

1 Learning in a Mobile-Centric Society

If we teach today's students as we taught yesterday's, we rob them of tomorrow.

John Dewey

School – like any other social institution – is a historical and cultural artifact and that means it is subject to economic, cultural, and political forces. Schools have always been under intense scrutiny and, perhaps too often, formal education is said to be in crisis. The role of formal education is, however, shifting. It can be argued that what is known as the *ecological turn* in the learning sciences has led to a situation in which learning is now considered as a participation in a network of both formal and informal settings, some of which are mediated by digital media. Although the ecological turn in educational psychology and human development can be traced back to Bronfenbrenner (1974, 1977, 1979), it seems to me that an ecological approach to our understanding of learning is needed today more than ever.

During the first decades of the twentieth century, John Dewey imagined the *Schools of To-Morrow* (Dewey & Dewey, 1915). Dewey emphasized that schools needed to adopt new instructional approaches and organize their curricula based on future societal needs. In one of his most widely quoted commentaries, Dewey predicted, “If we teach today's students as we taught yesterday's, we rob them of tomorrow” (Dewey, 1916, p. 167). Writing just over a century ago, it would have been inconceivable for him to envision the current world of globalization and digital media. Yet his basic message remains highly relevant today. If schools do not reinvent themselves to engage teachers and students and train learners for today's

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needs and for today's challenges, the idea of school as an institution will become nonsensical.

Nowadays, learners need to refresh their knowledge and skills constantly because of both the caducity of information and the precarious and changing job market. According to the *US Bureau of Labor Statistics* (2012), the average worker will change jobs almost twelve times before age forty-six, and nearly half of these job changes will take place between the ages of eighteen and twenty-four. At the same time, digital media is expanding learning activities because of its capacity to connect learners to a wide range of informational resources anywhere and anytime. Thus, rather than being limited to six hours a day for half the year, education is moving toward complete engagement and full-time learning; rather than being limited to school or university spaces, education is moving toward informal activities in countless different contexts and situations.

Indeed, according to the Learning in Informal and Formal Environments (LIFE) Center in the United States, most of the learning that occurs from infancy to adulthood takes place in informal environments. Most of the time, such learning is intuited, unconscious, “picked up” as we go along. We could say that today, more than ever, learning occurs across and throughout life; it involves *life-long learning* (where learning extends from our childhood into old age), *life-wide learning* (the breadth of transactions, locations, and experiences) and *life-deep learning* (embracing religious, social, moral, or ethical values that guide what people believe, how they act, and how they judge themselves and others) (Banks et al., 2007).

Preparing students for life-long and life-wide learning are important educational goals in democratic pluralistic societies but schools must not forget life-deep learning, or preparing students how to live together. “Effective citizens in democratic multicultural societies have the knowledge and skills needed to live in a complex and diverse world, to participate in deliberation with other groups, and to take action to create a more just and caring world” (Banks et al., 2007, p. 11).

Renowned sociologists such as Manuel Castells, Zygmunt Bauman, Stephen Castles, or John Urry, among others, argue that in this *complex and diverse world*, globalization and mobility are two sides of the same coin. Mobility has become a necessity because it allows people to be in touch with informational networks (Castells, 1996). Not being connected is today synonymous with being excluded. This is the downside of a global knowledge economy that is characterized by a social system and way of life – consumer capitalism – in which production, distribution, and consumption of goods depends on investment by private capital and profit-making in the free

markets (Ratner, 2011). The negative consequences include the creation of surplus people (who have no place in the system); the feeling of a liquid and unpredictable world over which people have no control; the increasingly visible inequalities between the rich and the poor; the fragility of jobs and relationships (Bauman, 2006); and the *cult of the self* that fosters a lifestyle of competition, private ownership of property, unstable lives, and hedonistic values (Esteban-Guitart, 2011b; Esteban-Guitart & Ratner, 2011).

Schools are not immune to these processes; quite the contrary, in fact. What is happening in the world is mirrored in school settings where, in recent decades, substantial changes have transformed school populations. However, there is a growing mismatch between the cultures in children's homes and the cultures in their schools brought about by the presence of different languages, identities, religions, and family traditions in contemporary societies. Consequently, at the same time, there are important differences in learning outcomes.

In short, disproportionately high numbers of students who are under-represented (because of low income, ethnic minority status, foreign origin, and so on) perform consistently lower academically than typical middle-class students. This is borne out by the Organisation for Economic Co-operation and Development's (OECD) Programme for International Student Assessment (PISA), which has illustrated the effects on learning outcomes of socioeconomic disadvantages by comparing students with and without an immigrant background. For instance, one of the conclusions of a PISA (2012) analysis of math scores from around 510,000 students across 34 OECD countries, was, "Across OECD countries, a more socio-economically advantaged student scores 39 points higher in mathematics – the equivalent of nearly one year of schooling – than a less-advantaged student" (PISA, 2012, p. 12).

Indeed, disadvantaged students not only score lower in mathematics and are more likely to skip classes or school days or arrive late for school, but they also reported lower levels of engagement, drive, motivation, and self-belief (PISA, 2012).

Radical thinking is required to deal successfully with this social and cultural heterogeneity to maintain and guarantee equality, social cohesion, and social justice. As my friend and colleague Juan Carlos Tedesco (2005) puts it: learning to *live together* for a fairer world.

Before we look at a new way of understanding educational practice, namely the *funds of knowledge* and *funds of identity* approaches, we need to figure out the current coordinates of learning, which will help us to understand why today's schools remain under scrutiny. In this chapter, we

attempt to characterize the society in which we live so that we can contextualize the learning and education that takes place within it.

Digital Media – an Extension of Man: Some Remarks and a Fresh Look at McLuhan’s and Vygotsky’s Legacies

There is a certain amount of convergence in some of the ideas espoused by Herbert Marshall McLuhan (1911–1980) and Lev Semyonovich Vygotsky (1896–1934), although it seems they never met.

Vygotsky’s ideas were introduced in the West, where they remained virtually unknown until 1962, when Jerome Bruner brought *Thought and Language* to the English-speaking world (Vygotsky, 1962). Since then and thanks to the Luria relationship with Jerome Bruner and Michael Cole, Vygotsky became a central component of the development of new paradigms in developmental and educational psychology.

The idea behind McLuhan’s well-known phrase, “The medium is the message” (McLuhan, 1964), is close to Vygotsky’s *principle of significance* – his explanation of the specificity of human behavior (Vygotsky, 1997). It seems to me that both authors stress the psychosociocultural importance and consequences of all types of media, be they radio, television, or Internet. Or as Ratner said, “We are the product of the products we produce” (Ratner, 2006, p. 13). And nowadays, digital devices are the products we produce and digital devices produce what we are. All media produce strong psychosociocultural consequences because all media are made up of particular psychological and social architectures (Esteban-Guitart, 2010). We actually build certain kinds of relationships, behavior, and ways of learning that are specific and contingent to the media we employ. As we have tried to show in other papers (Esteban-Guitart, 2015a; González-Patiño & Esteban-Guitart, 2013), this idea is rooted, or at least can be sustained, in ideas stemming from authors such as McLuhan and Vygotsky.

For both authors, any instrument or cultural artifact created during the historical and cultural development of humanity is an extension of human skills. The train, for example, is an extension of our legs and our ability to move; television extends our sight and perceptions; literacy amplifies our memory and thought; laws regulate our transactions; and Facebook and similar networking tools extend language and communication. Biological and psychological constraints meant that we could not fly, nor remember everything, nor perceive the details of the planets with the naked eye. However, thanks to prostheses, artifacts, instruments, media, and so on, we can now do all of these. We can perform these activities thanks to *cultural*

mediation – a core concept of Vygotsky’s work (Moll, 2014; Vygotsky, 1978; Wertsch, 2007). That is to say, we use artifacts and symbol systems (“psychological tools”), such as language, writing, art, mathematics, computers, Internet, and so forth that are created culturally and inherited socially. And we use these tools of the mind to engage in human practices and to regulate our behavior. It seems to me that this idea is a stroke of genius that overcomes the traditional separation between psychology (of the individual) and the physical world that characterizes other approaches in psychology such as in the work of Piaget. To Vygotsky, psychology is to be found in *things* as well as in people. In that regard, the world we live in is *psychologized*, full of material and symbolic resources that amplify, assist, and regulate our behavior.

The importance of the artifact – tools, devices, or media – is not its message but the medium itself; hence the relevance of McLuhan’s idea that *the medium is the message*.

This is merely to say that the personal and social consequences of any medium – that is, of any extension of ourselves – result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology. Thus, with automation, for example, the new patterns of human association tend to eliminate jobs; it is true. That is the negative result. Positively, automation creates roles for people, which is to say depth of involvement in their work and human association that our preceding mechanical technology had destroyed. (McLuhan, 1964, p. 23)

One of McLuhan’s favorite examples is the light bulb. The light bulb has no content and no message. It does, however, create and make possible certain forms of behavior and relationships. It enables people to read a book at night, for example, and it creates a new business: selling light bulbs and light fittings and distributing the electricity consumed by people.

Whether the light is being used for brain surgery or night baseball is a matter of indifference. It could be argued that these activities are in some way the “content” of the electric light, since they could not exist without the electric light. This fact merely underlines the point that “the medium is the message” because it is the medium that shapes and controls the scale and form of human association and action. The content or uses of such media are as diverse as they are ineffectual in shaping the form of human association. Indeed, it is only too typical that the “content” of any medium blinds us to the character of the medium. (McLuhan, 1964, p. 24)

What is relevant from a psychological, social, and cultural perspective is not what is said on WhatsApp, but that the *smartphone*, as a medium,

creates what could be called a *cultural ecology*, involving certain social relationships, cultural practices, and activities and psychological forms of life. Watching TV, video gaming, surfing the Internet, for example, are highly pervasive activities, which require a wide range of complex cognitive and motor skills. Indeed, such activity can be seen as intense training of a number of psychological processes such as visuospatial intelligence (iconic representation, spatial visualization) and multitasking skills (Greenfield, 2009a), working memory, or motor performance (Kühn et al., 2014).

Again, what matters is not the content that appears on TV, video games, or the Internet, but the *culture* – the cultural ecology – that the medium ends up creating: its psychological and social consequences. For example, TV changed certain social routines; it had certain psychological and social consequences that, for McLuhan, involved changes in scale or rhythm or pattern that the medium introduces into human affairs and daily activities. Another example: the railway did not introduce movement, but it did accelerate and expand the scale of previous human functions, creating brand new types of cities, work, and leisure. This was totally independent of the cargo – that is, the *content* – of the medium we call the railway. Hence, it is the medium that shapes and controls the scale and form of social and cultural interactions. This can be seen in the new ways of working that the Internet has produced or, for example, the changes in the routines of Congolese fisherwomen who have stopped simply taking their daily catch to market in the hope of selling some or all of it. Now they wait for calls on their mobile phones from customers before delivering fresh fish to them (Schmidt & Cohen, 2013).

In this context, we need to recognize that it was Castells (1996) who was one of the first to theorize about the meaning and scope of the “Network Society.” This is how he referred to today’s dominant form of social organization, otherwise known as the Information or Digital Age, which uses new technologies and communication systems distributed on digital networks. Of course relationships and social networks have always existed throughout the history of humankind. However, digital media (via the Internet) has hugely facilitated the creation and dissemination of such relationships between people. The Internet has induced profound changes in production (the organization of the economy), power (the organization of the state and its institutions), and experience (the organization of people and their relationships and lived experiences).

Like McLuhan, Vygotsky also believed technologies (and signs and symbols) are extensions of human faculties: writing is an extension of

memory and thinking, for example. However, Vygotsky goes a little further by stating that what sets our species apart is an ability to regulate our behavior, and that of others, through the creation and use of signs and symbols – also called *psychological tools* (Kozulin, 1998), *artifacts* (Cole, 1996), and *prosthetic devices* (Bruner, 1990) – which enable us to amplify our psyche and overcome our biological limitations (in the same way as, for example, an airplane can overcome our limitations of mobility).

In this regard, culture is defined as a collection of “material and symbolic tools that accumulate through time, are passed on through social processes, and provide resources for the developing child” (Lightfoot, Cole, & Cole, 2009, p. 54). The abacus, crayons, the phone, restaurants, the church, cars, Navajo cradleboards, mathematical equations, musical notation, the Star of David, Facebook, and Chinese characters are examples of material and symbolic tools that affect our daily life, organizing our behavior and modifying our relationship with the environment. In this way, actual human behavior is, in fact, culturally mediated behavior. And culture – specifically *human* culture – is the result of a historical accumulation of tools both symbolic (mathematical equations or musical notations) and material (a mobile phone or a house) that can regulate the behavior of people: a traffic light allows us to cross the street, a calculator allows us to do sums, and an educational law can organize a school.

As we said in the introduction, this involves *intentional conditioning* (Esteban-Guitart, 2013), which explains the specificity of our relationship with the medium. In short, people are no longer constrained or conditioned biologically because their environment can be deliberately manipulated: by setting an alarm clock for 7:00 A.M. we counteract our “biological clock.” Hence the human psyche and behavior is to be found scattered among local contexts of activity. By using and manipulating cultural artifacts, we broaden our ranges of activity. What Vygotsky (1978, 1997) called the *principle of signification* (creation and use of signs) according to which people introduce artificial, arbitrary, and conventional stimuli (to a coin, for example) to give meaning to their behavior and to allow their psychological acts to be governed from outside (making a decision, for example, by tossing a coin).

Tying a knot as a reminder, in both children and adults, is but one example of a pervasive regulatory principle of human behaviour, that of *signification*, wherein people create temporary links and give significance to previously neutral stimuli in the context of their problem-solving efforts. (Vygotsky, 1978, p. 74)

But human behaviour is distinguished exactly in that it creates artificial signalling stimuli, primarily the grandiose signalization of speech, and in this way masters the signalling activity of the cerebral hemispheres. If the basic and most general activity of the cerebral hemispheres in animals and in man is signalization, then the basic and most general activity of man that differentiates man from animals in the first place, from the aspect of psychology, is *signification*, that is, creation and use of signs. We are using this word in its most literal sense and precise meaning. Signification is the creation and use of signs, that is, artificial signals (...) Man introduces artificial stimuli, signifies behaviour, and with signs, acting externally, creates new connections in the brain. Together with assuming this, we shall tentatively introduce into our research a new regulatory principle of behaviour, a new concept of determinacy of human reaction which consists of the fact that man creates connections in the brain from outside, controls the brain and through it, his own body. (Vygotsky, 1997, p. 55)

In short, technology – devices or media – is neither inherent nor ancillary to our behavior; rather, it is a part of it, assisting, accompanying, and manipulating our behavior in certain ways. The invention and use of *artifacts* –auxiliary devices, artificial stimuli – to meet our psychological challenges such as comparing, selecting, communicating, remembering, creating, thinking, and so forth, signifies behavior from “outside,” from *culture*.

Hence, we can talk of TV-centric, PC-centric, or mobile-centric societies. Ultimately, television, computers, and mobile phones are media that regulate human behavior; social relationships, routines, and lifestyles; and teaching and learning situations, and they help to make up the psychological architecture of people.

From a TV-Centric Society to a Mobile-Centric Society

In Spain in 2014, according to the Spanish National Institute of Statistics (INE, 2014), 74.4% of homes had access to the Internet (almost 5% more than in 2013). For the first time, there were more people using the Internet (76.2%) than using computers (73.3%) and 77.1% of all Internet users used smartphones to surf the web.

Indeed, already in 2012, it was estimated that 90% of all media interactions in the United States were screen based, via smartphones, tablets, laptops, or television and only 10% of all media interactions were non-screen based: radio, newspapers, and printed magazines. It is estimated that people spent around 4.4 hours of their leisure time in front of screens each day using four primary media devices: smartphone (17 minutes, average

time spent per interaction), tablet (30 minutes), PC/laptop (39 minutes), and TV (43 minutes) (Google, 2012).

Today, people across the planet use mobile devices for browsing the Internet, social networking, shopping online, searching for information, managing finances, planning a trip, watching online videos, creating and sharing pictures, and so on. And we do these activities simultaneously and in parallel (multitasking) much of the time. We use laptops or tablets to search for information while we are watching TV and share what we are doing by mobile phone, for example.

The media in McLuhan's and Vygotsky's society was, of course, very different from the one that surrounds us today. McLuhan's society was TV-centric, given that television – first broadcast publicly by the BBC in England in 1936 – had become the medium that revolutionized people's daily lives and lifestyles. However, the impact of television as a medium and as a cultural ecology (in the TV-centric society) was soon added to by the appearance and use of personal computers (in the PC-centric society). And now, digital mobile devices (smartphones) and other digital technologies, such as tablets, have become the mediating element of endless human actions and interactions integrating other devices, such as television and radio, into their uses and applications.

In this sense, what I mean by the mobile-centric society (MCS) is

The globalized and networked practices that have arisen from the massive penetration of digital media in our everyday lives, routines and activities. In other words, our work, business, learning and relationships have incorporated and are mediated by digital devices.

The idea of the MCS captures the psychosociocultural consequences of media characterized by their mobility; ubiquity; portability; and the integration of multiple devices, applications, and functions.

Our everyday digital devices are a real extension of ourselves. Smartphones introduced a new scale in our affairs. For example, certain associations of a particular activity to a specific physical context have disappeared. The place of work no longer matters to many people because they can work at the office but also at the train station, at home, or in any bar or restaurant. In our pockets, we take our family, friends, and connections and we can connect and disconnect with them just as we can with our work: anywhere, anytime.

I suspect this will accelerate in the coming years as digital media penetrates everyday artifacts such as glasses, watches, household appliances, and places such as, for example, museums. The challenge of the MCS seems

to be to find ways to develop and implement devices based on the new architectures of software and hardware integrated into everyday objects that can work simultaneously, that can incorporate different features and applications, and that can be integrated and interface with offline, real-world environments. All of this must be mediated by the active participation of users – no longer simply consumers – whose profiles, experiences, and identities are distributed among the devices, both creating and sharing what they do. A good example is the “Google Glass” project, augmented reality glasses that integrate different technologies and features such as voice recognition, allowing users to take and share photos, obtain geospatial information, or communicate with other people.

However, emphasizing the transition from the TV- and PC-centric society to a mobile-centric society does not mean the end of television and radio or personal computers.

According to a recent study in Spain by the *Asociación para la Investigación de Medios de Comunicación* (AIMC) conducted from October 2013 to May 2014 (AIMC, 2015), 30.4% of the population were daily newspaper readers, 61% listened to the radio each day, and 88.1% watched television each day (slightly down from almost 90% a year before: from October 2012 to May 2013). People continue to watch TV and use computers but more and more of them are also using the Internet.

In the same study, by May 2014 around 60% of Spaniards had looked at the Internet the previous day – rising from 50.7% the previous year (AIMC, 2015). Nevertheless, two things have changed abruptly. First, there has been a convergence and integration of devices (TV, radio, press, Internet access) into digital media (latest generation smartphones, for example). Second, as the AIMC study shows, there is a trend of increasing Internet use and a decrease in the consumption of newspapers, supplements, magazines, or TV. For example, in 1997 the penetration of TV was 90.7% compared to 88.1% in 2014, while during the same period, Internet use increased from 0.9% in 1997 to 58.5% in 2014 (AIMC, 2015). These figures further illustrate the transition from the PC-centric society to the MCS.

According to *Telefonica Foundation* (Fundación Telefónica 2015), in Spain it is estimated that 26.2 million people regularly went on the Internet in 2014, and this number is increasing every year. That represents 76.2% of all Spaniards, 4.6% more than in 2013. Significantly, for sixteen- to twenty-four-year-olds the figure is 98.3%. Mobile broadband grew by 20% compared to the previous year and mobile data traffic grew by 81% in 2013; 80% of Internet users access the Internet using a mobile device.