors to suggest that what characterizes our era is information, which today is generated and distributed by numerous agents connected together in real time. The generation, processing and transmission of information has become the cornerstone of productivity, power and social, cultural and political organization. Information has, without doubt, always been crucial in any society, whether agricultural or industrial. However, the specific modern nature of it lies in the action of knowledge upon knowledge itself (i.e., the technology of knowledge

generation, information processing and symbol communicating) as the main source of productivity (Castells, 1996).

In the field of education, the Information Age (Castells, 1996) or the Mobile-centric Society (González-Patiño & Esteban-Guitart, 2014) brings with it a new scenario that some authors call the new ecology of learning (Barron, 2004; Coll, 2013).

The central idea in our view, and one which poses a challenge for educational science, is the need to develop a broad notion of learning which manages to incorporate the way people learn throughout their lives, as a result of participation and transit in different scenarios, practices and contexts of life as well as the content of what is learned and how it is learnt (Banks et al., 2007; Erstad & Sefton-Green, 2013; Esteban-Guitart, 2015, 2016; Ito, Gutiérrez, Livingstone, Penuel, Rhodes, Salen, Schor, Sefton-Green & Watkins, 2013).

In this sense, people do not do their learning exclusively at school with the scaffolding provided by the teacher; rather, through ICT, they access, build and distribute information and knowledge, turning the educational act into an action that is distributed and scattered among numerous scenarios and potential educational agents. In other words, thanks to mobile technologies, teaching and learning situations can emerge anywhere, anytime.

As summarized by Coll (2013), the new ecology of learning means recognizing people's need to learn throughout the length and breadth of life, beyond the exclusive realm of traditional/formal educational activity. Formal education is intentional, systematic, universal and planned; it is associated with the predominance of technologies based on the written language and the skills required to use it. Today's learning extends beyond the walls of the school through participation in communities of interest (such as a Facebook group, for example), and using different formats of representation, with a predominance of visual language and the multimodality of devices and codes.

The emergence and penetration of digital ICTs have changed the traditional spaces and forms of teaching and learning. In this sense, the Internet can be considered the main point of access to information and where it is handled, which turns the act of learning into a distributed and interconnected process, present in informal exchanges with the world at

large based on ongoing learning needs linked to the functionality, interest or feelings of the learner. In that regard, Siemens (2005) suggest the term “connectivism” to emphasize the technology’s effect on how people live, communicate and learn. Connectivism proposes to see knowledge as a distributed network across nodes and learning as a process of pattern recognition.

In addition, alongside the need to develop a holistic concept of learning, there is the need to broaden the traditional cognitive concept of the learner. Learners are no longer seen as cognitive individuals who substantially associate previous knowledge with new knowledge (Ausubel, 1963); now learners are seen as people with experiences and funds of knowledge and identity (Esteban-Guitart & Moll, 2014) who join communities of practice and transform, through activity and participation, how they recognise themselves as a ‘certain kind of person’ in a given context (Gee, 2000): a good FIFA player, a radical independent or a good maths student. In all these cases, learning is defined as being based on the construction of an identity or affiliation to a social group, with the subsequent incorporation of their discourse and artefacts. It is a process of identity transformation that is associated with the transformation of participation, from little autonomy to greater autonomy, in the course of socio-cultural practices (Lave & Wenger, 1991).

In this context, the term ‘learner identity’ (LI) takes on special prominence. Although there is no solid agreement on how to define and conceptualize it, it can be argued from a sociocultural perspective that learner identity is the position, perception or recognition that one has in relation to oneself as a learner (Coll & Falsafi, 2010; Silseth & Arnseth, 2011; Reeves, 2009; Vagan, 2011; Wortham, 2006). According to the definition of Coll and Falsafi (2011):

An analysis of LI can be understood as an analysis of the process by which we make sense of our participation in learning activities through a recognition of ourselves as learners and the values and emotions that accompany this recognition. [...] ...we think of LI as a set of meanings in a constant process of reconstruction in different contexts in which, through the interactions we establish with others, we have experiences of recognition as learners (p. 78 and 84).

From the above definition it seems that two things deserve special attention. The first is that the process of constructing a learner identity is related to one's experience of oneself as a learner. As we pointed out earlier, the cognitive perspective in education has, traditionally, conceptualized learning in terms of acquisition or construction of knowledge. In contrast, terms such as lived experience, feeling or recognition allow us to take into account more explicitly the social and emotional aspects involved in learning. And this brings us closer to the previously mentioned, and necessary, holistic notion of the learner and learning (Esteban-Guitart & Moll, 2014; Herrenkohl & Mertl, 2010). The second aspect refers to the notions of participation, activities and contexts. In this sense, what is emphasised is the social nature of the learning process by conceptualizing it as the fruit and result of the transformation that takes place while participating in communities of practice (Lave & Wenger, 1991).

The notion of learner identity (LI) as a unit of analysis brings us to the concept of 'subjective learning experiences'. In fact, the learner identity is articulated around the positioning – through a dialogic process, be it public or private – of negotiation of meaning and of making sense of social experiences that are subjectively recognized as motives, sources or situations of learning.

At this point, we should distinguish between 'objective learning experiences' and 'subjective learning experiences.' An objective learning experience is defined as an educational act or practice, be it formal or informal. For example, a history class in high school is an objective learning experience, as is shared reading of a bedtime story between a parent and a child who is learning to read, or even when one friend teaches another to play a particular game. Such situations can be, but are not necessarily, subjective learning experiences. For an objective experience to become subjective, the learner or participant needs to recognize and be recognized as a learner within the activity. In other words, the participant must give meaning to the activity and attribute or recognize that this is a situation in which he or she is learning something. In addition, we propose here to distinguish between 'subjective learning experiences' and 'significant learning experiences' (SLEs). Significant learning experiences require an even greater degree of explicitness since the term is used to refer to those subjective learning experiences which, because of their impact, whether

negative or positive, the learner recognizes as the most relevant ones. For example, the question ‘What has been the most significant, most relevant, learning you have experienced this week?’ focuses attention on significant learning experiences. From among all the objective learning experiences and situations that the learner may have participated in during a week, the learner can recognize subjective learning experiences in some of them, and even highlight those that have had the greatest impact –not necessarily those in which more things were learned, but those which make more sense to him or her, and which stand out for their positive, or negative, impact.

We can distinguish two trends in the analysis of subjective learning experiences in the literature. The first focuses on intra-institutional experiences in the formal setting. In this regard, previous studies have described the relationship between academic learning and the emerging social identities of students (Wortham, 2006), emphasizing the importance of certain orientations in classroom discourse that facilitate a sense of competence and recognition as learners among students (Mortimer, Wortham & Allard, 2010). The second, however, shows interest in tracking individual learning trajectories in informal situations arising from participation in communities of practice, interaction with technology and the popular culture of young artists, entrepreneurs and professionals (Erstad & Sefton-Green, 2013; Erstad, Gilje & Arnseth, 2013). It is obvious that both formal and informal situations provide resources and opportunities for learning. However, the hypothesis that sustains the concept of the new ecology of learning is that, through mobile digital technologies, learning is becoming increasingly informal and is associated with participation in accessing, creating and disseminating information: what we could call a process of informalization and informationalization of learning.

The overall objective of the study described here was to contribute to the existing literature that seeks to identify and describe subjective learning experiences while taking into account the parameters of the new ecology of learning, in particular the how, where and with whom learning takes place (Coll, 2013; González-Patiño & Esteban-Guitart, 2014), and using the notion of ‘significant learning experiences’ which we propose here. In this sense, we hope to illustrate empirically the new ecology of learning by identifying and analysing a number of different significant learning experiences, i.e., situations in which learners recognize themselves as learners and which they

identify as especially relevant from an existing range of subjective learning experiences.

Methodology

Participants

The participants in this study were four teenagers, two boys and two girls, aged between 15 and 16 in their fourth year of ESO - Educación Secundaria Obligatoria (UK equivalent, Year 11; USA Grade 10). Participants were selected via purposive non-probability sampling using the following criteria: a) studying in 4th year of ESO; b) Representation of gender (two boys and two girls); c) Representation of origin (two foreign-born and two native); d) socioeconomic representation (two from a medium-high socioeconomic level and the other two, medium low); e) academic representation (one boy and one girl with low academic success, one boy and one girl with high academic success, i.e., good grades). The distribution of the different variables among the participants is shown in Table 1. The goal was to achieve the highest possible heterogeneity among the participants.

Table 1
Sociodemographic Characteristics of the participants

Pseudonym	Age	Country of Origin	Sex	Academic Level	Socioeconomic Level
Jasmine	16	Morocco	Girl	Very high	Medium
María	15	Spain	Girl	Low	High
Albert	16	Spain	Boy	High	Medium
Roger	16	Holland	Boy	Low	High

Instruments Used

Personal journal of significant learning experiences. In order to elicit narratives in relation to learner identity, we designed a personal journal to record learning situations or experiences which, in the view of the participants, were the most relevant or important. The journal consisted of five questions that the participants had to answer at the end of each day for

one week (Monday to Sunday). The questions were as follows: a) What is the most important thing I learned today? b) Where did I learn it? c) Who did I learn it with? d) How, in what way, under what circumstances did I learn it? e) What did I feel? – i.e., subjective testimony of emotional experience associated with learning. The instruction given to the participants was as follows: ‘Using the five questions in this journal, we would like you to record, for seven days in one week, the situations, occasions or experiences in which you learned something. It is important that, from among all the things you have learned during one particular day, you concentrate on whichever one is the most relevant or important for you’.

Photographs of learning situations. In order to document graphically the participants’ learning activities, situations or occasions, we asked them, for one week, to take photographs that reflect the activities or circumstances in which they had learned something or that would constitute a stimulus that had made them think or impacted them in a way they would consider significant. Such circumstances or stimuli may or may not correspond to what the participant explained in his or her journal. The instruction was: ‘During the week you are completing the personal journal of learning experiences, take pictures with your mobile or whatever device you have available at the time, of the learning situations and occasions or things that have motivated you to learn something. These situations may coincide or not with the situations that you describe in your journal’. Subsequently, the participants had to choose four photographs from among all the ones they took that were the most relevant and significant for them.

Procedure and Analysis of Empirical Material

After choosing the four study participants according to the criteria described above, we explained the purpose of the investigation, emphasizing the interest in documenting learning experiences, understood as moments or situations in which the people involved have learned something. To this end, they were given the personal journal with instructions on how to complete it and on the need to take photographs. After one week, a member of the research team interviewed each of the participants in order to clarify the content of the selected photos and the personal journal.

Based on three of the parameters of the new ecology of learning described above (how, where and with whom something is learned) the empirical data was analysed using a thematic content analysis (Krippendorf, 1980) which took into consideration the terms or concepts according to the codes of analysis described in Table 2.

Table 2.
Codes of analysis according to three parameters of the new ecology of learning

Parameters of the new ecology of learning (Coll, 2013)	Codes of analysis	Criteria for inclusion
Where?	Formal:	When the participant describes the learning as being derived from participation in a formal educational institution.
	Informal:	When the participant describes spontaneous learning situations outside the traditional educational institutions.
With whom?	Alone	
	With the teacher	
	Classmates	
	Friends	
	Parents	
	Brothers / sisters	
	Others	

Table 2.

Codes of analysis according to three parameters of the new ecology of learning
(continued)

Parameters of the new ecology of learning (Coll, 2013)	Codes of analysis	Criteria for inclusion
How?	Instruction:	When the participant describes learning as a result of formal, planned and systematic teaching.
	Community of interest:	When the participant describes learning derived from participation in a community of practice and interest, for example, a Facebook group.
	Traditional format:	When the participant describes learning as a result of using written language and the skills associated with its use (reading books, writing).
	Digital format:	When the participant describes learning as a result of using of digital ICT to access information and knowledge

The encoding process consisted of assigning the codes shown in Table 2 to segments of meaning linked to the significant learning experiences recorded in the personal journals or in the photographs and their explanation. While all the significant learning experiences can be designated as informal or formal and associated with one of the categories relating to ‘with whom?’, this is not the case with the category ‘how’. In this case, when the criteria for inclusion were fulfilled, the learning experience was duly coded, but if this was not the case, they could be left uncategorized.

Results

From the content of the personal journals of significant learning experiences and the photographs taken and selected by the participants, a total of 43 significant learning experiences were identified: situations, moments, or activities perceived as significant through which the participant saw themselves as a learner and declared that they had learned something. Of these 43 experiences, 27 emerged from the personal journals (almost 7 experiences per participant, the exception being one day in Maria’s week in which she claimed to have learnt nothing relevant) and 16 photographs (4 per participant). Table 3 shows the thematic content analysis carried out according to the codes of analysis described in Table 2.

Table 3
Thematic content analysis of significant learning experiences

WHERE?		
Participant	Formal (Secondary Education School)	
	Formal (Secondary Education School)	Informal
Jasmine	0	11
María	0	10
Albert	0	11
Roger	0	11
Total	0	43

Table 3

Thematic content analysis of significant learning experiences (continued)

WITH WHOM?							
Participant	Alone	With Teacher	classmates	Friends	Parents	Siblings	Others
Jasmine	5			3	3		
María	3			5	1		1
Albert	4			2	4		1
Roger	7			2	1		1
Total	19			12	9		3
HOW?							
Participant	Teaching		Community of Interest	Traditional Format		Digital Format	
Jasmine			4			6	
María			3	4		2	
Albert			2	1		2	
Roger				1		6	
Total			9	6		16	

One of the figures that stands out from the analysis is that all the significant learning experiences recorded by the participants take place in informal settings; in addition, most of these are experienced on their own or with the peer group. As for how they learned, the emphasis was on television

and the Internet (digital media) as the devices through which participants say they learned something significant; also important were communities of interest, often their peer group gathered together for an activity or for some particular motive. Most conspicuous is the irrelevance of learning derived from schooling, as not one instance of a significant learning experience was linked to formal schooling. Below, we illustrate empirically the three parameters (where, with whom and how) through examples of the different significant learning experiences (which we will refer to as SLEs) of the participants.

Where Learning Takes Place

All 43 of the SLEs we gathered from the participants took place in informal spaces or situations, away from any formal institution, (i.e., the secondary school they were attending) with just one exception: one of the SLEs did actually take place on school premises but was unrelated to formal educational practice and was recounted by Jasmine as follows:

I have learned issues related to girls' sexuality, specifically the orgasm and the way you can achieve one. The thing about how the clitoris gets hard and so it is what makes you have an orgasm. It helps.
(Jasmine's SLE, Tuesday)

The situation, which the protagonist also records in a photograph (see Figure 1), takes place in the pause between a Catalan class and a Natural Sciences class. While waiting for the arrival of the teacher, the two friends chat for about 10 minutes.



‘This is a photo of the moment my friend told me about the female orgasm; she told me about it while we were waiting for the teacher, in class. My friend is the one whose hand you can see on the left, but I didn’t want to take a photo of her. And everybody’s on their smartphones, like always!’

Figure 1. Photograph and description of it in relation to a significant learning experience (SLE) by Jasmine.

However, the other SLEs that Jasmine talks about in her personal journal occur mostly at home and take place on the Internet. For example, she describes having learned how to delete information about her held by Google that she does not want people to see if they put her name in the search engine (SLE Monday), or having learned how to find, via the website notasdecorte.info, that the minimum Baccalaureate score that would gain entry to university to study law was 6.36 (SLE Friday).

Another of the significant learning contexts that Jasmine chose from the photographs she took is the mosque (see Figure 2). On this occasion, her emotional positioning is not positive, as can be read in the explanation she gives of the photograph.



‘This is the mosque at Torroella de Montgrí; I go there occasionally with my father. I took the picture when I went on Saturday, but it’s not really a context or stimulus that I like. I’ve included it because it is very important to my family, and because I should like it more, but I don’t.’

Figure 2. Photograph and description of it in relation to a significant learning experience (SLE) by Jasmine.

Although none of the 4 participants referred to any SLEs derived from the process of teaching-learning that took place in the formal setting of the

16 *Esteban-Guitart, Serra & Vila – Learnings in 21st century*

school, there were, in fact, a number of SLEs related to the content in school programme.

Measuring magnitude is not the same as measuring the intensity of earthquakes or seismic movements. They are often confused but they are different. The Richter scale is not the only measure used to measure this. (María's SLE, Sunday)

I understood, or I think I do, Einstein's theory of relativity: $E = mc^2$.
(Roger's SLE, Monday)

In the first case, María reported that she had learned this difference between the magnitude and intensity of earthquakes at home, preparing for an exam with the help of the Biology text book for her 4th year ESO class. In the second case, Roger says he learnt about Einstein's theory at home through a collection of DVD's from the television series *Cosmos*, by Carl Sagan. He went on to explain that, after finding a reference to the series on Internet, he found a set of DVDs of the series at home several days later. 'I'm learning loads of stuff and I'm really interested in this series. It's like going to class without having to go to class, and you have a great time. I did a search for information on Carl Sagan and he was a great broadcaster' (Roger's SLE, Monday). In fact, from watching the collection of DVDs at home, Roger highlighted other learning achievements during the week:

We are made of stardust and, in fact, we are mineral matter which became organic matter and this organic matter acquired life (Roger's SLE, Tuesday)

The idea that we are on the shore of the cosmic ocean is an idea that I really liked and it's one that conveys the idea of the size of the universe (Roger's SLE, Thursday)

Cosmos means the order of the universe and chaos is the opposite, disorder (Roger's SLE, Sunday)

Besides the home, there are other contexts that appear in the stories of the participants. Many of them reference the street or everyday situations such as in a pet shop, a perfume shop, at the gym, or at the disco.



‘This is the gym where I go three times a week and where this week I discovered stuff about Clenbuterol which I’ve written about in my journal (see written journal), taken the day after I learned this new thing’

Figure 3. Photograph and description of it in relation to a significant learning experience (SLE) by Roger

According to Roger, he learned at the gym that Clenbuterol is a medicine used to burn fat. He said he learned this from a conversation, between two people older than him, about a sympathomimetic drug called clenbuterol, widely used for the treatment of lung diseases because of its bronchodilator effect.

Who they Learn with

The participants mostly reported being alone during their significant learning experiences (19 out of 43 SLEs, see Table 5). Albert, for example, reported that all he had learned by himself – by observing life on the street – that ‘you cannot trust the zebra crossings’ (Albert’s SLE, Monday); from the internet he had learned that ‘psychiatrists are doctors and can prescribe medication and psychologists are not doctors and cannot prescribe medicines’; and, as a result of reading Bret Easton Ellis’s *American Psycho*, published in 1987, which tells the story of a yuppie murderer famous for being the archetype Wall Street capitalist, he discovered that ‘many people resemble those of the yuppie culture in Reagan’s America during the 1980s’

Another common reference are friends, especially in the case of María, and the family (father, mother), especially in the case of Albert. In María’s case, for example, she says she learned that the ABS braking system unblocks the brake discs of cars. A friend of hers, who was studying for her driver’s license, explained it to her and showed her the details in a book.

Also with friends, María says she learned the best things to combine with cava (see Figure 4).



‘I have become an expert on alcohol and drugs. I drink quite a bit at the weekends and I know more about it than most of the boys and girls my age, because I never get drunk and I have a better time than them. I am an expert in this and there are people who get to thirty and they don’t know how to drink. On this day, I learned with some friends what goes best with cava, and we took these bottles with us on a night out’

Figure 4. Photograph and description of it in relation to a significant learning experience (SLE) by María

Regarding the SLE that took place with his parents, Albert recounted a conversation with them about the dangers on the road, something he reported in his journal and in one of the photographs he selected (see Figure 5).



‘In the written journal, I’ve described it in more detail, but I was amazed to see this crashed car and learned that there can be lots of ways to die if you drive like a maniac on the road. I talked a lot to my parents about what the most serious accidents are and which parts of the car withstand the best if it you crash into someone

Figure 5. Photograph and description of it in relation to a significant learning experience (SLE) by Albert

Other social learning situations included a perfume shop, in the case of María, who says she learned how to use lipstick properly with the help of the sales assistant in the shop or, in the case of Albert and Roger, with animals.

Albert, for example, after visiting a pet shop, noticed how the mother birds raise their young chicks and established a comparison with the human family. Roger, on the other hand, after attaching a photograph of a dog says: ‘Today I learned about the domestication of dogs, which I wrote about in the daily journal, and this is the dog in my house in the country which inspired this reflection’.

How they Learn

Finally, with regard to the learning context and the process involved in learning, ICT devices stand out as the tools used to learn things according to the participants. A very illustrative example of this is the case of Albert who, for one of his four photographs, chose a picture of his mobile phone (see Figure 6).

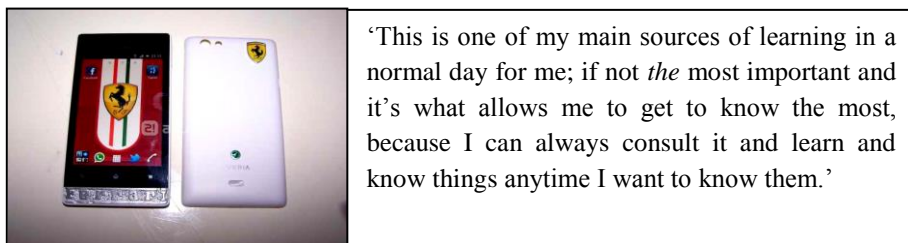


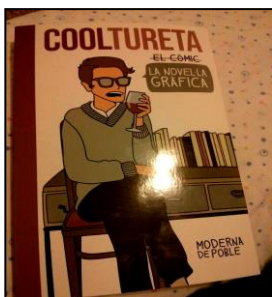
Figure 6. Photograph and description of it in relation to a significant learning experience (SLE) by Albert

Other commonly referenced learning contexts are television (María says she learned that L’Oreal had released a new lipstick because she had seen it on the television) and especially the Internet, using Google, for example, to find and download information. Jasmine, for example, says she learned about the Crusades via the web.

I learned lots of stuff to do with the Crusades, because I downloaded the film *Kingdom of Heaven*, and I watched it with great interest because it talks about the conflict between the two main cultures in Catalonia and I understand much better now why people fight so much. I felt cultured! I learned a lot but there are still things I have to find out. I will try to find more things and learn more about it. Why

don't they teach us this stuff? We do years and years of History and hardly anyone my age knows what the Crusades were and how important they were (Jasmine's SLE, Sunday).

Despite the prominence and importance of digital technologies as learning tools (TV, tablet, mobile, computer, etc.) there are also references to traditional formats such as magazines or books.



'I wish they made us read these books and do work on them; then more people would read and not hate books. I really like this book and I always have it close to hand at bedtime. It's like my Bible, and it's a commentary on the guys who go through life thinking they're cool. There are loads of these types of guys and sometimes they don't even realise it' (SLE by María)

Figure 7. Photograph and description of it in relation to a significant learning experience (SLE) by María

With regard to the communities of interest, the participants referred mainly to gatherings of friends for a common interest or reason, for example, fashion, flirting at the disco or motorcycles.



'I don't know how to ride a motorbike, but I really like looking at them. I didn't take this photo myself but I asked a friend to take it so I could bring it here, and I think it's valid because I wanted to be in it to prove I was there. It was an area for motorbikes and I was with my friends; we really like bikes.'

Figure 8. Photograph and description of it in relation to a significant learning experience (SLE) by Albert

Discussion and Conclusions

Recent studies in science education have shown that there is a need to expand the traditional boundaries in research on learning. Notions such as ‘learning lives connected’ (Erstad, Gilje & Arnseth, 2013), ‘connected learning’ (Ito et al., 2013), the ‘mobile-centric society’ (González-Patiño & Esteban-Guitart, 2014) ‘funds of identity’ (Esteban-Guitart, 2014, 2016) or ‘new ecology of learning’ (Barron, 2004; Coll, 2013) have set out the need to situate learning as the result of a lifelong personalized set of socially and culturally mediated transactions or experiences.

The school, as an institution, has traditionally been regarded as the repository and transmitter of information and knowledge; now, with the Internet and digital information and communication technologies, access to knowledge that is constantly reissued and re-constructed is available to anyone, anywhere, anytime. Moreover, people today are not passive recipients of information, nor are they mere spectators of what happens; rather, they actively participate in the creation and distribution of such information. Wikipedia is perhaps the paradigmatic example of this ‘collective intelligence’ (Jenkins, 2006) or Mind, with a capital ‘m’, as Gee would say (Gee, 2013). This online encyclopaedia is the fruit and result of a distributed collaboration among people and cultural artefacts. This is what Jenkins (2006) encapsulates in his well-known notion of ‘participatory culture’ and what González-Patiño & Esteban-Guitart (2014) summarize using the label of ‘creating-sharing’. Such collaborative and collective intelligence is the result of membership of and participation in liquid communities of interest (Facebook, Instagram, MySpace) or ‘affinity spaces’ (Gee, 2013), where text and images are produced and shared (via YouTube, Twitter or Instagram, for example), and where problems are solved (in certain online games, for example).

The significant learning experiences described in this article are evidence of the informal and informational nature of learning. Firstly, formal schooling does not appear in any of the learning experiences identified; the situations described take place in informal situations, in many cases the participants are alone or else with family or friends from their peer group. Hence, we can talk about informalization of learning. Secondly, digital media which offer opportunities, resources and learning experiences are the

commonest tools reported by the participants. Hence, the concept of learning becomes informational as a result of access to and creation of information, via digital media devices or screens, mainly smartphones, computers and television.

The first conclusion, concerning the informality of the significant learning experiences identified, is in line with the existing literature regarding the crisis of meaning in the school as an institution (Coll, 2009; Gee, 2013; Tedesco, 2011). In particular, our study shows that any learning that takes place in school is not reflected in the significant learning experiences that our participants told us about. The second conclusion, concerning the informatization of learning, illustrates the impact of the information society (Castells, 1996) or mobile-centric society (González-Patiño and Esteban-Guitart, 2014) in shaping the activity of teaching and learning. Specifically, it is an empirical illustration of the potential educational resources that digital ICT devices, crucial for accessing, generating and distributing information, offer the learner.

We believe that the main contribution of our study lies in the empirical illustration of a number of parameters regarding the new ecology of learning (where, with whom and how one learns) using the notion of ‘significant learning experiences’, or SLEs, identified using the tools designed for this study: the Journal of significant learning experiences and photographs of times, stimuli or situations to do with learning. We think that the notion of SLE can become a specific unit of analysis within the broader notion of learner identity.

Notes

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