POLITECNICO DI TORINO

Corso di Laurea Magistrale in
Ingegneria del Cinema e dei Mezzi di Comunicazione

Tesi di Laurea Magistrale

New Technologies for Learning and Post-Covid-19 Education

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A.A 2019/2020

A mia madre,
per essere il mio indispensabile
e solido punto di riferimento a
prescindere dai chilometri che
ci separano.

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Introduction

Technology has had an impact on human life in many areas, such as healthcare, entertainment and lifestyle services. The education sector is also altering by using some of these technologies. People are introduced to different innovative ways of learning and teaching; people can use these technologies to learn educational activities in very various ways than traditional methods. Learning innovation will trigger a powerful learning cycle that can be extremely beneficial to learners and teachers worldwide.

In this thesis, we will briefly discuss the different technologies and how they shape the way we learn with these technology solutions; we will try comparing their functionality and find their educational benefits. Despite the advantages of using internet-based technologies and platforms for learning, transforming traditional learning has not been without challenge and controversies. And we explain also the potentials of new technologies for learning purposes and finally show where there is more potential to study and which platforms are worth to take a look at. Many of these technologies are starting to emerge, while some of them have been there for quite some time, and we will also give some insight on the barriers of these technologies that can be addressed in future studies.

In the first part, traditional and e-learning media are defined. E-learning can be called Electronic Learning, Distance Learning, Online Learning, Virtual Teaching, Virtual Education etc (Mijwil,2020). The bright and dark sides of each model are discussed and compared. Further, it is discussed how using technology can spread the internet-based skills and narrow the skill gap among the people and how books are replaced by digital devices such as tablets, e-books and smart wearables such as AR headsets.

Social media have been largely integrated into our lives. The second part contains a Social Media definition, theory and some examples of the most used ones, including studies that have been carried out on each of them to analyze their potential to be used as a learning tool.

It is illustrated how social media can be beneficial and important to e-learning and educators. Naturally, there are challenges in using social media generally and specifically as a learning tool, like content, discourse, community and identity challenges. For example, what is shared for learning purpose regarding a specific group of people can be reached by unintended users on Instagram or the personal data of educators can be revealed or their identity can be shown not accordingly.

YouTube, Instagram, Facebook, TikTok and WhatsApp were discussed and analyzed, experiments and data gathered about them are shown. Especially TikTok and Instagram are discussed as efficient and effective tools which have not been considered and studied as they had to be.

Finally, we will also learn more about some fairly new technologies used in education, such as Game-based learning, Virtual and Augmented Reality, that can be used to recreate the real situation and give immersive learning experiences and made learning more intuitive and engage learners. The growth of ed-tech businesses has been the highest in the recent years (Hootsuite. 2020)

By analyzing empirical evidences, a relative judgement of the nature of distance learning is given and it is shown how digital technologies and distance education have played important roles spacially during the pandemic of COVID-19 since learning from the house has been one of the ways recommended by all Nations during the pandemic.

Part I - E-learning methods and Transmedia Storytelling

1.1 E-learning definition

E-learning or Electronic Learning, Distance Learning, Online Learning, Virtual Teaching, Virtual Education (Mijwil, 2020), refers to use of the information and communication technologies to allow access to online educational material. In its wider definition, Abbad et al (2009), defined E-learning to mean any electronically enabled learning. However, they narrowed this definition down to the meaning of learning empowered by the use of digital technologies. This definition is further narrowed by some researchers as any learning that is internet-enabled or web-based. (LaRose et al, 1998; Keller & Cernerud, 2002).

According to Maltz et al (2005), the term 'e-learning' is applied from different perspectives, such as distributed learning, online distance learning and hybrid learning. E-learning, according to the OECD (2005), is described as the use of information and communication technologies in various education processes that support and enhance learning in higher education institutions, and includes the use of information and communication technology as a complement to traditional classrooms, online learning or a mix of the two models.

The term e-learning also refers, according to Wentling et al (2000), to the achievement and use of knowledge that is predominantly facilitated and distributed by electronic means. They believe that e-learning depends on computers and networks, but it is likely that e-learning will progress to systems comprising a variety of channels, such as wireless and satellite, and technologies such as cell phones (Wentling et al., 2000).

In their literature review on definitions for e-learning, Liu and Wang (2009) found that the main focus of the e-learning process is on the Internet; global sharing and learning resources; information broadcasts and knowledge flow through network courses; and, lastly, flexibility of learning as a computer-generated learning environment is created to overcome distance and time issues (Liu and Wang, 2009)

Gotschall (2000) argues also that concept of e-learning is formulated on the basis of distance learning, thus a transmission of lessons to distant places through video presentations. However, Liu and Wang (2009) claim that the advancement of communication technologies, particularly the Internet, has transformed distance learning into e-learning.

E-learning has increased dramatically integrating the education system. With recent technologies, modern age-based technologies are transforming, enabling distance educational

practices and empowering teachers to provide students with fast and efficient learning experience (Saliq et al, 2020).

This can be considered complementary to the traditional education methods. Advantages of e-learning and necessities of today's world, have increased the popularity of this method. In fact, in this pandemic period, E-learning is necessary to pass course materials, themes and subjects, tests and assignments and to implement feasable learning experiences.

Unlike the popular preconception that "E-learning is not as effective face to face education", the wide range of new tools available, such as presentations, instant internet access, e-mailing and electronic boards, can positively view this routine and they can be important for a good correlation between the technical and pedagogical aspects. By e-learning we understand the totality of educational situations in which ICT means are significantly used (Ilie & Frăsineanu, 2018).

Used a few decades ago as a reaction to behaviorism, cognitive learning defines learning as a search for the knowledge stored in memory, after the primary processing of information, the formation of mental images and their abstract processing. The traditional learning stands on: transmission of the knowledge, reflections of the teacher, abstract symbols, endorsement, retention, reproduction, finalizations, and targeted applications.

Knowledge itself is considered independent from the student's mind, although the students absorbs the knowledge subjectively. Learning different knowledge is influenced by support materials, independent or interconnected group working conditions, the strategies, and the ways of expression and different communication factors (Joita, 2006).

Cognitive learning can be considered the result of transition from behaviorism to constructivism. It represents assimilation and acquisition as an active process of mental structures organizing. Constructivism considers that learning can happen more effectively when the learner active and makes tangible objects in the real world. "Constructionism shares constructivism's view of learning as building knowledge structures through progressive internalization of actions. This happens especially in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe" asserts S. Papert, the promoter of constructivism (Papert, 1991).

Anchored Learning or Anchored Instruction (AI), The Cognition and Technology Group at Vanderbilt (1990) defined: "The major goal of anchored instruction is to overcome the inert knowledge problem. We attempt to do so by creating environments that permit sustained exploration by students and teachers and enable them to understand the kinds of problems

and opportunities that experts in various areas encounter and the knowledge that these experts use as tool. We also attempt to help students experience the value of exploring the same setting from multiples perspectives" p.3

Anchored Learning supported by multimedia tools, based on the knowledge and technology, is a type of learning that makes easier the practice of resolving skills in students. Computer use in education has offered multimedia as a tool for more interactivity which is important in the context of computer-assisted training, this type of instruction conducted in interactive learning environments is clearly superior to that performed in a traditional didactic context without interaction in terms of school performance (Thomas, et al, 2013).

Based on Anchored Interactive Learning Environments (1997), the Anchored Learning principles are described as follows:

- GENERATIVE LEARNING FORMAT: students must become active learners when they solve the clues in the story and come to a possible end.

- VIDEO-BASED PRESENTATION FORMAT: learners can see actions, and settings are realistic. The video-based format allows individuals "to weave in related background information that motivates the study of other challenges in mathematics and other domains" (Crews and Green, 1997, p.1).

- NARRATIVE FORMAT: the video narrative contains not only information settings, but also character slates.

- PROBLEM COMPLEXITY: there is a complex situation for students to solve. Learners are given with clues and intentionally challenge them to find solutions as they move along interrelated steps.

- EMBEDDED DATA DESIGN: students do not have explicit math problems and steps to solve. Instead, students must first identify the problem, then understand the problem, determine what information is important, and discard what is not. In addition, all this information is embedded in the story, and students need to remember where to find it when they need it.

- LINKS ACROSS THE CURRICULUM: students are given the opportunity to combine different disciplines at once. Each video story allows the introduction of subjects from other disciplines. "For example, maps are used in trip planning episodes to help figure out solutions (Crews and Green, 1997, p.3).

- TRANSFER OPPORTUNITIES: the design of the story leads to use of the acquired concepts more than once; therefore, students are taught not only in one context. "This gives students the opportunity to use and reuse mathematical concepts in a variety of contexts, significantly increasing the likelihood of transfer of skills to new situations and reducing the likelihood of inert learning" (Crews and Green, 1997, p.3).

The central element of Cognitive Theory of Multimedia Learning (CTML) is that the multimedia learner will try to build a series of logical connection between words and images. It was born in the late 1980s as “model of meaningful learning” (Mayer, 1989).

1.2 Traditional Learning vs E-learning

The 21st century is characterized by the interdependence between nations facilitated by global communication, the decentralization of power accelerated by social media, Workplaces have become more flexible and more transparent; teamwork is valued more than hierarchy in organizations. It is the era of exponential new technologies such as cyber-physical technology, social media, machine intelligence, nanotech, the Internet of Things and 3-D printing, and many more. In the education field, Some changes are already emerging. Schools are no longer seen as closed entities in themselves but as part of the larger eco-system in which they perform. Some schools work with one another, forming networks or partnering with other schools (OECD, 2019).

Traditional education approaches have often centered on knowledge transfer strategies that have focused on textually-based engagement with learners and on dialogic methods of interaction with tutors (de Freitas et al, 2010).

In traditional learning, the aspects of planning, monitoring and evaluation are a part of the teacher's attribute, but in e-learning include also the student, and they can be seen as part of the socio-emotional development (Volet et al, 2009).

By developing Information and Communication Technology (ICT), the learner can choose the rhythm of learning and even decide some details of the learning process and the course. Web-based learning can improve the relationship between learner and teacher. Technology can make it possible for teachers and students to have access to various materials well beyond textbooks, in multiple formats and in ways that can bridge time and space.

However, students who are unable to move through a complex digital world will no longer be able to engage completely in the economic, social and cultural life around them. Those responsible for educating today's connected" learners are faced with challenging issues, ranging from information overload to plagiarism, from shielding children from online threats such as fraud, privacy violations or online bullying, to maintaining an appropriate and appropriate media diet. We want schools to prepare our children to become critical consumers of Internet services and electronic media, to help them make responsible decisions and avoid negative behaviour. And we want schools to raise awareness about the dangers children face online and how to stop them (OECD, 2014b).

While e-learning and internet training is being developed, a problem is becoming more complex: the learner’s cognitive overload using multimedia. That is why experts are looking for

also new technological solutions. These solutions can be evaluated by applicability and the added contribution to the educational act.

Considering the fact that in the most countries the youth are grown engaged in using internet and electronic gadgets, there are plenty of opportunities to improve e-learning techniques and spread them. It is important to reconsider the use of the mainstream connection platforms on the learning purpose. The Organisation for Economic Co-operation and Development reported there is a high level of awareness among OECD countries of the benefits of digitalisation and the role of governments in promoting digital innovation in education (OECD, 2019).

1.2.1 Millennials and access to ICT

Mc Loughlin and Lee (2008) discuss how Web 2.0 has given birth to "Pedagogy 2.0", by showing opportunities for participation, personalization, and productivity.

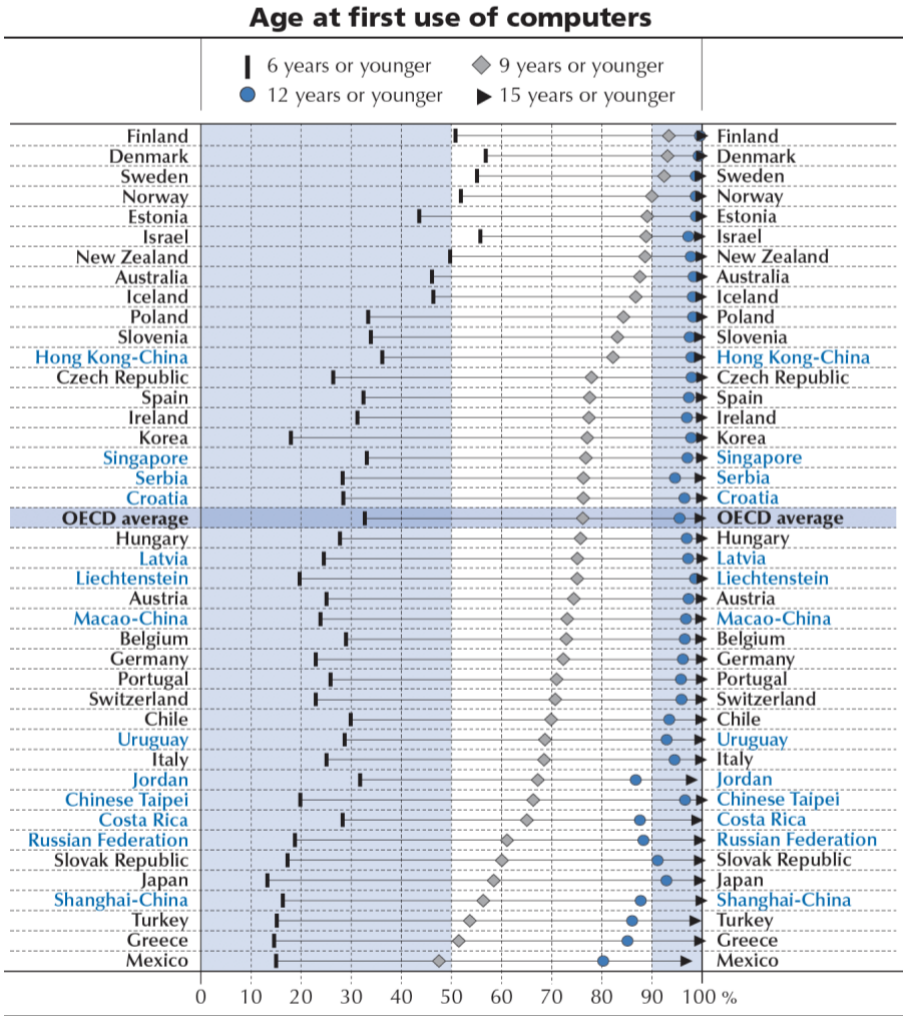
"Net" or "Millennial" generation, come from a different era of technology and tools. Naturally, they expect new development in learning and teaching; more interactivity, experiment, collaboration and technological connection (Oblinger & Oblinger, 2005), despite the fact that only 44% of college students believed that most of their instructors use technology in their teaching as needed (Caruso & Salaway, 2008). However, implementing technology is not the final goal. The final goal is still increasing the quality of learning, creating opportunities for learners to "talk and listen, read, write and reflect" (Myers & Jones, 1993).

According to the OECD (2014b) report produced by a collaboration among the OECD countries in 2012, shows that the use of ICT by students depends on the accessibility of the devices and the availability of an Internet access. PISA data indicates that access to computers had become almost universal in most of the participating countries by 2012. However there are major variations between countries in the quantity and quality of devices that are available and in the experience gained in using them. This chapter focuses on these disparities in access and use of computers.

The typical 15-year-old student had at least five years of experience using computers in 2012. More than one in two students mentioned being 9 years of age or younger when they first used a computer. In five countries – Denmark, Finland, Israel, Norway and Sweden – the majority of 15-year-olds recorded having first used computers at age 6 or younger, and therefore began using computers in the early 2000s. These early users were already familiar with ICT methods when they were taught to read and write. By comparison, more than one in ten students in Costa Rica, Greece, Jordan, Mexico, the Russian Federation, Shanghai-China and Turkey had no or restricted experience using computers in 2012 when they were 15. These students first used a computer when they were 13 or older or more rarely, they never used one. About 3% of

students in Mexico, 2% in Jordan, and 1% of students in Costa Rica and Turkey never used a computer; These students came overwhelmingly from the lower fifth of disadvantaged students. In all other countries and economies, fewer than 1% of students never used a computer (Table 1).

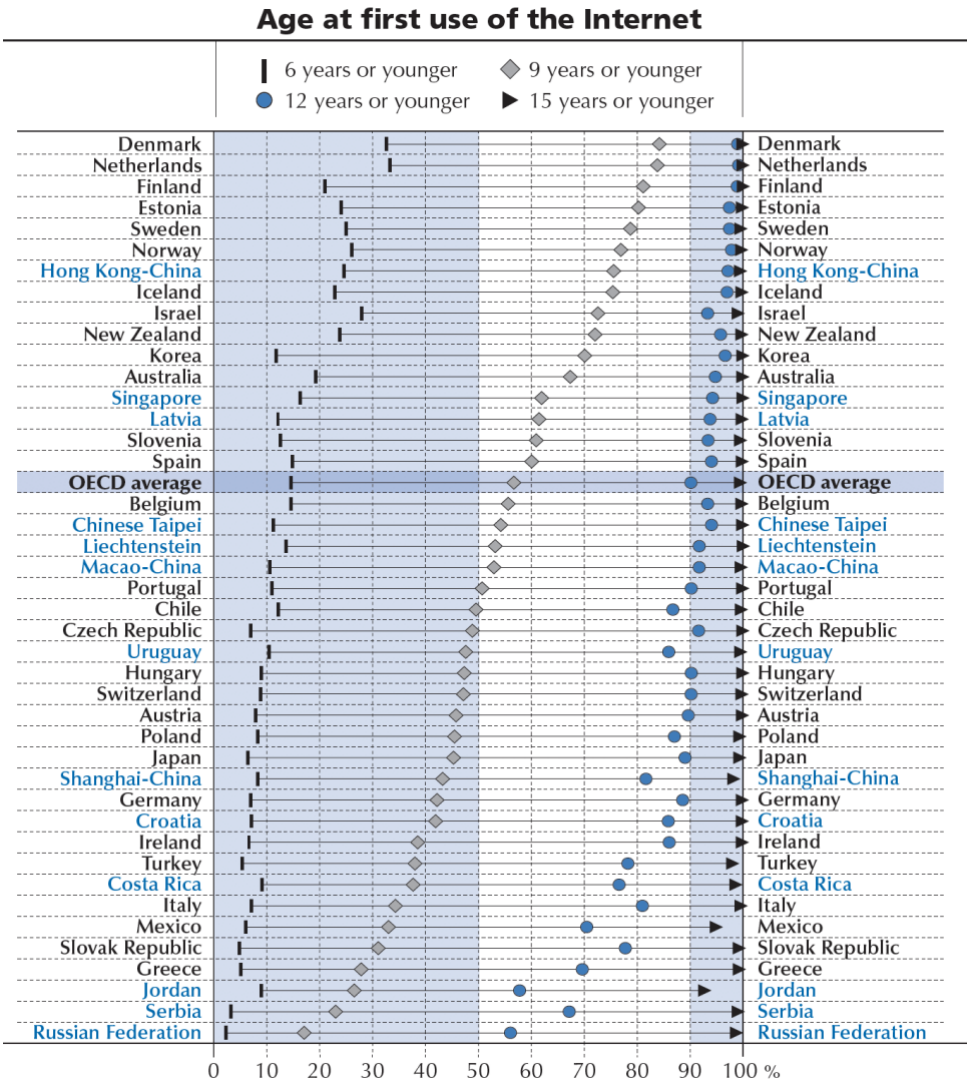
Table 1 Countries and economies are ranked in descending order of the percentage of students who started using the Computers at age 9 or younger. Source: OECD, PISA 2012 Database, Table 1.3



At 15, students normally had at least five years of experience with the Internet, but for many students, the first computer they used did not have access to the Internet. A comparison of students' answers on the use of computers in general and the use of the Internet, in particular, means that students usually accessed the Internet for the first time one and a half years after they began using computers. On average across OECD countries, 57% of students first accessed the Internet when they were younger than 10 years of age (76% of students were already using computers at that age). In Denmark and the

Netherlands, more than 30% of students had access to the Internet for the first time before they were 7 years old (Table 2).

Table 2 Countries and economies are ranked in descending order of the percentage of students who started using the Internet atage 9 or younger. Source: OECD, PISA 2012 Database, Table 1.4

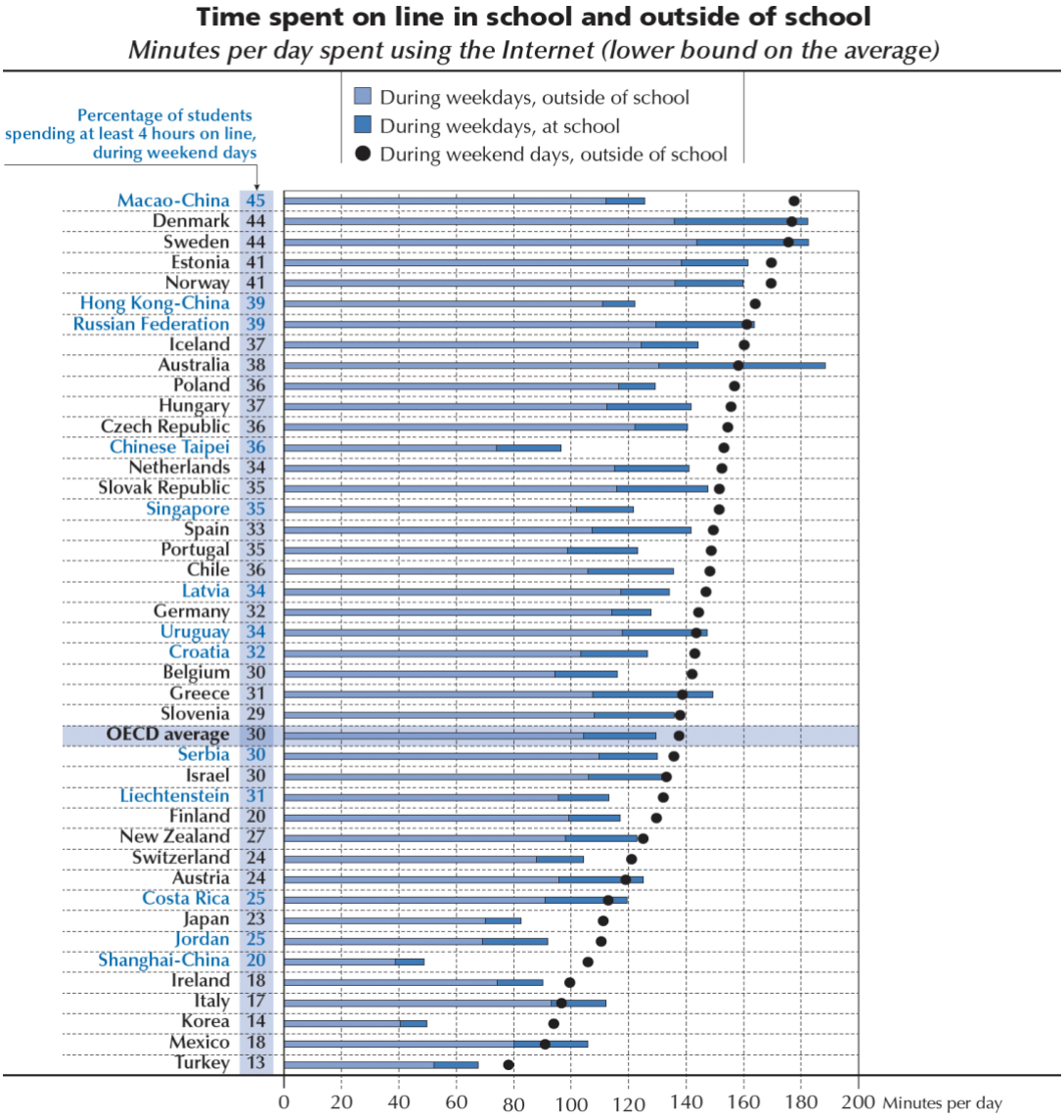


1.2.2 How much time students spend online

For the first time, PISA 2012 examined how much time students spent on the Internet at school and at home, during both school days and on weekends, during the average school week. Since the answers were given on a categorical scale, it is not possible to measure precisely the average time students spent on line. However it is possible to create with certainty a lower threshold for the number of minutes spent by students on online activities, whereby the

response "between one and two hours" is for example, translated to at least 61 minutes." Self-reporting reveals that on average across OECD countries, students typically spend more than two hours on line per day on school days and weekends (OECD, 2014b).

Table 3 Countries and economies are ranked in descending order of the average time students spend using the Internet during weekend



Over a week in Australia, Denmark, Estonia, Norway, the Russian Federation and Sweden, more than one in four students (25%) spend more than four hours a day on line outside of school. On average students in these countries, as well as in the Czech Republic and Iceland, spend roughly two hours (120 minutes) on line outside the school across weekdays (Table 3).

1.2.3 Cyber-bullying

As seen above (Table 1 and 2), adolescents accessing to the Internet that can be a host of educational opportunities and knowledge sharing through ICT devices is increasing, they still need to be sheltered from the possible negative effects of ICT use. Risks include exposure to potentially harmful material or contacts like cyber-bullying which happens when a young person is repeatedly attacked, insulted, or humiliated by someone else using the Internet, it has emerged as a public health issue and a risk to young people's social and emotional growth (David-Ferdon and Feldman Hertz, 2007; Raskauskas and Stoltz, 2007; OECD, 2013b; OECD, 2014a). According to a study conducted in 2010 in European countries, 6 percent of children aged 9-16 were victims of cyberbullying in the previous year (Livingstone et al., 2011).

The widespread presence of ICT in daily life often generates a need for specific skills and literacies. At the very least, education will raise awareness among children and their families about the threats they face online and how to prevent them (OECD, 2012).

1.3 The potential of technology to narrow the skills gap

Many advances which are starting to display in the field of education technology, promise for improving education and helping to overcome gaps in skills. Educational technology is used to reduce costs and enhance the quality of education in order to:

• Create or find innovative solutions to fundamental problems in several countries, such as a shortage of well-trained teachers and easily available technology infrastructure.

• Make education accessible at a much lower cost to a wider audience or offer higher quality training at the same price.

• Make it easier to scale up promising local market models and pass best practices across markets in such a fashion that can be maintained over the long term.

• Obtain a vision about how and what students learn by taking advantage of the greater variety, volume, and speed of data in real-time.

• Increase teachers' effectiveness, freeing up precious time from activities such as grading and testing, which can be used to teach differentiated skills and character attributes.

When teachers introduce education technology to the mix of possible solutions, if implemented to an integrated educational framework known as the “closed-loop” (D. Wicken,

1992), we find that they are most successful. The closed-loop refers, as in engineering or manufacturing, to a system that involves an interconnected and related series of steps to produce results. The closed-loop instructional framework operates similarly in the educational environment.

Educators create learning goals at the closed-loop classroom level, develop curricula and instructional strategies, provide curriculum, integrate ongoing evaluations, provide effective interventions based on student needs, and monitor outcomes and learning. All these activities must be connected together and matched with the aim of improving skills in the 21st century (see Figure 1).

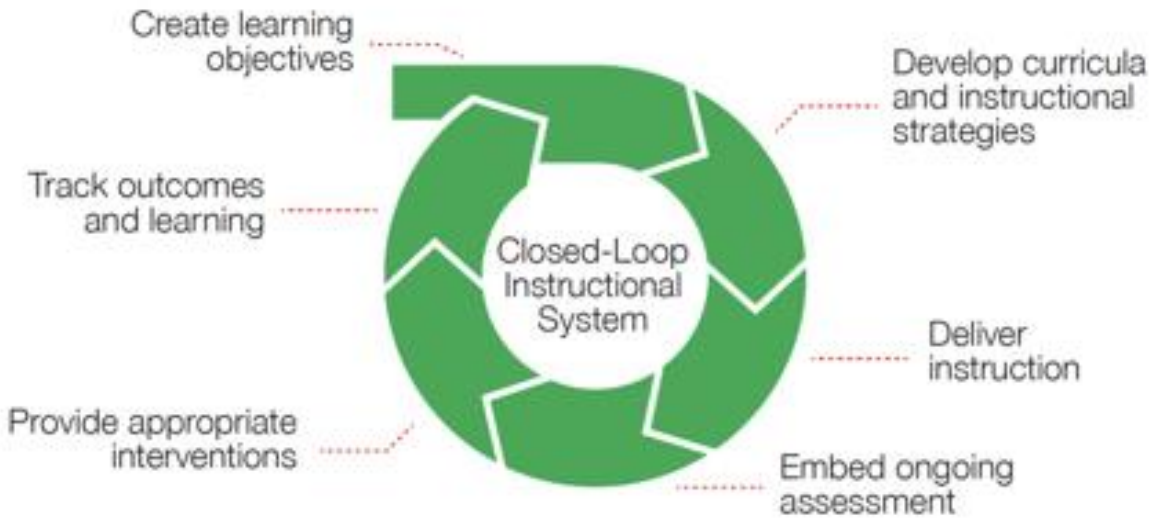


Figure 1: An instructional system known as the closed loop is necessary to address skill gaps.

1.4 Constructivism and Vygotskian theory

The philosophy of constructivism has been correlated with learning through ICTs (in and out of formal education). Proposed by Bruner (1966) and popularized by Seymour Papert and his colleagues at MIT in the computer field (Papert, 1993), this principle essentially implies that all learners create their perception of the world by drawing on their own experiences. Each of us creates our own 'laws' and 'mental templates' to make our interactions meaningful. Learning

is seen as the process of modifying our conceptual models to fit new experiences in this theoretical context (Wegerif, 2002).

ICTs have historically been able to provide representation structures to simulate and model potential results for some situations and, above all, to be managed at their own speed by the user, contributing to the belief that ICTs provide a particularly supportive atmosphere for constructivist learning.

Various learning models emphasize various strengths and limitations, as Wegerif (2002) states, and constructivism is frequently contrasted with Vygotsky's (1962, 1978) work, who formulated a more social theory of learning. While constructivism focuses on the individual mind, learning is conceptualized as socially constructed by Vygotskians (sometimes also known as socio-cultural theorists).

The work of Vygotsky is well known for its various characteristics, most of which relate to its use in developing pedagogy theories. For instance, Vygotsky suggested that we all move from using spontaneous concepts to what he called 'scientific concepts.' These are not science in the traditional use of the term, but they refer to an educated and mutual understanding instead of intuitive ideas. Besides, Vygotsky is well known for the philosophy of scaffolded development, where active teaching is seen as the only way to learn at the right time and in the right place. In particular, he conceived the idea of the 'Zone of Proximal Growth,' which can be defined as the difference between what an individual is capable of achieving or understanding on their own and what an individual is capable of accomplishing, whether a person or a resource, in conjunction with a more expert 'other.'

1.5 Transmedia Communication

Media convergence is seen by Jenkins (2006) as a cultural process characterized by interaction and interchange between commercial, governmental, educational, and amateur bodies that produce and distribute content through social media and other cultural production and consumption channels. He states that “flow of content across multiple media platforms, the cooperation between multiple media industries, and the migratory behavior of media audiences who will go almost anywhere in search of the kinds of entertainment experiences they want” (Jenkins, 2006).

People are now entering online communities such as Facebook, making and posting videos or blogging, solving tasks in certain videogames collaboratively or sharing information on Wikipedia, as well as circulating contemporary activities. There is no question, either, that the dissemination of cultural material across a wide spectrum of media depends on consumers' active involvement.

In other words, individuals are no longer simply witnesses of what is happening in the media (a screen, television, or video console) but may be interested in the creation of it. Indeed, over the last years, more than half of teens and young people have produced cultural content through digital media - part of what is called the millennial generation (Álvarez Monzonillo, 2017) - and a third of internet users share the content they produce (Lenhart et al, 2005).

Current digital media allow individuals, based on a social dynamic of exchange, to participative store, note, appropriate, and distribute the material. This is more consistent with the logic underpinning doing it together then doing it yourself, according to Jenkins, Ito, and Boyd (2016). Participative culture is defined as “a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing creations, with some type of informal mentorship whereby what is known by the most experienced is passed along to novices, where members believe that their contribution matter, where members feel some degree of social connection with each other (at least they care what other people think about what they have created)” (Jenkins et al, 2009, p. 7).

Jenkins refers to two transmedia uses; they have opposite ends, though they are connected. Perhaps the more widespread links transmedia to an evolving discourse, plot, or narrative (transmedia storytelling), while the other is linked to transmedia navigation: skill, or competence.

Transmedia storytelling is a set of communicative practices implemented daily by social media users, when they convey forms of online self-narration and self-representation (Sage, 2014),

selecting and sharing in a coordinated way, through a multiplicity of channels, the content they deem appropriate to build their storyworld, or the fictional world in which interacts with their projective identity (Gee 2003).

The Matrix, which was spread through various media (cinema, TV, internet, magazines, and video console), is one example. It can certainly not be reduced to a single medium; it forms an intelligible whole in its entirety.Jenkins (Jenkins, 2006, pp. 95–96) defines transmedia storytelling as a "story [that] unfolds across multiple media platforms, with each new text making a distinctive and valuable contribution to the whole. In the ideal form of transmedia storytelling, each medium does what it does best –so that a story might be introduced in a film, expanded through television, novels, and comics; its world might be explored through game play or experienced as an amusement park attraction".

Firstly, this term was introduced to refer to a new way of constructing stories or narratives in line with the convergence between different media and platforms that form the way our community expresses itself and defined by the flow between the different spaces that channel the narrative experience of the consumer, thus favoring their participation in content creation (Jenkins, 2003).

In parallel with the above, the "New Media Literacies" are located within the MacArthur Foundation's framework to develop what is called "Digital Media and Learning." Learning in a participatory society,' in which the principal investigator is Jenkins.

The project was founded on a White paper of 2006, which was later published as "Confronting the Challenges of Participatory Culture: Media Education for the 21st Century" (Jenkins et al, 2009). It takes 11 abilities in special consideration, which one of them is exactly transmedia navigation, defined as: "the ability to deal with the flow of stories and information across multiple modalities" (Jenkins et al, 2009, p. 46). Indeed, this expertise is closely linked to the media above and cultural convergence processes, which involve the capacity to process, construct, and distribute new types of stories and arguments. "It involves the ability to both read and write across all available modes of expression (…) learning to understand the relations between different media systems" (Jenkins et al, 2009, pp. 48–50).

The educational effects of these new ideas are evident. This should be present in the education system if we speak of a new culture; if we speak of the skills required for citizenship to be practiced in the 21st century, it is also indisputable that education should ensure that it is learned by new people. Nevertheless, as far as we are aware, the meaning of this competence or the existence of this participatory culture has been given more importance than the highly significant educational consequences.

1.5.1 Transmedia teens: the creative transmedia skills of Italian students

1.5.1.1 The challenging concept of digital creativity and participation

One of the distinctive characteristics of a participatory culture is that it enables users to experience complex consumption processes that include various formats of the similar content and multiple devices or platforms that are accompanied by a high level of autonomy and engagement (Bruns, 2008; Jenkins, 2006; Lange et al., 2010; Manovich, 2009).

Lee et al. (2015) proposed a theoretical method based on their analysis of the historical evolution of literacy. New media literacy was basically defined as the intertwining of two continuums:

• from consuming to prosuming;

• from functional literacy to critical media literacy.

In addition, they identified the issue of production as a continuum among functional and critical production, also separating production methods based on a low level of autonomy and uniqueness from methods used by users to produce original artifacts resulting from their own point of view and critical sense.

On the basis of these assumptions, a conceptual framework consisting of four dimensions was proposed:

- Functional consuming (the ability to access new media created and understand what is being conveyed);

- Critical consumption (average consumer ability to study the social economic, political and cultural scenarios of media content);

- Functional prosuming (ability to participate in the development of media content);

- Critical prosuming (the contextual interpretation of media content by individuals during their usual participatory activities).

Several academics (Jenkins et al. 2006, 2015; Lankshear & Knobel, 2007) investigated these types of practices related to critical consumption and production, defining criteria for understanding the quality of contributions, as well as the set of skills, values and impacts related to adolescents' social cultural and civic growth.

Creation and media participation have also been increasingly highlighted as the pivotal skills of policy makers and institutions, as shown by the Digcomp 2.0 framework (Carretero et al., 2017) as well as the 21st-century skills map of the World Economic Forum (2015), in which creativity has advanced its ranking as one of the top skills.

New forms of participation and media creation have also been discussed from a critical viewpoint, challenging, for instance, the access and distribution of these skills in relation to social gaps (Eynon & Geniets, 2016; Livingstone, 2013; Schradie, 2011; van Deursen & van Dijk, 2014; van Dijk, 2009), and their real influence on social and civic engagement, as well as on the effects of remixing on individual creativity.

As reported by Jaron Lanier (2010), for instance, "Pop culture has entered a nostalgic malaise. Internet culture is dominated by trivial mashups of culture that existed before mashups started, and by fandom responding to the dwindling outposts of the centralized mass media. It's a culture of reaction without action" (p. 20). Therefore, according to the author, digital media can effectively hinder, rather than help, creativity.

1.5.1.2 Case study:

According to a study conducted through the Transmedia Literacy Project (European Commission - Horizon 2020) from 1st April 2015 to 31st March 2018, involving eight countries: Spain (coordinator), Australia, Colombia, Finland, Italy, Portugal, United Kingdom and Uruguay, Through an analysis of information collected using various methodologies (survey, in-depth interviews, workshops and media diaries), about both the consuming and producing media practices of Italian adolescents and the ways in which they are related to emerging transmedia skills (Scolari, 2018a, 2018b), Research examined how teenagers produce, consume, analyze and perceive stories that emerge across books, video games, TV shows, movies, music, etc and across various social media (YouTube, Instagram, Snapchat, Facebook, etc and other social networking sites (online forums, online communities, blogs, etc.).

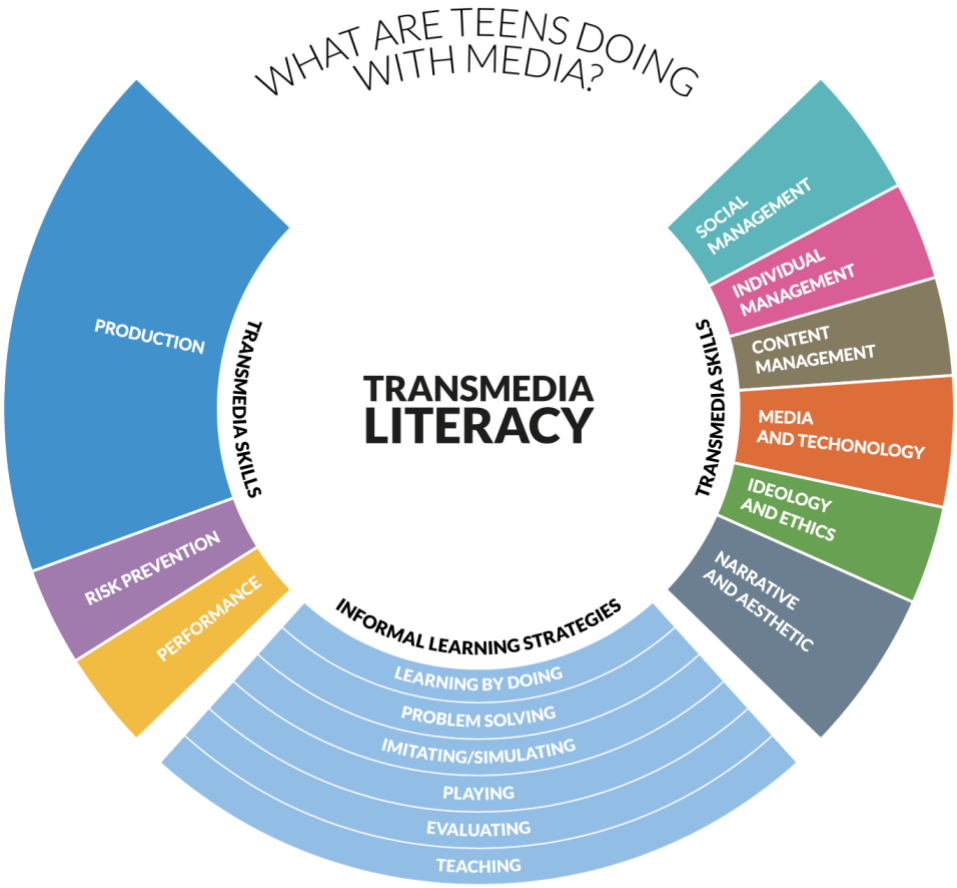


Figure 2 What are teens doing with media. Source: Tansmedia Litteracy (Scolari, 2018)

1.5.1.3 Methods:

The "Transliteracy" project approach was built in the light of the need to examine and evaluate media practices as closely as possible to the reality of the situation. In fact, young people's communicative practices are highly complex and it is difficult to fully understand the processes of audiences or to study how they use and rework media content (boyd, 2010, 2015). For this purpose, the methodology developed by the research is mostly qualitative in nature and consisted of several steps:

1. Questionnaires with semi-structured questions on teenagers media use and their opinions/attitudes on a few aspects of media content (97 Italian students involved);

2. Workshops on participatory culture and video games (16 workshops involving 103 students). The workshops were planned using a multi-method approach, including rapid ethnography (Handwerker, 2001), participatory design approaches (Crabtree & Miller, 1999; Halse & Boffi, 2016), visual-sensory ethnography. (Ardévol, 2012; Pink, 2014), and design ethnography (Pink, Ardévol & Lanzeni, 2016).

Workshops were arranged in specially prepared spaces in schools, not in classrooms. During the sessions, the moderators suggested creative/productive activities for teenagers. For example, in the "Participatory Cultures" workshop, adolescents were asked to invent a story using different materials or tools, while in the "Video Games" workshop, researchers arranged a Trivial Pursuit game based on video games questions, built and invented by adolescents themselves. This made it possible to monitor teenagers' media production practices in real time, particularly in group contexts, where active negotiation and debate are required.

3. In-depth interviews on adolescent relationships with participatory cultures and video games (39 students). The interviews focused on three parallel areas: participatory culture (content production); videogame culture (gaming and problem solving); and social media activities (sharing, commenting, liking, etc.).

4. Media diaries compiled weekly by teenagers (24 students). The diary is intended to report teenagers' social media routines, for example, when interacting with family and friends through various social media.

1.5.1.4 Results:

The most important objective of the Transliteracy project was to connect the cultural consumption of teenagers with the skills they have developed in relation to the various media and cultural environments.

Jenkins et al. (2006) reported a variety of skills connected to teen's online practices: Ito et al. study (2008) reveals three types of participation that include "new media" skills among young people and which are targeted to adolescent learning in non-formal and informal education contexts, that is: *hanging out*, *playing around* and *geeking out*.

Hanging out is characterized by a non-purposive way to learn new media skills, often among peers. Messing around involves more self-directed ways of learning based on the error checking, such as starting a new video game or activating a new smartphone, or trying a new downloaded app; It's a way to tinker and explore. Geeking out is correlated to a more purposeful way of learning, as they interact with media and technology in an extreme, independent and interest-driven way of improving skills or knowing more about something, seeking advice and collaboration amongst peers. (Taddeo & Tirocchi, 2019).

Jenkins et al. (2006) described a broad range of skills, including playing (the ability to experiment with one's environment as a form of problem-solving), performing (the ability to adopt alternative identities for improvisation and discovery), appropriating (the ability to substantively sample and remix media content), and judging (capability to evaluate the reliability and credibility of different information sources), transmedia navigation (ability to monitor the flow of stories and knowledge through multiple modalities), networking (ability to search, synthesize, and disseminate information) and negotiation (capability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms).

The Transliteracy Project framework reported that "transmedia literacy could be understood as a set of skills, practices, values, priorities, awareness and learning/sharing strategies developed and discussed in the context of new participatory cultures" (Scolari, 2018b, p.15); The team of researchers identified "transmedia skills" (Scolari, 2018) that relate to the complex system of digital media, social media, video games use and the ability to connect and synthesize these activities into a new transmedia culture. Transmedia culture is a modern definition of a symbolic paradigm that begins with a convergence culture (Jenkins, 2006), underlining the ability of consumers to work through multiple media channels, platforms and modalities.

They are connected to digital interactive media production, sharing and consumption. According to the research team, "transmedia skills range from problem-solving mechanisms in

video games to content creation and sharing in the context of web platforms and social networks" (Scolari, 2018, p.18). (Scolari, 2018, p.18). They are also focused on narrative content (fan fiction, fanvids, etc.) created and posted by teenagers on digital platforms.

The data collected from the Italian research field revealed certain skills that show clearly the autonomy and creativity of adolescents. The data shows that Italian teenagers can still be considered relatively traditional media users: their creative participation is minimal and they often merely imitate or remix the works of others, acting as "functional prosumers" rather than "critical prosumers" (Chen et al., 2011). The results of the research show the meta-reflexive approach of teenagers to the media, an approach that seems to regulate and limit their attitude towards creating and above all, revealing their own creativity online. At the same time teenagers show the acquisition of new and creative skills linked to mechanisms of media industry and self-management (Taddeo & Tirocchi, 2019).

Part II: Social Media Platforms and Transmedia Skills

2.1 How Social Media are important to E-learning

The constant increase of using internet (Figure 3) and social media (Figure 4) in the recent decade is an undeniable fact. Its use is spread from politics to entertainment and information circulation, and personal life. In a New York Times article, the need to participate on social media is described as a "fear of missing out". The article then adds how simplicities of life like a concert or a lunch become a part of our extended social life and become significant in knowing we are a part of a larger community (Herman, 2019). Social media did not stop here, but as a tool continued growing to what the major part of people would not have expected. Nowadays, many people use social media in order to learn and gain skills.

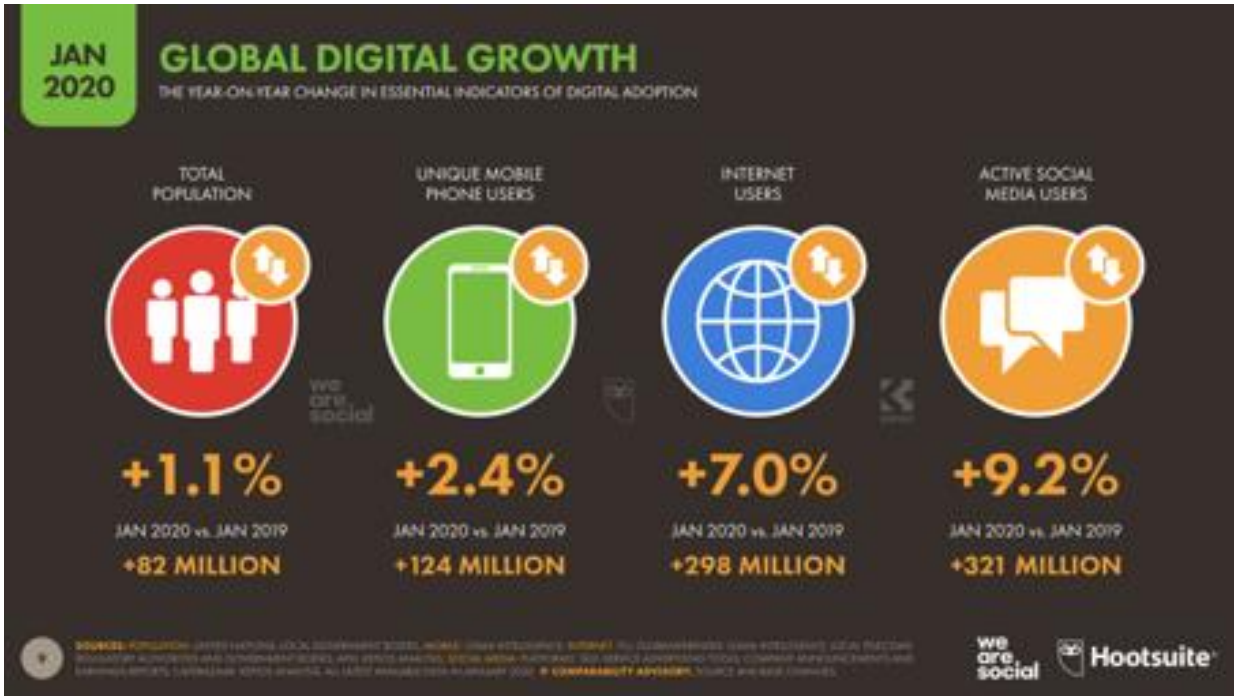


Figure 3: Global digital growth. The year-on-year change in essential indicators of digital adoption. (Hootsuite 2020)

Mansor and Rahim (2017) discussed that social media networking pages give a sense of community and enhance the learned subject to a vaster extent. It also can be said that the major part of the students viewed Social Networking Sites (SNSs) as potential tools for learning purpose. "Social media is also a platform for learners to express their thoughts more clearly while improving their English language at the same time (Plumb, 2013)".

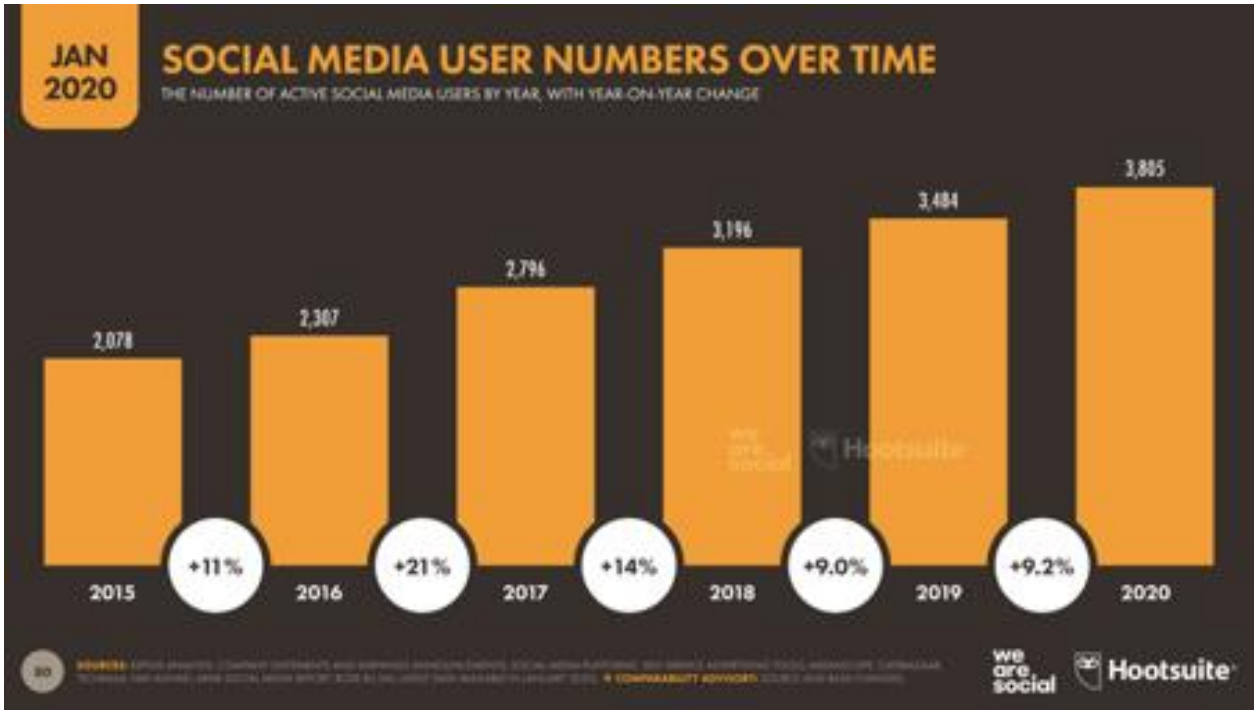


Figure 4: Social media user numbers over time (Hootsuite 2020)

Freedom of expression makes even more sense in social media, talking about the people who are not confident enough to express themselves face to face. Khalitova and Gimaletdinova (2016) stated that Instagram can be used as an online instructive tool to help and upgrade learning EFL (English as a Foreign Language).

2.2 Benefits of educators' uses of social media

Despite the shortage of literature on the subject, it is possible to exploit the literature on educators' professional social media use. Educators have used different applications and platforms to teach outside a physical school. (Carpenter & Green, 2017; Rehm & Notten, 2016; Risser, 2013). For example, Pinterest has been used by educators to search and obtain content (Carpenter, 2018; Schroeder, 2019). Using hyperlinks, social media can redirect the user to the main source of the information (Forgie Duff & Ross, 2013). For instance, (Carpenter, 2020) showed that around one third had hyperlinks in a sample of 2.6 million tweets. However, Instagram currently restricts most users to put one hyperlink in their profile. The lack of hyperlinking possibility on Instagram, suggests that educators should use this platform differently than the other platforms. For instance, they might not be recommended to use Instagram in order to share or address content located outside Instagram, like blogs or articles: what educators are very much used to do (Carpenter & Krutka, 2014).

Generally, social media can be used for professional networking and support. Many educators have used twitter to build communities and learning network and cope with isolation, which normally happens after years of working in this profession (Carpenter & Krutka, 2014; Harvey & Heyndman, 2018). Social media has helped educators to organize and promote strikes and protests (Will, 2018). However, Instagram leads to building different community and network types, thanks to its visual nature and lack of hyperlinking and other features that are available on other social media (Waterloo et al, 2018)

Social media can change the physical barriers on professional lives of educators. It can let them modify their professional identity and access more and different job opportunities related to their interest (Robson, 2018), rather than staying in a school where the central office has gathered people considering purpose or personal affiliation (Huberman, 1995).

Networking in social media can be need or goal oriented rather than relying on personal networking. Twitter for instance, provides hashtags so professionals can discuss a particular subject which they would not be able to discuss in other occasions (Aguilar, 2018). Researches also show that social media can provide different resources to inspire educators, such as new mentoring ideas and professional network development (Carpenter, 2015; Risser, 2013).

2.3 Challenges in educators' uses of social media

Naturally beside numerous advantages, using social media may bring challenges to educators. These challenges can be described as below:

2.3.1 Content challenges

Although social media have somehow decreased the absolute power of mainstream information gatekeepers and all the users, formerly known as audience, can now spread information (Rosen, 2012), the quality of the accessed content can be compromised or decreased. Some information sources may provide inaccurate or inappropriate information.

However, the lack of gatekeepers also means that users face a more outstanding obligation to assess the content quality and integrity. Different concerns have been raised with respect to the precision and suitability of some instructive materials shared in social media. (Gallagher et al 2019). Two analyses of various posts related to elementary teaching on Pinterest (Hertel & Wessman, 2017) found frequent mathematical errors; furthemore Instagram, thanks to its visual nature focuses more on gratification rather than the cognitive effort related to education.

Another challenge can be spam content on social media. Although the quantity is very large (Willet, 2019), the bulk content of some education-focused twitter hashtags spam has been largely found(Carpenter, 2020). Further, advertisement may change the priority criterion, in such a way that the most qualified content would not appear the first (Friesen & Lowe, 2012). Also, the presence of only "like" button and not "dislike" and redirecting advertisement based on the information gathered by the "liked" pages, encourages a shallow, rather than a deep relationship between the user and the page,

2.3.2 Discourse challenges

Social media are not only platforms to share information, but also to discuss and interact. Although the generativity or criticality of online discussions among educators are not so clear (Carpenter & Harvey, 2019) in offline contexts a tendency to polite talk rather than robust and productive discussions has been observed (Russo & Beyerbach, 2001).

Huberman (1995) suggests that discussion among teachers does not normally lead to actual changes in teaching methods in many schools.

The same dynamics may be expected on social media. Also, platforms' nature may lead to only sharing rather than discussion or sharing conflicting or controversial content, which may bring dialogue and interaction (Kimmons & Veletsianos , 2014). Online spaces used by educators,

have been characterized free of controversiality and conflict, which may bring up the question: “are the social media really effective in users’ dialogue and exchanging ideas”? (Kimmons & Veletsianos , 2014).

2.3.3 Community composition

Although social media may lead users to encounter new ideas and communities (Messing & Westwood, 2012) a tendency to gravitate towards the people with the same or very similar set of ideas and opinions has been witnessed (McPherson et al, 2001). Instead of receiving different vibes thanks to social media, these platforms' algorithms have been more likely to push the users towards similar or identical ideas they already have (Praiser, 2011). Common affinities can be a powerful motivation to use social media, nevertheless following only usual content, the user might not exploit the social media completely (Kope, 2012). This even may put the likelihood of learning through educators’ Instagram account, in doubt.

2.3.4 Identity challenges

Educators' professional profile and identity are continuously built interacting with schools and institutions, policies, cultural issues and standards, and finally communities (Danielewicz 2001; Zembylas, 2018).

Social media can create possibilities for expression and identity construction; however, they expose the user to the hegemony of pre-existing ideas (Landin et al, 2017). Pittard (2017) noted how social media could create unrealistic self-expectations in educators. Considering that friendliness and vulnerability are important to create effective relationships online, both emotional and professional relationships seem to be necessary to establish supportive online relationships among the users and educators (Lasky, 2005).

Unintended audience is another challenge. On Instagram, context collapse is a well-known phenomenon when posts reach the audience out of the normal range. So, when the user shares some content aiming or communication with a certain group of audience, the post can also be seen by the other people, unlike face-to-face communication where people can give the message to the intended person (Marwick & Boyd, 2011). Content collapse can be overwhelming for educators since it increases their responsibilities to multiple parties; not only the students but also administrators, families, parents, colleagues, etc. (Cho & Jimerson, 2017).

Instagram can be even more tricky regarding context collapse. Sharing a post, it is public by default and unlike Facebook relationships are not reciprocal. The educators who prefer to keep their posts public, are likely to face even more context collapse.

2.4 YouTube

It hosts many applications and features which can bring added value for the user (Snickars & Vonderau, 2009). This medium now merges an archiving website with television and entertainment features and is widely considered a social medium. It hosts millions of users which produce, share and consume content.

Although content production may lead to earning money, an average Youtuber is not necessarily motivated by financial benefits, but self-expression. However, for the most of the people YouTube is a source of passive entertainment. It is important to mention that the archiving possibility, actuates more passivity and less productivity in users. Productivity is considered the mean to develop informal learning.

According to Hootsuite (2020) report, 90% of the Internet users, consumed online videos each month(Figure 5) . YouTube is one of most present oneline video platforms in the youth's lives, it is a platform to produce, share and consume different entertainment forms as news, gameplays, vlogs, fanvideos, fandubbing, lectures and tutorials and video essays. The latter can be a direct source of knowledge.

Figure 5: Online content activities. (Hootsuite 2020)

For practical purposes such as playing musical instruments, cooking and making handcrafts, YouTube has become the mainstream source of knowledge (Jenkins, 2010; Hartley, 2009).

The content produced for these purposes is normally made by individual and spontaneous work which can be considered a less formal knowledge source. However, YouTube is turning into an academic source of knowledge too. Some participants stated that tutorials have been helpful for their academic needs.

The Transmedia Literacy project (Scolari, 2018) reported, By taking over some of the school's functions, YouTube is creating a new room to add to the gaps that teachers are unable to fill. The customized dynamics of the platform enables individual practices to acquire specific knowledge: math, philosophy, chemistry, history, and even foreign languages. The range of subjects is as broad as the online community itself. (Gutiérrez et al, 2018). Colombian teenage students involved in the study introduced a channel called "Julio Profe", which teaches math in a simple way. (Scolari, 2018)

"Lucero
14 YEARS OLD - FEMALE
Colombia
Lucero: I learn better with him [Julio Profe] (Youtuber)
Interviewer: Why do you think you learn
better with him?
Lucero: I barely understand the teacher I have now.
So, I watch YouTube videos about what we are
studying and I understand them and it's easier.
Interviewer: How do you do it?
Lucero: I watch him, and while he explains
I do the exercise.
Interviewer: Why do you think it works better?
Lucero: In class you can ask maybe twice "teacher
I didn't understand"; but on YouTube or any social
network you can repeat it as many times as you want."
Source: (Scolari, 2018)

2.4.1 Integrating YouTube videos in online courses

Online courses have become a very common style and method of education. The courses' base is normally tutor's recorded videos, but other features can let students communicate among themselves. These features and courses have led to engage and educate students (Stern & Hussey, 2014). Thanks to the recorded videos, learners can attend and listen to the lessons multiple times.

Extra content to complete the course can be found on similar video-sharing websites such as Vimeo, Hulu, Dailymotion, or YouTube. The latter one is the most popular choices, thanks to being user friendly and the huge number of videos and variety. On YouTube channels can be

created and followed, which are often dedicated to a certain subject to provide consistent information.

2.5 Instagram

In a research through 841 american educators interviews' about who engaged Instagram in the exchange of both professional knowledge, as well as affective support. In addition to Identifying benefits to Instagram use, some participants offered critiques of Instagram's professional utility, one of those educators states:

"Instagram has completely changed my classroom and my outlook as an educator. I can point to any area of my classroom and cite a resource, center, display, or other educational tool recommended or created by an insta-friend. The support from Instagram has also been incredible; after tough days in the classroom, I know I can share my experiences and brainstorm solutions with fellow teachers." – Elementary school teacher

Instagram is widely considered to be the 21st century to enhance learning. It is also a free mobile application, available for Android and iOS. It can be used to share photos and videos, snapshots, send text messages and even go live. Instagram is claimed to be a form of digital literacy, able to aid teaching process and enhance the quality of learning (Salomon, 2013). Dewi and Salam (2018) suggested that since students can use Instagram also out of the classroom and expand their learning time to more than school hours, which is closer to the essence of learning.

School policies and popular culture narratives often focus on social media issues, and indeed these media have generated challenges that many individuals, families, communities, and even political systems are struggling to handle. (Tufekci, 2017; Vaidhyanathan, 2018). However, educators used social media in student activities (Carpenter & Justice, 2017) and professional learning (Xing & Gao, 2018).

Many studies on educators' use of social media can be found in literature, such as Facebook, Pinterest, Twitter and Reddit. Despite being the second popular platform in the United States a and the fifth in the world (Hootsuite, 2020), Instagram has drawn relatively little attention from the researchers.

Instagram is a photo and video-sharing social networking service, which can be used through the application or the website. Up to 2200 characters can be used as a caption for a photo or video. Private messaging, tag option and search, live video, multiple video and photo post and also story adding (a content available only for 24 hours), are the features offered by Instagram. Different features let users to communicate with different levels of privacy or formality; while posts are more elaborated, stories are more likely to be friendly (Hong et al, 2020). Instagram has been reported be more popular than Facebook among teenagers in the United States

(Anderson & Jiang, 2018). These facts show how important the lack of information and research about Instagram for educational purpose can be.

Instagram relies on visuality, which differs it from the text-oriented social media. This also implies that educators should have a different approach using Instagram as an educational tool. Technologies determine how to shape the learner's thought, as (McLuhan, 1964) says:" the medium is the message", so social media can promote lifestyle or way of thinking, in other words "culture". These platforms connect users (educators in our case) and affect the architecture of the connections made within their spaces (Friesen & Lowe, 2012). So, different platforms, giving different features give different experiences. For example, Twitter has a feature called "retweeting", where a user broadcasts an already published post. This can be considered a minor legitimate participation.

2.5.1 Conceptual framing

Here, we will try to explain educators' Instagram experience and use, using two principal concepts: Affinity spaces (Gee, 2005) and Teacherpreneurship (Berry et al 2013).

2.5.1.1 Affinity Spaces

Affinity spaces are defined as locations (online or offline) where people gather thanks to a common interest or goal. These interests or goals may vary or relate respect to age, gender, social class or profession. However, affinity spaces are often born thanks to hobbies rather than the profession itself. By skipping over geographical or traditional blockades, social media can make it very easier to create affinity spaces. These spaces allow different levels of participation or expertness (Gee, 2005).

It is to be considered that social media can make larger communities and spread knowledge or messages to a bigger number of audiences, thanks to geographically independent. For instance, a math teacher in a small town, can share their ideas to many math teachers regardless of where they live.

The idea of space, helps Instagram establish boundaries more easily, where every user has their own space and place. Spatial view decreases the necessity for members to dissolve completely in the new community (Gee & Hayes, 2012).

Further, it is to be considered that affinity spaces not always result in positive change. Some spaces may be not beneficial or healthy to some users, by promoting wrong or highly traditional values and techniques, actually harming the teaching methods (Nagle, 2018; Little, 2003).

2.5.1.2 Teacherpreneurship

Normally, a common drive is what gathers people into an affinity space. These motivations however, might be not overlapping completely. For example, some educators may participate in an affinity space because they want to update their teaching and improve their teacherpreneurship skills (Carpenter, 2018) and are not necessarily interested in interacting with other teachers.

Teacherpreneurship may have different shapes, but normally teacherpreneurs look beyond their small circle of audience and want to spread their influence to more people (Berry et al, 2013). Many teacherpreneurs use their network to promote and advertise related products to their job in places like teacherspayteachers.com and other affinity spaces which can be promising for new audience which can potentially buy. Therefore, financial interest of teacherpreneurs can differ them from the other members of affinity spaces.

Teacherpreneurs have common goals with the other members of education based affinity spaces. They want to create and share content and spread knowledge, where the main difference is their financial purpose. The difference may bring unwanted effects. For example, some users evaluated the content shared by teacherpreneurs as spam (Carpenter, 2018). On the other hand, some users felt the material shared by teacherpreneurs was useful, indeed affinity spaces are used to exploit various sources of knowledge. That is what teacherpreneurs do: bringing material from other places (like TPT) and share (Gee, 2005).

To recap, affinity spaces users are driven by different motivations, combined of financial and non-financial. These motivations may vary over time, explaining why educators' behavior and participation may fluctuate over time (Carpenter & Krutka, 2014).

2.5.2 Literature on Instagram

Although journal reports testify vast and numerous uses of Instagram for educational purposes Rozen (2018). Students have observed Instagram use as a part of course assignment (Erarslan, 2019) and primary and secondary educators' use of Instagram has been reported in a few conference papers such as (Carpenter et al, 2019) and (Shelton et al, 2020; Scolari 2018)

As seen as the par. 2.1, Firstly education-related hashtags are being used in millions (e.g. #teachersofinstagram by around 7 million posts as of June 2020. Secondly, Instagram users have grown by 4000 percent since 2014 200 million to nearly 1 billion active users (Hootsuite, 2020).

Nowadays, educators use internet in different fashions: using educational websites and platforms, exploiting traditional publishers' releases or participating in formal educational communities (Lantz-Andersson et al, 2018). They may also use websites that are not created for the exact purpose of education, where Instagram can be an outstanding example. Instagram turns out to be a gate for professionals to access their affinity spaces and exchange knowledge and technique, with some users who are more concentrated on money making.

The present study has tried to document how educators use Instagram and offer paths for future studies on opportunities and challenges of this field.

2.6 Facebook

According to (Hootsuite, 2020) Facebook is the most popular and frequently used social media platform. (Figure 6)

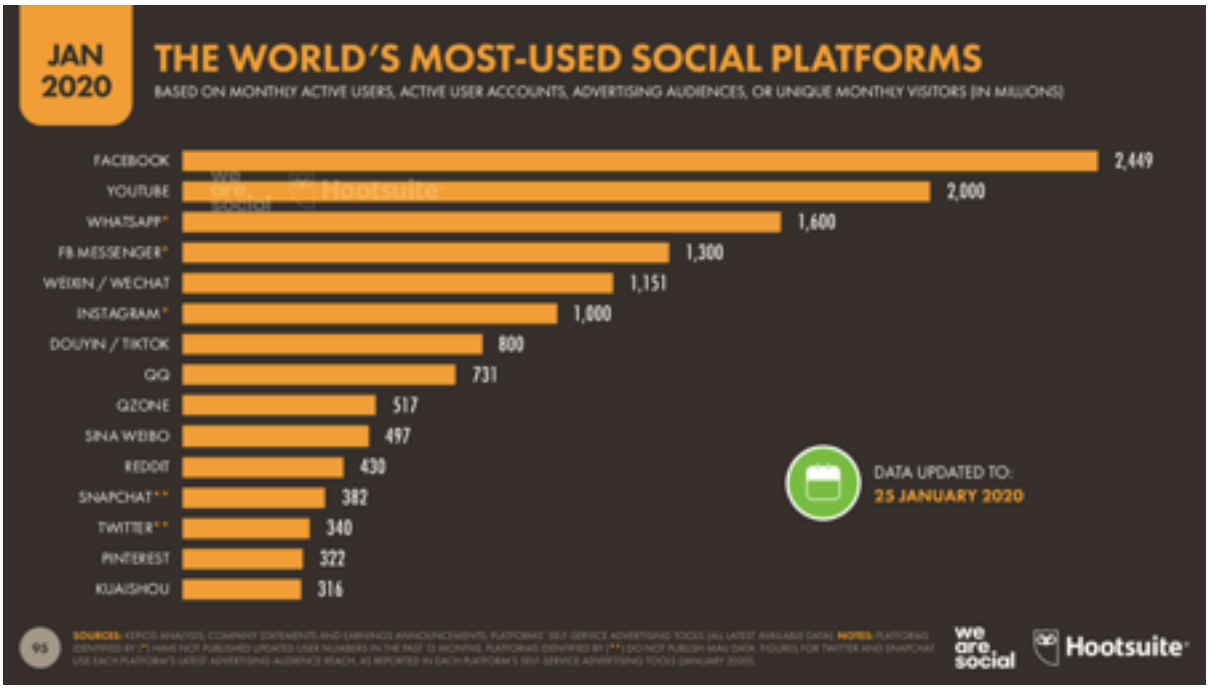


Figure 6: The world's most-used social platforms. (Hootsuite 2020)

Facebook is still the most relevant social media among young people (Hootsuite, 2020), which is widely common among those teenagers who start using the networks. Many teens start using social media, inspired by the website's games. In reality, some of them were initially designed to be played on this network and were later developed for other platforms. The platform contains hundreds of different videogames. The clearest example is Candy Crush, the Facebook game. As young people grow older, however, they diversify their use of this social network, especially in terms of peer sociability and entertainment.

The most important reason for sharing the content of all kinds is to be in contact with peers and family members. However, another important reason is to "follow" and connect with common young and adolescent idols across the web in their profiles. What determines how famous a well-known individual is among teenagers, on Facebook or other social networks, is not just their media reputation. However, the number of fans, friends, and "likes" they get in each of their publications (Scolari, 2018).

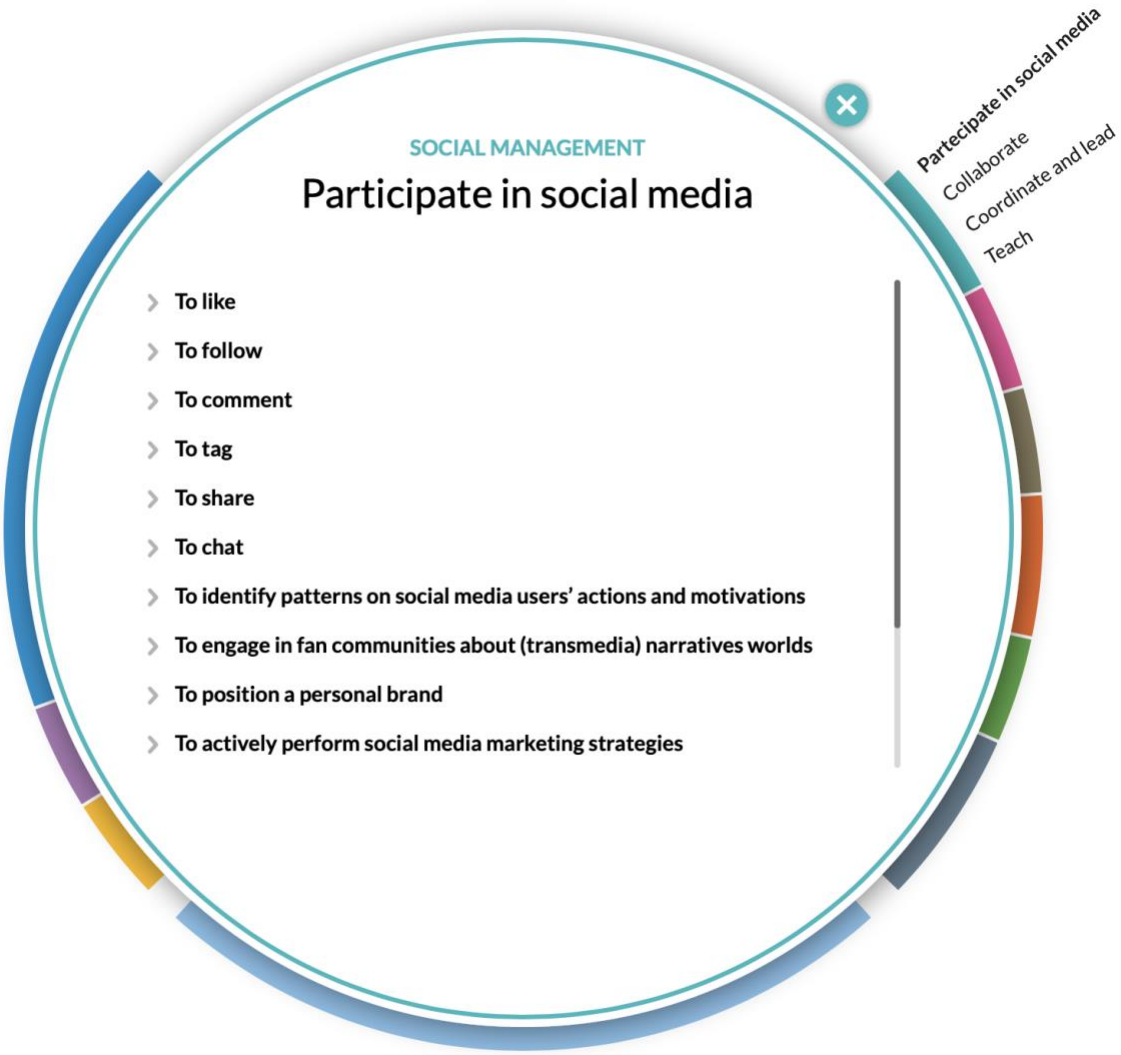


Figure 73 Social management, TransmediaLiteracy.org (Scolari, 2018)

The powerful and dominant audio-visual aspect of all content and products posted on Facebook is another important factor that should be considered. Various content and curricular and extracurricular school events related to projects should include the common activity of capturing, editing and posting photos and videos of adolescents on Facebook. In order to make, edit or distribute information, the collaborative culture teenagers establish on the Internet is often linked to a certain project or goal.

Like completing a level or overcoming a game obstacle, planning a party, visualizing an idea or initiative, competing, or building a group of fans or a space with a given identity to belong to. Furthermore, such projects, of various nature and length, require multiply deferred or

overlapping phases that do not necessarily have a definite beginning or end; thus, flexibility or diversification of the initial goals must be taken into account to exploit them educational purposes.

The inclusion of technology and computers in teaching and learning has become an integral part of the educational system increasingly in recent years. This pattern has started to grow in primary and secondary education but is currently more pronounced at the university level. This does not mean that, in general, teaching and learning as a social activity are to be efficiently replaced by technology. On the other hand, however, technology will serve the educational process in numerous ways. Technology influences almost every part of our lives, our cultures, our homes, and is pervasive. But at the very last stage of employing the technology in the classroom, most schools are lagging far behind. (Shefketi et al, 2019)

Shefketi et al (2019) studies show during class hours, the vast majority of teachers did not contact Facebook. Those that do typically have access to their cell phones or tablets. This is consistent with the finding that access to this site appears to be blocked by several schools. One of the questions was if they prefer to look at Facebook. It turned out that 17% of teachers use Facebook, but not when they teach in the classroom, 2% said they seldom use it during class hours, and 81% usually use it when getting notice/message (including during lessons).

Another finding is that they said 2 percent used more than once, 4 percent a few times a week, 5 percent about once a week, 4 percent about once every two weeks, 13 percent about once a month, and 72 percent used slightly more frequently. The question was how often they changed their Facebook status for school affairs. Passive participation on Facebook happens when it comes to status updates, with fewer than a third of teachers updating their school affairs status at least once a month. But what teachers posted on social networks such as Facebook they said most teachers replied that they use social media to share completely personal news such as birthdays, family cases, hobbies and interests, some teachers said that it is totally inappropriate to mention anything about educational matters, especially because it could lead to a disciplinary procedure due to the policy of their school. For teachers who use Facebook in their teaching capacity, sharing comments on current issues or educational news, policy changes, learning ideas, and resources were the most common activities. News items, journals, videos, weblinks, and various subject-specific data are also frequently exchanged by teachers. Many educators are also very interested in engaging with other peers using their social media accounts to check for and answer questions, provide help, and exchange ideas with their peers.

2.7 WhatsApp

While ICTs have been used widely at universities since the European Higher Education Field became a reality, their main emphasis has been on providing tools for enhancing online teaching. However, the types and quality of the initiatives carried out by lecturers require an in-depth analysis of the (Urbina & Salinas, 2014). ICTs give lecturers new ways to promote student-centered, constructive, and participatory learning processes (Esteve & Gisbert, 2011). Thanks to their capacity to communicate in communities and intergroups, social networks and mobile instant messaging (MIM) can be used as participatory methods, breaking the spatial and temporal requirements of the classroom (Elhay & Hershkovitz, 2018).

Mobile technology reports predict that MIM users will rise from 1423 million in 2014 to more than 3.8 billion by the end of 2018. In particular, in 2018, WhatsApp increased the number of messages every day, comprising three-quarters of all mobile messaging traffic (Yoon et al, 2015). WhatsApp was the third most successful global social network, accounting for 1,5 million users, according to Hootsuite (2018). Several studies have explored this method from a pedagogical perspective because of WhatsApp's growth, making it useful for both affective and cognitive experiences (Kim et al, 2014).

Two opposing viewpoints emerged after reviewing the literature on this subject. The optimistic approach involves promising results on MIM contributions such as strengthening cognitive experiences or reducing cognitive load (Gao et al., 2017; Kim et al., 2014; Rambe & Bere, 2013). The negative approach by which the use of MIM is adversely assessed when attending lectures or working on assignments, and the outcomes of their learning are often significantly undermined (Hawi & Samaha, 2016; Jahnke et al, 2017; Rubio-Romero & Perlado, 2015); Santos et al., 2018).

A popular technique in education that needs collaboration to share and process information among team members is the implementation of team-based assignments and projects. But it is not an easy task to make a shared decision since it requires complex activities (Gewerc et al., 2014).

Team decision-making activities may be an important method for

learners to integrate teamwork abilities in educational contexts (Baghaei et al., 2007). Coordination and specialization are critical factors for team decision-making, according to Ren and Argote (2011). Team collaboration refers to the efficiency of exchanging information and expertise between team members in order to accomplish the task, while team specialization involves the distinct knowledge that members have and the mutual confidence in who knows

what. A team in which a certain degree of specialization is installed would help its members to more efficiently perform their tasks. While research in educational contexts on these structures are scarce, Neville et al. (2013) indicated that students liked to share their information to better understand their future workplace and build more professionally focused perceptions.

2.7.1 Advantages and disadvantages of MIM in educational context:

2.7.1.1 Mobile instant messaging (MIM) and learning

Social networks and mobile instant messaging (MIM) can, as described, be used to increase classroom participation and, consequently, to mprove learning. MIM can be described as timeless, user-friendly, cost-free, and multi-modal tools from an educational perspective (Tang and Hew, 2017). MIM learning opportunities are enormous because they can be carried out naturally, almost anywhere, and can be tailored (Motiwalla, 2007) (Ryu & Parsons, 2012).

Four key groups may be categorized into research on learning by MIM. First, several research explored the impact of MIM on the learning process and its outcomes (Middelweerd et al. 2015). Second, the educational effects of mobile devices have also been explored via the design of learning scenarios (Sung et al. 2016). Third, several research underscore the beneficial effects of MIM on main learning variables, such as cognitive and emotional engagement and teamwork (Rambe & Bere 2013; Kim et al. 2014).

Finally, in the transition from university to professional life, MIM was often analyzed as a support and networking mechanism to strengthen information and minimize feelings of professional isolation (Pimmer et al., 2019). Research has also based its attention on the negative effects of MIM from this optimistic perspective. In a broader sense, some evidence has been found for addictive behavior associated with inappropriate use of technology (Hong et al. 2012). It is widely agreed that socializing by MIM does not meet the expectations of a healthy socialization process (Anderson et al. 2012). Hawi and Samaha (2016) recorded elevated percentages of smartphone addiction at risk and the correlation between this risk and lower academic achievements in a sample of university students. In particular, when it is used compulsively or when people are permanently linked, MIM could be assessed as problematic (Gao et al. 2014; Salehan & Negahban 2013). For academic goals, adult learners expressed ambivalence about MIM as they were destructive of family life (Rambe & Bere, 2013; Heflin et al, 2017) also discovered in a university study that mobile technology was correlated with disengagement in interactive learning contexts during the course.

2.7.1.2 Technologies and collaborative learning

Technology may deepen the reflection of students about how to carry out their assignments collaboratively. Kim et al. (2014) noted, for example, and as discussed previously, that MIM is good for interactions and teamwork. According to Voyiatzaki and Avouris (2014), technology promotes active and collaborative learning, as it encourages group activities and helps the instructor in his or her role. Technology permits synchronous and asynchronous communication, which promotes engagement and interactive learning (Kienle, 2009). Because of these advantages, many technical tools have been introduced since Johnson and Johnson (1996) to improve collaboration in learning (e.g., computer-supported collaborative learning such as the so-called "KOLUMBUS"). Besides, Gilson et al. (2015) agreed that younger generations regard working as commonplace in virtual teams because work-life balance and immediate access to information are very important. In a less hierarchical partnership structure, young generations often analyze networking tools to erase barriers and increase collaboration (Myers & Sadaghiani, 2010). In fact, technology offers an environment that promotes communication between students to improve their learning processes (Kreijns et al, 2003), encourages collaborative learning (Pea, 1994), and enhances group cognition (Stahl, 2006). In 2007, Lancaster et al. found that MIM was clearly the most common communication method among university students. Further research revealed that WhatsApp was becoming very popular, almost replacing the conventional mobile phone community, which saw WhatsApp as a space for exchanging experiences (Rubio-Romero & Perlado, 2015).

MIM also removes some of the inconveniences of mediated technology as it takes place in real-time and can consist of email, voice mail, video, or a combination of all three of these (Purvanova, 2014).

Since teams are the most common way of coordinating work in real work environments more than ever (Rico et al, 2017), team-based learning activities are a widespread tool because they can help share and create academic expertise and improve useful generic skills in the current job market (Huang, 2016).

2.7.1.3 Technologies and team cognition

Team activities such as decision-making include coordination between team members to share, process data, and decide the next appropriate steps towards the team's goals (Olson et al, 2007; Prayitam & Dooley 2009). Members need to build team cognition to exchange their skills and cooperate on the shared mission in order to achieve successful teamwork.

Team cognition is characterized as the mechanism by which team members understand how within the team, the key information of team effectiveness is mentally preserved and distributed. Group cognition also provides the framework for team members to organize their tasks (DeChurch & Mesmer-Magnus, 2010). In particular, one form of cognitive function, the transactive memory system, may influence decision-making (TMS). More precisely, TMS may be defined as a shared framework that involves both (1) team members and their expertise and experience, and (2) the interactions between team members that reflect the awareness of others of that knowledge and expertise (Contractor et al, 2006).

First, the perceived cognitive interdependence of teams depends on the difficulty of tasks and group communication. If team members experience cognitive interdependency, they will build connections between them, their comprehension, and the characteristics of the task (Peltokorpi, 2008). They form a web of shared or complementary information stored in their memories when individuals know each other well. TMS thus provides a framework for understanding the dynamics of teamwork in collecting and sharing data between individuals (Chou et al., 2012). Transactive memory systems (TMS) can be seen as a meta-awareness of what others know and the availability of that knowledge (Lewis, 2003). TMS explains how team members use their colleagues as "external memory aids" as Wegner (1987) posited, completing their own personal awareness.

Technologies such as MIM can reduce cognitive load and decrease confusion from the point of view of data processing, resulting in more successful teamwork (Rambe & Bere 2013). Also, technology could directly encourage information generation by increasing the level of motivation of students (Heflin et al., 2017).

2.8 TikTok

In September 2016, TikTok was introduced and soon assumed a leader in social networking (Sehl, 2020). The media fascinated younger people and teenagers worldwide. TikTok can be represented as an application where individuals can make around 15 second videos and run them in a loop, until the audience decides to go to the next one. The user can also stick videoclips together to make up to a 60 second video. Music, filters, short cuts, add-ons and stickers can be used in the video. (Meola, 2020)

This research has tried to focus on youngsters, whose numbers an attention to this platform, has been increasing significantly. It has taken a look at how young adults use this platform and what effect does this application have on the life of this generation, widely referred as “Gen Z”. The Gen Z generation are the ones born between 1997 and 2012, capable of using internet and electronic gadgets such as computers, cell phones or tablets, in order to express themselves. TikTok is only one of many platforms that offers them a space to show their thoughts. (Meola, 2020)

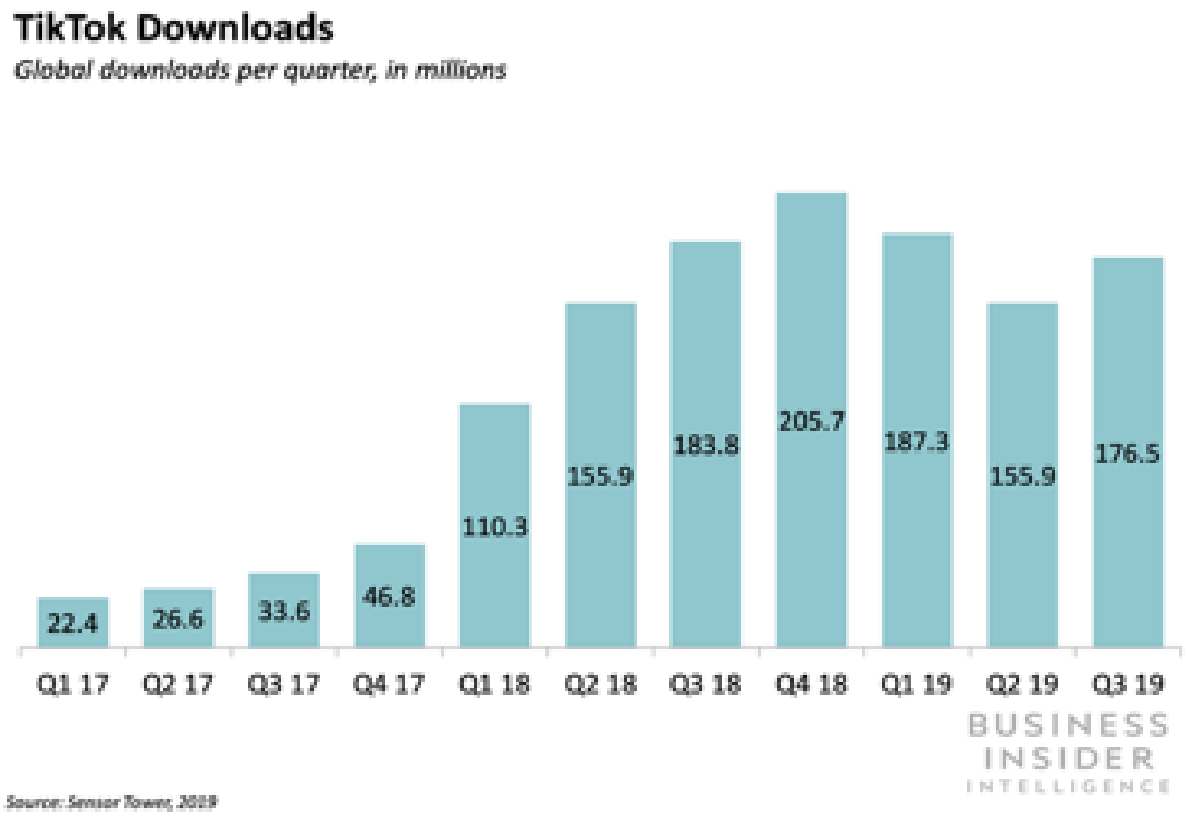


Figure 8: TikTok Download (Sensor Tower 2019)

2.8.1 Challenges

The most significant problem of this interviewees was that they had no other place or space available to complain or report. Thanks to lack of knowledge, many users do not know of the reporting system available on the platform. The second challenge is that TikTok is believed to induce anti-social behavior. It is believed that the people gravitate towards individual life and leave the social one and the youth, tend to be “showing off” their personal life rather than studying. (Gupta, 2020)

Evidently, older generations have always been keen to keep traditional communication methods and criticize the new one, but this case is different. The subject of the biggest concern is the middle aged and adults, who misuse these platforms.

The survey shows that TikTok app has been successful to keep the target category of the people happy. A considerably big share of people has had unsatisfactory experiences, nevertheless it has not stopped them from using the service. TikTok has resulted to have better protective service than other applications; as many Facebook, Twitter and Tinder users have been targeted and experienced unpleasant incidents.

It is considerable that TikTok platform is majorly used on phone or tablet, which may show nuances of the future of the hardware. However, TikTok videos tend to be funny and harmless, parents found multiple security gaps in the app (Ucciferri, 2020). The latter problem has not appeared for the first time on TikTok. Parents have always found new technologies and platform challenging and possibly for their children. TikTok has been fined millions of dollars in the United States, but has never had as many as problems Facebook and Twitter have (Ucciferri, 2020).

TikTok looks to be a problem for the parents more than the users. It might be derived form the very heterogenous digital literacy. To be fair, accepting how challenging new technologies can be, older generation training can help the problem to be treated better. While social media are growing more important through the time and social interaction inevitable, the safe use should also be considered in the educational system. The standard education in primary school that is used to prevent physical or mental abuse can accompany social media safety education.

A study in China was performed with the goal of exploring students’ point of view on using TikTok to learn English language outside the physical classroom. Questionaries were uploaded, so the 187 volunteer students from the secondary school could reach and fill in them. These questionaries were designed for a quantitative evaluation. The results showed that the students were positive about using TikTok as video supplementary material, in English

classroom teaching. They held also a positive position about using it outside the classroom. Further, they agreed upon getting help from their teachers to use TikTok better. (Gupta, 2020)

Four main purposes are considered for social media: entertainment, socialization, informativeness and academic use (Gupta & Bashir, 2020). The latter use has been gradually but constantly growing during the recent years, like TikTok was the second popular network to share language learning videos on in 2019 (Gupta and Bashir, 2020).. Although numerous studies have been performed on using social media as a learning platform, relatively few studies were carried out on how helpful TikTok can be on teaching English as a foreign language (EFL). This is why this study took place, aiming to look into the perception of secondary school students using TikTok for learning English inside and outside the classroom.

The main questions of this study were:

- What are the advantages and disadvantages of using TikTok to learn English outside the classroom in students' eyes?
- What ideas and perspective do students have of using TikTok to learn English outside the classroom?

2.8.2 Theory base:

Described as the use of mobile devices to support language learning, MALL can be seen either as a mobile learning specialization, mLearning, (Viberg & Grönlund, 2012) or a separate area that shares some commonalities with computer-assisted language learning (CALL) and mLearning (Stockwell & Hubbard, 2013). The key characteristics of mobile devices, such as portability, interactivity, accessibility and context sensitivity (Mishan, 2005; Klopfer et al, 2002); Gangaiamaran & Pasupathi 2017), which define the characteristics of MALL, have been concluded to be ubiquitous, accessible, instant, interactive and educational activities (Ogata & Yano, 2005)

MALL offers both language teachers and learners with full opportunities to make language learning happen without time and position constraints and to access ample English learning materials and tools using their mobile devices such as smartphones, pads, MP3, MP4, and so on. Furthermore, a lot of research has shown that MALL can be used to develop the vocabulary, hearing, reading and other English language skills of learners (Miangah & Nezarat, 2012).

2.8.3 Language learning outside the classroom:

As for the concept of language leaning strategies, the taxonomy of Oxford (Ehrman & Oxford, 1990), which divided language learning strategies into direct strategies and indirect strategies, has been commonly adopted. In specific, direct strategies include recall strategies, cognitive strategies and reward strategies, while metacognitive strategies, affective strategies and relational strategies are indirect strategies. According to the selection of various techniques, learners' willingness to study, attitude towards language learning, and years of learning have been shown to affect the preference of language learning strategies for learners (Sedighi & Zarafshan, 2006).

This query's findings revealed that 128 participants (68.45 percent) favored videos based on authenticity; 17 participants (9.09 percent) wanted videos focused on demand, while 42 participants, corresponding to 22.46 percent, preferred videos centered on the test.

The distribution of English teaching videos favored by participants in various grades on Tik Tok was seen in table 5. The findings revealed that participants chose the authenticity-centered video from six grades as the most common one. This may be a consequence of using more authenticity-centered English videos as external educational materials in class for EFL students.

In comparison, respondents from eighth grade to twelfth grade considered the demand-centered video as the least welcome one, with the exception of participants from seventh grade, who claimed that the least popular English teaching videos on Tik Tok were exam-centered videos.

2.8.4 Implications and recommendations

The study's findings suggest that most people have optimistic attitudes towards Using TikTok in and outside the EFL classroom for English learning.

In specific, participants were required to use Tik Tok's short English-teaching videos to develop their English skills, especially their listening, vocabulary and speaking skills. Participants favored authenticity-centered videos among the three key styles of English teaching videos on TikTok.

Most participants felt that cultivating and improving English learning interests were the revealing advantages when it came to the advantages and faults of using Tik Tok for English learning. In contrast, the fractured knowledge structure was the key flaw of using Tik Tok for English learning. Most participants accepted that systematicity was the prevailing advantage of in-class English textbooks relative to using Tik Tok to learn English, which may help students improve their knowledge base and create a systematic knowledge structure. In the meantime, the key faults of using textbooks for English lessons were limited learning resources and static

teaching content, since they were not conducive to the cultivation of learning interests and promoting knowledge.

In addition, the vast majority of participants decided to incorporate the TikTok social media program into the EFL classroom as video aids because TikTok was able to enhance their expectations and encouragement for in-class English learning, strengthen teaching practices in the classroom and extend their knowledge of English.

In addition, as an English learning technique, most of the participants were able to use Tik Tok to learn English outside the classroom. At the same time, they shared their deep desire for advice from teachers about effectively using Tik Tok for out-of-class English learning.

2.8.5 Summary

Advanced Web 2.0 technologies and the widespread use of mobile devices enable social media apps to significantly affect English learning in and beyond the language classroom. This thesis examined 187 Chinese high school students' experiences using a social media program called Tik Tok for English learning in and outside the classroom. The study's findings showed that considering grade gaps, the vast majority of EFL secondary school learners had good attitudes towards learning English in and out of class using Tik Tok. Tik Tok can be used as supplemental video aids in the EFL classroom to complement conventional in-class English instruction, enrich classroom practices, increase their enthusiasm for learning, and develop their basic English skills. Tik Tok can be used as an English learning strategy outside of class to extend students' English literacy, obtain access to ample genuine learning resources, and develop their English learning interests.

Despite the positive impact of using Tik Tok for English learning, students from secondary schools have voiced their reservations that EFL teachers need to help and direct them. Furthermore, based on this study's results, realistic guidelines for EFL professors, students, and the Tik Tok network's program managers have been suggested. This report has certain drawbacks. Second, it is not big enough for the sample results. Second, this analysis lacks tests to validate the results of using Tik Tok to boost students' English learning performance. Experiments as methods should be used in future experiments and survey data extended to make study findings more representative and relevant.

Part III – Learning Strategies

3.1 VR and AR in education

From a technical viewpoint, virtual reality generates the illusion that you are in a different environment. In a dream, it is like being there. With 360° views, virtual reality will immerse us in totally new, synthetic worlds. It substitutes a virtual one for the real world, integrating sensory input, primarily auditory, visual, and haptic. Imagine being able to move students with learning disabilities who, without leaving the school, just happen to be in wheelchairs to anywhere in the world. Do you think your students may have dreamed of visiting Disneyland and never considered it possible to experience rides? Have they ever wanted dolphins to play?

Have you ever wanted your students to see what a volcano is like on a more academic level as you teach them about volcanoes? Giving the students first-hand experience will not generally be very comfortable or within the budget. It is now possible for them to witness, via VR's power, a Super Volcano in Yellowstone National Park in America. Instead of trying to get visual learners to know how the body works, they can now navigate the human body to learn about it. Virtual reality makes this all doable.

VR can and must be incorporated into work schemes and integrated into curriculum areas so that ignorance does not harm the effect of its use. As a learning instrument, it should be prepared and used. VR may also be used to improve the mental health of students. Children can face phobias and concerns about real-world circumstances with learning disabilities. Parents and teachers must know how to plan for such events for students with a learning disability.

Students with learning issues also have to resolve learning difficulties, such as emotional chaos. How much did a parent with autism of a young child stand by as their child melts helplessly in a store, at a road crossing, on a train?

VR can also carry you, with or without superpowers, to the Dinosaur Era, to the Moon, or the DC Comic Universe. It is the means of bringing you to a magical world of make-belief waiting to be discovered and playing a part for you, generating an experience that in ordinary physical life is not possible. The ability to reach the VR universe could well have been enjoyed by Robert Louis Stevenson, who wrote The Land of Counterpane1 in 1885, referring to his childhood imaginings when bedridden.

Jaron Lanier coined the word "virtual reality" in 1987 during intense research activity on this type of technology. Although other researchers were involved in NASA VR science, until 1989, virtual reality was not introduced to the general public.

Technology is ever-present in this day and age, where our homes are fuelled by broadband, and gaming is considered an Olympic sport due to its success; schools should use this fascination to reach and educate students.

In schools, VR helps students imagine abstract ideas and visit environments, and engage with inaccessible activities due to distance, time, or security factors. For example, virtual language labs allow learners to have a conversation without leaving the room with a native speaker. In contrast, virtual science labs allow students to experiment without open flames or toxic chemicals. For the Daydream platform, which universities and colleges have embraced, Google and Labster have created several immersive lab experiences. Students can access these online virtual labs at any time and as many times as they need to.

Google Arts and Culture6 use immersive media such as VR tours to help preserve and render art available worldwide to give students in schools (and the general public) access to great classroom works of art. With Google Arts and Culture, at least 1,500 museums from over 70 countries have collaborated to bring their collections online.

We also discovered that virtual reality could help alleviate anxieties and train students for the circumstances they dread most in real life. The immersive atmosphere in the room is very real. It allows students to witness uncomfortable situations that they sometimes encounter during their everyday lives and play them out. VR helps students, as if they were already present in that setting or location, to explore and discover situations.

We have discovered that students who experience virtual reality can conduct specific tasks with substantially enhanced confidence. We also found the influence of virtual reality on students' ability to cope as real-life functional changes have led to functions that were not previously feasible in a fight or flight situation. This has had a significant effect on students' ability to learn, their well-being, and their participation. The effect is qualitative sometimes, and it is quantitative sometimes. If learners are given a chance to immerse themselves in the situation they are attempting to understand and learn from, learning is qualitatively and quantitatively easier.

3.1.1 Virtual classrooms

Several countries are now benefiting from virtual classrooms all over the world. The School of the Air in Australia connects urban teachers with children wherever they are in their homes. With 120 students spread over 1 million square kilometers of central Australia (ASSOA, 2018), Alice Springs has the world's largest classroom operating since 1951. Teachers would post workouts by mail in Australia in the past, and students would post responses back.

It could take them weeks to figure out what they have done well and what can be changed. Australia moved to the computer and video-based teaching in the early 2000s. In Australia today, families will enroll their offspring in virtual schools. This is often referred to as online learning, cloud-based learning, or e-learning.

Sometimes, students in a virtual school can only see the instructor until the teacher clicks on a specific student's video stream. When teachers click on their link and broadcast it via the teacher feed, students can only see each other.

Web conferencing software is used by other virtual schools, allowing you to see your classmates as you log in. This allows for online synchronous provision. There is a chat icon on everyone's screen that facilitates a continuous stream of feedback, questions, and answers. Lesson material occupies the remainder of the screen. Depending on school funds, students in virtual classes will have the same access to VR learning methods as other ordinary classes.

Via several interactive learning aids, teachers remain involved with the students. Breakout rooms are used in some virtual schools for groups of students to work together on a project before presenting it to the whole class later. In simulated schools, behavior-related concerns are minimized.

Among other items, Dropbox, Google Drive, and Microsoft SkyDrive will make essential documents accessible in seconds to students and teachers. Assignments may be submitted by email or posted to Internet clouds to allow learners to receive instant feedback. In several countries around the globe, virtual schools exist. In America, for example, in 2017, a study released by the National Education Policy Center of the University of Colorado had over a quarter of a million students enrolled in 528 full-time virtual schools in the United States.

Educational funding is a worldwide issue, but by using the same technology, virtual schools can share a plan and share a teacher. For the governments concerned, this is cost-effective and gives learners the freedom to help the family business for part of the day and research when it fits. It also saves travel and living expenses for families. Some virtual classes schedule actual meetings a few times a year in the real world so that students who work together online get

the chance to develop virtual learning experience. Artificial intelligence advances have contributed to a boom in online learning.

Free online platforms such as Massive Open Online Courses (MOOCs) and the Massachusetts Institute of Technology (MIT) are still popular in remote parts of the globe, offering graduate and undergraduate free online courses. MIT is leading online programs to help businesses that foster manufacturing in the twenty-first century.

3.1.2 Immersive learning experiences

Second life's (SL) common news, a virtual social world, has helped to illustrate the more general use of immersive environments to encourage a range of human experiences and interactions, offering a wealth of new possibilities and obstacles to enrich how we learn (e.g., Boulos et al, 2007; Prasolova-Førland et al, 2006), as well as how we work and play. In this way, SL has opened up the opportunity for users and learners, instructors and trainers, policymakers and decision-makers to easily interact in interactive three-dimensional (3D) environments regardless of distance in real-time, in combination with other virtual world applications.

The learner or user's involvement as an 'avatar' in the virtual space is at the center of interactive experiences. This avatar reflects the user's embodiment in the virtual space. It promotes a greater sense of control in the immersive environments, enabling users to interact with the encounters more effectively as they unfold in real-time (Gazzard, 2009).

Via Web-based technologies and software and growing broadband access and computer graphics capabilities, the more general use of virtual environments in recent years has been greatly facilitated. Together, these allow a variety of educational and training options, including the exchanging of documents and files, the holding of meetings and activities, the networking and hosting of virtual workshops, lectures, and conferences, the conduct of research studies, the provision of forums to discuss research results and meetings with foreign colleagues (de Freitas, 2008).

Via supporting social software applications (e.g., Facebook, Flickr, and Wikipedia), providing e-learning materials and content, and offering student games and rich social experiences, such applications often have an even greater capacity for incorporating various technologies. In addition, custom online virtual platforms were also built mainly for educational and learning purposes, mainly from universities and research institutes (e.g., Liarokapis et al, 2002; Liarokapis et al., 2004). These are more experimental prototypes that generally use advanced

projection (head-mounted screens, stereoscopic displays), interaction (3D mouse, orientation, and location sensors), as well as haptics (gloves) for dedicated hardware devices.

3.1.3 Transmedia storytelling in Alternate Reality Games

Alternate Reality Games are playful and collaborative narrative experiences that take place in an alternate reality where everything that happens in the game does not have the appearance of a game.

They are an articulated form of transmedia storytelling: they are narratives that use in a complementary and coordinated way more media to tell a story. In the Alternate Reality Game the experience is immersive, experienced in the first person by the player in his daily reality and co-built in real time with the storytellers (Jenkins 2007; Mcgonigal 2008; Rose 2013).

Alternate Reality Games are played partly online, through social media, websites, messengers, and partly offline, through clues hidden in the territory, performances, artifacts and diegetic objects.

In most cases, as we said, it is planned to activate collaborative dynamics between players, who are called to find clues, decode puzzles and exchange information, activating forms of collective intelligence (Lévy, 1994) with the aim of reconstructing a fragmented and dispersed narrative, of which they themselves are protagonists.

Born as a promotional and marketing strategy (think of “I Love Bees” (2004), "The Lost Experience" (2006), "Cloverfield" and "Why So Serious" (2008), Alternate Reality Games are increasingly used as facilitators of public involvement in social communication campaigns, promotion of heritage and cultural activities, and as a education tool (Milanesi & Morreale, 2020).

The Alternate Reality Game is a role-playing game that allows participants to interact within an alternate reality: playfulness as a motivational and involvement factor facilitates the start of collaborative and competitive activities that bring out the dynamics of the group and teamwork (Milanesi & Morreale, 2020).

The Alternate Reality Game works as a role playing in a fictional world, within which it is possible to reconstruct dramaturgically critical situations that participants face in real contexts. In addition, the Alternate Reality Game uses traceable online communication and collaboration spaces available for subsequent analysis of relational processes. Facebook profile boards, social pages and messenger are places where participants interact with each other and with

storytellers, and represent a track for the discussion of communicative processes, mechanisms and the dynamics that come into play in a community of practice that communicates in a mixed way (with or within technologies) (Milanesi & Morreale, 2020).

3.2 Digital game-based learning

To understand modern games (computer games or video games) It helps take a step back first and realize what is actually defined by game in general. However, it is extremely difficult to describe games.

Games form a 'magical circle' for Huizinga (1955), an early games theorist, which distinguishes the experience from that of the physical world, while games are light-hearted, non-productive tasks for Caillois (1962), which are bound in time and place and have unknown consequences.

However, according to the philosopher Wittgenstein (1968), it is not necessarily possible to describe a game precisely without any games falling within that description. Instead, since they have certain "family similarities," he suggests that games can be understood as things that are "recognized as games."

Here, based on the approach of Wittgenstein, the family parallels of computer games will be taken to include the following, all applied in a digital technology: simulated make-believe environments, rules of play (limitations and constraints), effort-intensive activities, unique goals and targets, input from actions, scored outcomes, virtual or actual competition, lack of implications for the consequences of the action.

One reason why interactive games are sometimes used to promote learning is that they are so popular. Surveys have repeatedly shown that computer games are played by about 90 percent of children (Lenhart et al., 2015). However, the success of computer gaming shouldn't be believed to be universal. Some figures for the number of kids playing digital games are based on them doing so for as little as one hour per month (Macchiarella, 2013), while other studies have shown that some children often prefer other activities, like playing with friends outside or building with 'Lego' bricks; digital games are fun but not that important for those kids (Holmes, 2011).

For at least 35 years, DGBL, also known as instructional games, learning games, or serious games, has focused on scholarly research, with Thomas Malone's Ph.D. thesis,' What makes learning fun? A review of fundamentally motivational video games.' (1980) , also cited as one of the first scholarly research. Since then, several thousands of articles have been conducted, and several systematic analyses (Boyle et al. 2016).

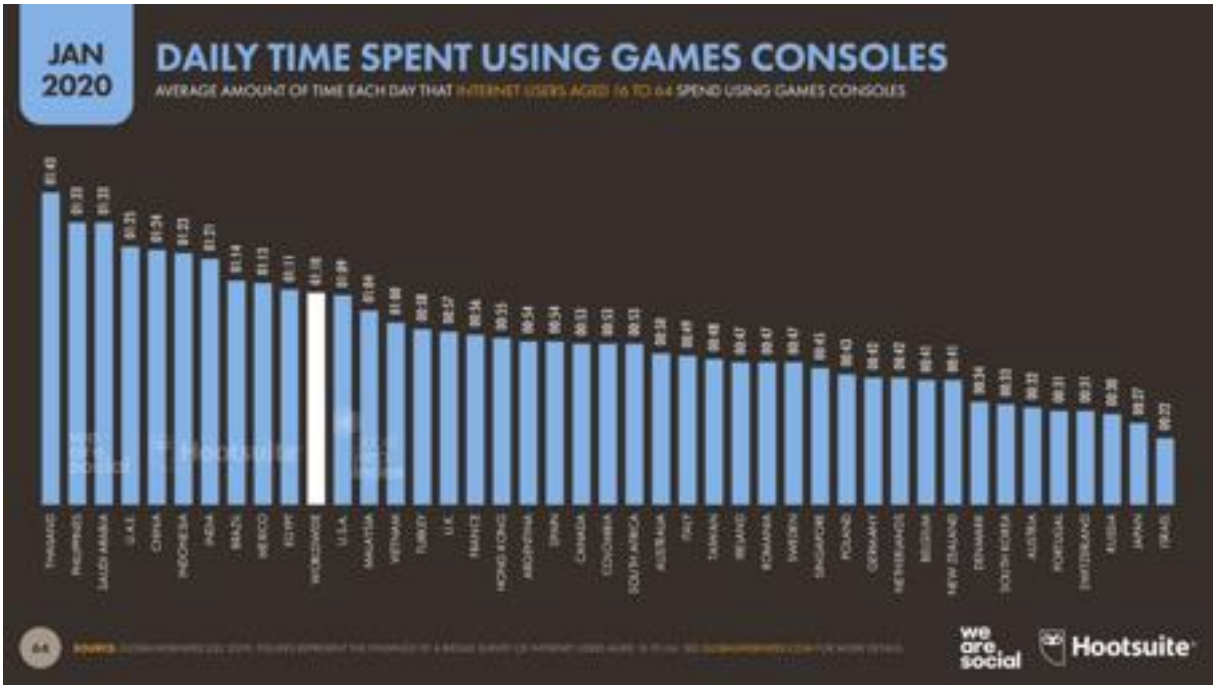


Figure 9: Daily time spent using games consoles. (Hootsuite 2020)

Furthermore, a casual examination of children playing games leads to the confusion that they are most often practicing as they do so. For several, children's play is a fundamentally constructivist experience; the proto-natural type of learning and learning is playful implicitly (Bruner, 1960). Digital entertainment games are themselves 'learning machines' for Gee (1999), and their prototypes contain different fundamental learning concepts. This learning may be as easy as understanding how to use the game controller to move a player around the game's simulated environment. It could include learning about the benefits and drawbacks of teamwork, either with in-game avatars Alternatively, with actual individuals in shared game worlds, or learning fine visual/motor control and quicker decision-making. "While this learning "can be more unintentional than deliberate, wider than profound... it nonetheless constitutes learning" (Facer et al. 2003).

DGBL typically attempts to expand on and go past these pillars to discuss learning targets that are more useful with formal education standards and are frequently associated with them. The mechanics of computer games designed for gaming was modified and implemented for educational purposes. For example, digital games can enable the player to try a new concept or improve acquired behavior by reacting directly to the player's feedback, encouraging them to take action and influence outcomes. They can also be programmed to conform to the individual's skills and desires, just as teachers do, raising the difficulty for players who move

quickly through the gameplay, minimizing idly. Digital gaming environments can also be built to replicate and make the real world's features protected or usable (for example, the inside of a volcano), offering learners a more immersive experience than books or other media can offer. Players must 'experience' items in genuine game worlds, rather than only reading about or viewing them, set in a fictional universe that relates to their real lives somewhere.

The analysis of Yu-Kai Chou, pioneer of topic, illustrates the key principles (core drive) of gamification and brings them together in the theory "Octalysis" (Petruzzi 2015):

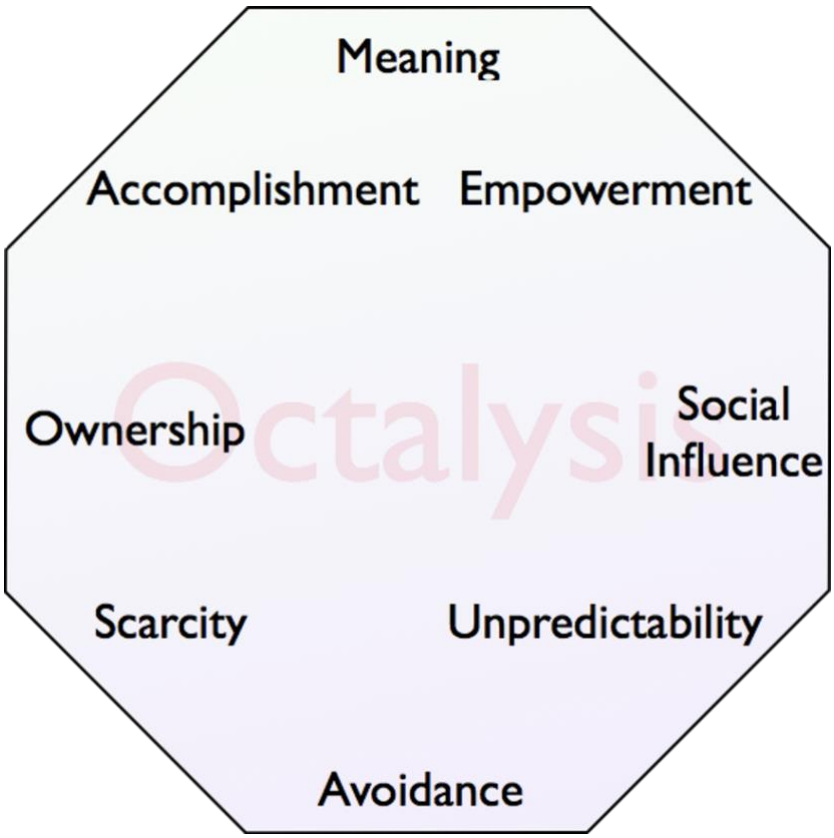


Figure 10:: Octalysis. (Kwon 2018)

EPIC MEANING & CALLING: represents the desire to participate in something greater than ourselves, to be called to a mission for the creation of a collective good. This element is exploited in the game through the so-called "epic narrative", so there is often a princess to save or a fearsome villain who wants to destroy the planet. To give a more subtle example of the application of the epic sense, think of Wikipedia: many people work to create pages of information without perceiving any gain, just for the pleasure of knowing that it will be read and considered a "source of wisdom" by millions of people.

DEVELOPMENT & ACCOMPLISHMENT (progress): it is the innate instinct that pushes us to ask ourselves the challenges and the objectives of increasing difficulty. This need in the game is met by mechanisms such as points, credits, badges, bonuses, leaderboards, progress bars (progression bars), challenges and missions.

EMPOWERMENT & FEEDBACK (self-expression): is the tendency to creativity, experimentation and customization (an example in game of self-expression are LEGO). In addition, the self-expression produces in us a need to receive feedback (feedback) from third parties.

OWNERSHIP & POSSESSION: represents individual's need to jealously guard what he/she possesses, to make it better and more beautiful, to increase his heritage. The game has exploited all this with virtual goods, which are often not usable in the real world but give us a feeling of wealth.

SOCIAL INFLUENCE & RELATEDNESS (relationality): these elements are the cooperative and competitive mechanics that act within a social system and that are applied in social games, ie in those games that provide interaction between friends: challenges, help and gifts in bonuses. In this type of game mechanisms such as group missions and virality are implemented (it consists in increasing their success in the game by inviting the largest number of people to participate).

SCARCITY & IMPATIENCE: it is based on the principle that the more a resource is scarce, the more the asset becomes valuable. Games apply time scarcity by implementing countdowns (countdowns) and appointments (temporally defined moments in which you may have advantages in the game).

UNPREDICTABILITY & CURIOSITY: when we do not know what is going to happen our curiosity pushes us to become impatient and this fact is exploited by the game through random bonuses or "easter egg" (they are "easter eggs" hidden by game developers) that generate surprise and push the user to continue the game.

LOSS & AVOIDANCE (fear of loss): it is the push that leads us to avoid defeat and is connected to the concept of opportunity that, once presented to us, we are led to immediately seize for fear of losing it and not to have more. A glaring example of application of this core drive in the game is the purchase, through real money, extra lives.

All core drives push us to certain behaviors: progress, possession, scarcity and fear of loss are clearly levers of a rational type because they concern much more logic and calculation and

represent extrinsic motivations; self-expression, epic sense, Relationality and unpredictability instead relate to the irrational and emotional sphere and represent intrinsic motivations.

Another explanation for promoting computer games as candidate learning technologies is that they can be incredibly empowering. Many potential motivational pathways (Iacovides et al, 2011) have been established, often distinguishing between 'intrinsic and extrinsic motivation. Digital games can deliver convincing plots and dramatic tensions at an underlying level, using immersive experiences, high-quality graphics, and sounds. Some often offer ideal challenges, choice over actions and priorities, sensitive and fast feedback, and an escape from an alternate world. It can also be fun to play computer games because it provides opportunities to learn new knowledge and develop new talents and abilities. When acts lead to outcomes, they may lead to a sense of accomplishment, superiority, empowerment, and improved self-esteem. The satisfaction derived by over-coming adversity is of special importance, switching from the negative emotions of anger or confusion to the happy emotions of success as a gaming challenge is resolved.

DGBL also claims to take this one step further. Digital games are nominee learning technologies because it is claimed that encouragement to communicate with the game (e.g., Hoffman and Nadelson 2010) almost certainly contributes to learning. This argument has been questioned elsewhere. While Whitton (2007), for instance, did not find any proof of a link between the enjoyment of entertainment games and learning support games, participants of Calvo-Ferrer (2016). In short, the relationship between DGBL, encouragement, and learning is complicated, such that the potential of games to inspire learners alone is inadequate to explain their widespread use in classrooms.

Instead, in the broadest context, rather than just their capacity to inspire, the effect of the games on the learning of the pupil should be prioritized.

Several explanations for DGBL's unfulfilled pledge have been proposed, not least the fact that some remain controversial with the use of digital games to facilitate structured learning (Bourgonjon et al., 2013). Although, as has been noted, some have called for a game-based revolution in educational practices, others have dismissed the notion that digital games can play a role in the classroom, fearing that In any case, it can be difficult to locate games that discuss the desired learning results of current curricula (while not being weighed down by unrelated or unacceptable content or gameplay) and that appeal to the various desires of the students who are invited to play the game whether they function in predominant instructional environments rather than seeking to undermine them radically. There is a need for robust facilities, laptops and likely internet connectivity, and technological assistance and contingency measures (alternative classroom activities) for when mid-class equipment ceases operating, both of which

will also influence school budgets. Teachers are often unfamiliar with how DGBL works or may be used to facilitate learning (Takeuchi and Vaala 2014) and can also benefit from proper technical preparation, which has significant expense consequences again. They would need opportunities to get acquainted with the game in question, for each game is different, so learning will be influenced differently.

Teachers will be assured that the game performs as it promises to do. This means that assessments must go beyond the simplistic and all too frequently incorrectly designed quasi-experiments that appear to underestimate the influence of the novelty of the DGBL in the classroom and overestimate its efficacy (inevitable advice of evaluations performed by researchers/developers, known as super-realistic evaluations). Instead, smart tests should take into consideration all the reasons why a game can or may not be effective in a given classroom, as well as what 'effective' really entails in this sense. In any event, regardless of how successful the game is if no substantial advantage is perceived if teachers do not feel that it will decrease their everyday workload or increase student learning if they feel that it will impair or weaken their normal teaching in the classroom, or if they are not secure in its pedagogical value, it is unlikely that DGBL will become a part of standard teaching practices.

Meanwhile,' learning,' which is, after all, the main goal, appears to be interpreted in simplistic terms by many DGBL developers. DGBL scholars and developers all too frequently believe that their own learning experiences and their limited understanding of certain buzzwords of education philosophy or psychology (such as Vygotsky's 'proximal growth zone,' 1978; or Csikszentmihályi's 'flow' theory, 1997) are enough to guide their approach to pedagogy rather than relying on learning sciences or education research. Perhaps since digital game players and app developers are typically excited, they too often prefer to concentrate on gaming and software creation, those facets of DGBL that they might find fascinating. In contrast, learning is more or less taken for granted. In any event, the rich history of learning sciences and education research is widely overlooked. In contrast, learning is mistaken as a relatively unchanging practice through individuals, subject areas, and educational goals (Dede, 2011).

And in realms beyond sports, even in school, good video games have a lot to tell us about promoting learning (Gee, 2003). Complex, difficult, and long are good video games; they can take 50 or more hours to finish.

Commercial designers and designers of non-entertainment games for learning have recognized that both game participation and learning are improved in groups organized around an interest in the game by creating social engagement inside and outside a game (Salen & Zimmerman, 2003).

If it is not possible to learn a game well, so it will not sell well, and the business that makes it is in danger of going broke. As most ardent players do not want fast or simple games, shortening, and dumbing games down is not a choice. Therefore, good games ought to implement good learning values by virtue of which they are well learned if only to sell well. Game designers build on each other's accomplishments, and good games represent even better and better learning concepts in a sort of Darwinian process.

To experts in the learning sciences, the learning concepts that good games implement are by no means obscure. Current research on learning supports the kinds of learning principles used by successful games. However, these principles are often exemplified in especially striking ways in games (see Gee 2003 for a survey and literature citations). Though, many of these values are much more expressed in good games than they are in schools today, we often challenge young people to learn complicated and difficult things. With the present return to skill-and-drill and curricula guided by standardized tests in our schools, good learning values have progressively been left on the cognitive scientist's laboratory bench, and it’s argued, inside a good computer and video games.

Game design requires modeling human experiences, including learning processes as part and parcel of these interactions, with and within complex virtual worlds. In fact, this is not unlike design research in educational psychology in which researchers model new types of interaction linked to classroom learning (in fact, complex worlds), study those interactions to better understand how and why they contribute to deep learning, and then gradually disseminate them through a large number of classrooms (see, for example, the chapters in Kelly 2003).

Shooters (e.g., Deus Ex, Return to Castle Wolfenstein, Unreal II: The Awakening), squad-based shooters (e.g., Tom Clancy's Ghost Recon, Operation Flashpoint: Cold War Crisis), adventure games (e.g., The Longest Journey, Siberia), simulations (e.g., The Sims, SimCity 4, Black and White), role-playing games (e.g., Baldur's Gate II: Shadow II) are many different types of computer and video games.

This chapter examines real-time strategy games such as Rise of Nations. As "RTS games," I will apply to real-time strategy games and as "RoN" to Rise of Nations.

Among the most complex and challenging computer and video games are RTS games. Players play a civilization of their choice in such games, a civilization for which they must make a multitude of choices. They send their people to collect resources (e.g., food, wood, minerals, gold) and to build domestic and military buildings, and participate in various types of study using these resources. They will train soldiers and other types of individuals in these buildings (e.g., officials, priests, scientists, and/or professors), as well as construct military and other types of

apparatus. They will progress to various ages as they gather and build, enabling their culture to reach higher levels of complexity and sophistication. They have to go to war against other civilizations or participate in diplomacy all the time.

This is all done in real-time. While the player constructs his or her community, other players (or the machine representing other players) are also constructing theirs. Players are expected to determine when to strike or participate in diplomacy. Victory will come to the swift: that is, to those who strike early (a 'rushing' strategy) or the players who wait and patiently build-up (a 'turtling' strategy).

RoN (along with such outstanding games as Civilization III, StarCraft, WarCraft III: Reign of Chaos, and Age of Mythology) is one of the most successful RTS games ever made. RoN enables the player to play one of 18 cultures, each with various advantages and disadvantages (e.g., Aztecs, Bantu, British, Chinese, Egyptians, Maya, Nubians, Russians, Spanish). The player can compete against one or seven opponents (other actual individuals or other civilizations playing on the computer). From the Ancient Age to the Information Age, players can travel through eight ages through different intervening ages, such as the Medieval Age, the Gunpowder Age, and the Enlightenment Age. RoN includes players learning well over a hundred different commands, each related to decisions that need to be taken, like all RTS games, as they pass through a multitude of different menus (there are 102 commands on the abridged list that are written on a small sheet with the game enclosed). In addition, if they are to keep up with professional opponents who are building up as they are, players must work at top speed. RoN needs a lot of micro-management and decision-making under the pressure of time.

Some games are well built to be learned by themselves. So, when we say it was too difficult," what we really mean is that we have struggled to deal with it in a manner that has completely recruited its solid concepts of design and learning. Good games are never really "too difficult." For certain players, they fail, either because their programmers did not use good learning principles or because, for one reason or another, players have failed to participate in the good learning principles incorporated into the games. So, something has to come even before the ideals of good learning. The motivation for extended interaction with the game is what has to come before. No profound learning of a complex domain may occur without a dedication to an extended engagement. (2000 di Sessa)

In providing an incentive for prolonged participation, computers and video games have a built-in benefit. Human beings believe that their bodies and minds spread to the environment around them in a very intimate way over which they have direct influence, typically a fairly limited area (Clark, 2003).

When humans are able to manipulate anything at a distance, such as manipulating a distant robot seen on a computer with a keyboard, they get an odd sensation that their minds and bodies have been greatly expanded (Clark, 2003) (Goldberg, 2001). When individuals play a computer or video game, they control a character in a very fine-grained manner at a distance, a virtual distance in this case. They believe that this virtual world has been expanded into their minds and bodies. This process seems to enable players to identify strongly with the virtual characters or characters they play in a game and to be strongly motivated to commit themselves with their help to the virtual world that the game is creating.

When learners develop a new skill set/strategy, in order to make it work at an almost unconscious routine stage, they need to practice it over and over in different contexts. They're pretty good at it then. But they also threaten to sit on their laurels and learn nothing new. A good game throws a problem at the player at this point, where the routinized skillset/strategy will not work. This forces the player to think about talents that have become unconscious, taken-for-granted, and routine consciously once again. The player must incorporate with new ones his or her old abilities, forming a new and higher skill set/strategy.

Now, in turn, once it is routine, the game will allow this new skill set/strategy to be practiced. The player has advanced to a new level of competence and will ultimately face an even more challenging issue that will start the process all over again. Good games thus cycle through times when they operate at the outer edge of the competence of the player (but within) and times when they allow players to consolidate their abilities. The times when players consolidate their abilities to the point of routine and taken-for-granted application give rise to the pleasure of mastery, another form of pleasure. A cycle of storm and calm, games cycle through periods of pleasurable frustration and routine mastery.

This domain can be seen as a special world where learners learn a content area in school, such as some field of science: the world of science in a certain method and acting with respecting values. Students could be encouraged to build identities of a certain kind as scientists, to see and think in new ways about themselves and their taken-for-granted daily world. In this case, the school would function more like a good game than traditional schooling, which stresses knowledge apart from action and identity.

The numerous practical challenges of successfully incorporating DGBL in classrooms have already been listed. An often forgotten problem, however, still needs to be tackled. Although classrooms are essentially social environments, DGBL is all too often intended to engage students as separate individuals. Each student typically sits on their own digital screen (desktop, laptop, or tablet), plays their own limited digital game (there are relatively few multiplayer

DGBLs), and while there is often a hubbub in the classroom, it is unclear whether or how these broken and unstructured conversations contribute to the learning of the student.

In short, the game developer concentrated on the program and did not thoroughly address the social dynamics that could arise around the game, what was considered the 'affinity room' of the game (Gee, 2004), and did not exploit significant socio-constructivist learning opportunities. Indeed, research into a prototype platform game designed to be played by individual children (who were low-attained in mathematics) had shown that the game was most useful when it was also a focal point for social interaction between children and between children and adults (Holmes, 2013) in addition to encouraging individual learning. Those kids who sat next to each other as they played talked about what they were trying to accomplish in the game, shared gameplay hints and debated how best to react to the mathematical issues. In other words, the game helped children to develop and strengthen their own mathematical understanding by promoting a discussion about the mathematics embedded in the game and by providing a pedagogically stable scaffold for that conversation. Their cooperation and discussions around the game also offered opportunities for adults to identify specific needs in order to provide effective and timely guidance.

Gee (2011) formalizes the difference between the software game, what he refers to as the 'small game,' and the social interaction environment in which players participate around the game, what he refers to as the 'Big Game.' This meta-level provides opportunities for the peer discussion, links to other components of the lesson being taught, and experiences that reach beyond the classroom. The point is that while well-designed 'small game' interactions involving solving complex issues can contribute to learning, the ‘Big G Game’ acts as a force multiplier on the impact potential of restricted gameplay experiments' (Barab et al. 2013), leading to deeper learning and improving the transition of that learning to the broader context. While developers all too often concentrate solely on the individual bounded 'game' therefore it is, in fact, the entire meta-level 'Game' that must be taken into account when designing, implementing, or assessing the impact of DGBL.

The previously described DGBL,' The Taiga River Mystery,' created over more than a decade (Barab et al. 2013), exemplifies a 'Big Game' approach. 'Taiga River' includes a learning platform outside the game itself, on which the game is hosted and which links multiple games together to provide a learning journey, a data and analytics dashboard to enable teachers and students to inspect and learn from their learning paths, features of the social network that could allow discussion and reflection, and a gamification layer of careful de deletion. The 'small game' is contextualized by this 'Big G' infrastructure into a fluid space of affinity linked to the real world and extended beyond the classroom.

However, although The Taiga River Mystery' and its 'Big G' approach are self-evidently engaging and powerful, it is not without problems. To begin with, it took many thousands of hours of development time, and therefore it was probably relatively expensive, but it only addresses a very small part of the science curriculum (although the underlying game engine is structured so that the game can be changed for other areas of the curriculum). Implementation in classrooms can also be time-consuming. Teachers need to spend a few hours understanding both the 'game' and the 'game' and how they could best be used to complement their teaching and address their intended outcomes of learning. And a significant amount of student time can be required (learning how to play the game, the gameplay itself and the significant post-game debriefing, helping students return to other classroom learning), which can be out of balancing with the relative importance of this small area of the science curriculum.

As noted, DGBL games designed for the construction of information appear to be more engaging since they are more like interactive digital entertainment games, which is perhaps why researchers and developers also prefer games designed for organized practice. However, as has already been indicated, it is inadequate for robust learning to enable the construction of information on its own, and deliberate retrieval practice is also a prerequisite (Rummel et al., 2016). Robust learning requires 'in-depth, linked, and detailed knowledge of a domain that lasts over time accelerates potential learning and easily transfers to new circumstances' (Mazziotti et al, 2015). It includes three closely linked forms of information: factual knowledge (knowing 'what'), procedural knowledge (knowing 'how and conceptual knowledge (understanding 'why'); and it includes three closely linked processes: acquisition of knowledge and skills, accumulation and storage, and recall (for declarative knowledge, often conscious recall, and also unconscious recall, for skills).

The complex is the relationship between DGBL, motivation, and learning. However, some perspective is offered by the learning sciences. Cognitive neuroscience, for instance, indicates that the response of our brain to rewards in games increases when players are in the presence of their peers (Chein et al., 2011), referring to our earlier discussion of the social context's effect on DGBL. Furthermore, parallel research indicates that players actually react to the loss of a competitor as if it were their own benefit (Howard-Jones et al., 2010), which highlights the possible effect on enjoyment and self-efficacy of competition.

Motivation is correlated in the brain with the generation of dopamine, a neurotransmitter that also has learning connections. Within limits, the greater the incentive, the greater the motivational signal, and the greater the possible effect on learning. However, Howard-Jones (2011) explains that the anticipation of rewards may be as important or more important than the reward itself and that the use of unknown rewards, anticipated rewards that may or may

not be given depending on chance, actively can be counter-intuitively. This additional dopamine helps explain why unpredictable rewards can be appealing (a phenomenon not lost on popular digital game developers) and provide a potential neurobiological reason for our attraction to games that include an element of chance (consider, for example, sports fixtures where the teams are well-matched and thus the outcome is uncertain, which are generally much more entertaining). The expectation of an unknown reward is also likely to produce an extended window of increased focus, a timely educational moment during which students are particularly sensitive to encoding long-term memories that could be manipulated by the nature of DGBL or its use in classrooms (Holmes et al, 2013).

However, while the use of chance-based ambiguity in learning activities seems to be favored by children (Howard-Jones & Demetriou, 2009), the use of unpredictable incentives is contrary to a lot of educational experience. Teacher consistency appears to be respected in classrooms and other educational contexts, and unpredictable incentives are generally considered to be unreasonable and de-motivating, which is perhaps why chance-based or uncertain rewards are rarely featured in DGBL. Nevertheless, in response to chance, the research briefly reviewed here shows a strong correlation between increased motivation and improved deep learning so that researchers and developers can more often consider using uncertain rewards in DGBL.

Despite all of the research, activism, and hype over 35 years, DGBL remains relatively rare in schools, and it remains controversial for some to use interactive games to promote structured learning. Nonetheless, there are several instances of well-designed' DGBL that have been shown to help 'certain' aspects of learning in certain' contexts. However, as has been argued in this chapter, a better understanding of digital games, learning, and classroom activities in all their complexity are important if DGBL is to realize its demonstrable potential. For example, instead of prioritizing one to the exclusion of the other, researchers and developers need to consider merging core approaches to DGBL (games designed to support formal practice and games designed to support information construction). By collaborating with learning scientists, they need to draw on perspectives from the learning sciences and step beyond a simplistic understanding of what learning actually means and what circumstances help to learn better (for example, acknowledging the significance of retrieval practice and the effect of unpredictable rewards on learning). And if DGBL is to be used by teachers as a useful supplement to their normal teaching activities in addition to the 'tiny g' of educational games, DGBL designers and researchers also need to recognize and accomplish the 'Big G' (the affinity space and the classroom context). DGBL can only be widely accepted within two to three years once all that is in place.

3.3 Distance learning

The Italian education system has been the subject of a number of reforms and initiatives over the last 20 years, which, with the aim of improving its quality, have led to a progressive introduction of information and communication technologies (ICT) in our classrooms. The time of a priori discussions between proponents and detractors of the use of ICT in learning environments is now over (Ranieri, 2011). The acquisition of a mature critical awareness of the subject is now necessary for both the teacher and the political decision-maker. Given these premises, the question from which we want to start is: what do we know about the educational effectiveness of technologies in the school field?

A large number of studies on the subject have been produced within an evidence-based education (EBE), a research perspective engaged in producing, collecting, and disseminating reliable knowledge about the effectiveness of different educational options (Vivanet, 2014).

3.3.1 Analysis of empirical evidence - The meta-analysis of Hattie

One of the most cited works of EBE literature is that conducted by Hattie (2009), who developed a meta-analysis of over 800 other meta-analyses to detect factors influencing, whether positive or negative, the learning outcomes of students of school age.

His analysis focused on effectiveness factors related to six areas of influence: the student, the home environment; the school environment; the teacher; the curriculum; and teaching. Among the factors investigated, the following table summarizes the main data on directly attributable data the use of technologies.

Considering the threshold mentioned above of 0.40, we can immediately see that all the factors considered, with the exception of interactive video methods, are below this value (programmed instruction, audio-visual methods, web-based learning, and distance education show a near-zero ES, in other words, they would be almost irrelevant to student learning outcomes). These data, however, taken alone, are not very significant; a critical analysis of them, although reported below in extreme synthesis, brings out elements of greater interest for their interpretation.

With reference to interactive video methods (0.52), they are defined as a combination of computer-assisted instruction and video technologies for teaching. The meta-analyses considered have fairly homogeneous results, with ES between 0.41 and 0.65, and were published between 1980 and 1999. They summarize the outcomes of educational experiences that are very different from each other, some of which directly concern the use of video, other video games, illustrated material, hypermedia solutions, etc. (Table 4)

Position (*x* out of 138)	Elements	Number of meta-analyses	Number of studies	Number of subjects	ES
44°	Interactive video methods	6	441	4.800	0.52
71°	Computer-assisted instruction	81	4.875	3.990.028	0.37
82°	Simulations	9	361	n.a.	0.33
95°	Programmed instruction	7	464	n.a	0.24
104°	Audio-visual methods	6	359	2.760	0.22
112°	Web-based learning	3	45	22.554	0.18
126°	Distance education	13	839	4.024.638	0.09

Table 4. *Effectiveness of educational technology factors, according to Hattie (2009).*

3.4 Digital technologies and distance education during the pandemic emergency

With the coronavirus pandemic sweeping around the world, the future appears more uncertain than ever. Global infection and illness, population lockdowns, and mass closures of educational institutions have engulfed countries across the planet in a short period of time.

The global pandemic is, of course, not only a serious public health emergency but a political, economic, and social emergency too. Scholarship across myriad disciplines in years to come will examine the medical, political, economic, and social factors defining our present moment. Many of these issues will be of interest to readers of Learning, Media, and Technology. They include political maneuvering in relation to the pandemic, from misinformation and economic measures to policies of social distancing, quarantining, and isolation; the use and misuse of large-scale data, statistics, and visualizations; new forms of digitally mediated work, culture, and personal life;

In one key area, we feel Learning, Media, and Technology can and should make a more direct contribution to knowledge and practice during the COVID-19 pandemic: the switch to online and digital education formats and the rise of 'remote' forms of teaching and learning as a consequence of mass closures of schools, colleges, and universities. But the need remains for critical reflection on the planetary pivot to digitally mediated remote and distance education.

3.4.1 The political economy of pandemic pedagogy

A distinctive approach to pedagogy has emerged as a global norm in the opening months of 2020. Distance education, remote teaching, and online instruction are not new approaches to pedagogy or curriculum design, but they have taken on renewed salience.

Yet, at the same time, it appears clear that certain actors in the EdTech industry are treating the crisis as a business opportunity, with potentially long-term consequences for how public education is perceived and practiced long after the coronavirus has been brought under control.

The marketing of these products to teachers, by email and online on social media, has been intense, as the closure of schools and colleges has become an opportunity for the EdTech industry to prove its benefits, to extend its reach, and to grow market share.

Many of the world's largest and most successful technology businesses have also rapidly expanded their educational services, including Google, Microsoft, Amazon, and Zoom. Markets have long been a central concern of the global tech industry, but the pandemic may have presented it with remarkable business opportunities for profit-making, as well as enhanced influence over the practices of education.

In a recent special issue of Learning, Media and Technology, Hillman, Bergviken Rensfeldt, and Ivarsson (2020) speculated that education systems might become increasingly platform-based, especially those systems that already exhibit a high degree of decentralization. The 'platformisation of schooling', in a context where 'schooling as an institution has already been broken-up, decentralized and marketized', they argued, is already leading to a situation with little state governance where the dominant technical platforms are amongst few centralising powers uniting schools as a national school system' and 'global commercial platforms incorporated into public education risk challenging education as a public good' (Hillman et al, 2020).

Their political economy analysis of educational platformization (van Dijck et al 2018) suggests the need for serious caution regarding the expansion of EdTech and other platform companies during the coronavirus pandemic. At the present time, public education has been forcibly decentralized into students' own homes, largely disaggregated from the institutions and practices of education and instead repositioned as a form of homeschooling mediated by technology tools, edu-businesses, and other institutions.

The current state of 'pandemic pedagogy', in other words, may not be seen by some businesses as simply an emergency response to a public health and political crisis, but as a rapid prototype of education as a private service and an opportunity to recentralize decentralized systems through platforms.

Beyond simple market-making strategies, a range of coalitions and networks has formed to promote forms of online learning as both a short-term response to the pandemic and long-term ambition for whole education systems.

These snapshot examples indicate how the new pandemic politics, pedagogies, and practices of online education, remote teaching, and homeschooling have become embedded in political and economic contests. In many respects, the switch to online education around the world has been haphazard and chaotic in practice. Critical studies will need to locate these changes in the broader political economy of the COVID-19 pandemic, its antecedents, and long-term consequences.

3.4.2 Digital inequalities during the pandemic

Learning from the house is one of the ways recommended by all Nations during the COVID 19 pandemic. This type of Learning can be achieved using a Distance Learning system Electronic Learning, Online Learning, Virtual Teaching, etc (Mijwil, 2020)

Not all young people are the well connected, digitally savvy, 'digital natives' that the rhetoric around young people and technology would have us believe. Instead, there is significant variety in the ways that young people can access, navigate, and use the internet and other new technologies, with an important minority who are excluded entirely.

All young people should have the ability to access and skills to use technology effectively and safely to achieve their own goals (educational and otherwise). Yet, it is extremely hard to get such schemes right. Three common questions that such schemes have to address are:

What is an adequate level of digital access?

For example, do all children need their own devices? If not, how many young people could reasonably use the same device? What is the age group that such a scheme would impact the most? Is it a mobile sufficient, or do young people need a laptop for learning and education?

How can young people and their families be supported by technology in the home? Young people who do not have digital access at home are likely to have less digital skills than their peers, and it is likely that their parents and guardians also do not have strong sets of digital skills.

How can the longevity of the scheme be assured? In a rush to connect young people, quick fixes are being sought, where devices are to be borrowed, and internet connection provided free of charge for a short period of time. However, this uncertainty over ownership and responsibilities stymies use and often causes a great deal of stress as families feel under pressure to begin paying for the internet once the initial 'free' period is over.

It is crucial to consider how any access scheme connects with the broader plan for providing young people with distance education of quality. Schools have many roles and purposes, and pro- viding distance education at this time for all young people is hugely challenging.

A holistic vision will work better than a piecemeal approach.

The primary reason these families do not have digital access is because of a lack of material resources due to social inequality. These economic realities do not go away as a result of a laptop scheme. Indeed, as this pandemic continues, more and more young people and their families will be in financial hardship, and inequalities in society are likely to widen.

Technology cannot fix social inequality. Though access schemes will help (if done well), it is important to think more holistically and in the longer term. We should not simply think about the issues of digital inequalities in relation to questions of access, but instead, to see this time as an important moment to support, regulate and design an inclusive digital future for us all, that is part of a society that is more socially just.

3.4.3 Spaces and hierarchies in pandemic times: relocating digital pedagogy

Being in lockdown in pandemic times and working from home, for those of us fortunate enough to be on the right side of the inequality and with the opportunity to do so, means further consideration of the ways in which spatial and temporal relations are changed in the (digital) work we do as educators and researchers. The lockdown in many countries occasioned by the pandemic requires us to hold the mirror up to what happens when classroom space-time travels in the other direction, into the home environment, introducing the poly- synchronous world of learning in the digital age into the rhythms of family life. We might call this the Bring Your Own School Home (BYOSH) movement. In this environment, personal screen-time is taken over at the same time as the physical spaces of the home are colonized and co-opted. Those grappling with the delicate ecosystem of parenting in the digital age realize that this is anything but remote learning. It is up close and personal and with the customary territorial trade-offs of colonization. The promise of both the infotainment value (as in the recent BBC here in the UK providing celebrities as teachers) and the familiar hype of 'anytime', 'anywhere' learning are ever-present except that this carries the potential promise, or threat, of 'all the time' and 'everywhere'. So, routines are disrupted, but not in the ways nor in the places imagined by ed-tech advertising;

spaces are invaded by devices and screens which have now, like the eponymous character in Diana Wynne-Jones's novel Archer's Goon (2000), melted into the foreground and, finally, roles are renegotiated and re-imagined under terms and conditions no one thought would ever apply.

3.4.4 Emergency EdTech experimentation

According to an article in Quartz magazine, coronavirus has catalyzed:

the world's biggest educational technology (EdTech) experiment in history. With 1.5 billion students out of school and hundreds of millions attempting to learn solely online, the experiment will reshape schools, the idea of education, and what learning looks like in the 21st century. (Anderson, 2020)

This idea of experimentation makes remote learning students, teachers, and parents into laboratory subjects whose contingent experiences and activities are being observed for insights about the future of EdTech itself.

The global EdTech experiment is also an opportunity to produce very large quantities of student data, as students are forced online into data-intensive digital learning environments at an unprecedented scale.

3.4.5 Some facts and figures

In China, school-age children's homeschooling behaviors and feelings were assessed with online surveys obtained separately from students, parents, and teachers of grades 1–9 in 15 Chinese provinces (Guangzhou Medical University, 2010). Ying Zhao et al (2020) study's showed that 76% of the respondents thought the homeschooling style was acceptable. However, teachers were concerned that students' interest, focus, and academic performance would decline. Sixty-nine percent of the parents reported their children had more than 3 hours of daily screen time, and 82% of students had less than 2 hours of daily outdoor activity. Ninety-five percent of the parents were concerned about their children's eyesight. Additionally, 17.6% of the students were suspected of having emotional or behavioral problems.

In conclusion, students should continue the going-to-school rhythm at home to cope with changes caused by the COVID-19 pandemic. Integrated grade-specific approaches are needed. Because long screen time and insufficient outdoor activities can severely affect children's eyesight, appropriate eye-protection measures should be implemented.

At this time of crisis, digital technology has a great promise to give learners access to high-quality learning. However most education systems need to pay careful attention to ensuring that technology does not further expand current gaps in access and quality of learning. This is not

only a matter of providing access to technology and accessible learning resources, but also of maintaining effective social ties between families, teachers and students.

3.4.6 Considerations by Experience

Distance learning is not just a change of medium from the physical to the digital. It involves a review of the ways in which knowledge can be expressed, the nature of pedagogic interactions, and a redesign of the learning experience with the semiotic technologies used (van Leeuwen et al, 2013). Semiotic technologies in the teaching and learning context refer to instructional tools that are both resources and social practices that we make meaning with (Lim, 2021). The teacher, as a designer of learning (Kress & Selander, 2012), uses appropriate semiotic technologies along with a set of design considerations in designing the learning experiences of the students.

Conclusion

The Internet has been growing significantly as a medium, phenomenon, and potential all around the world. It is used for financial, technical, cultural, and organizational purposes. One of the fields that have been changing dramatically is education. Learning and teaching are changing rapidly, thanks to communication technologies development. Nowadays, for most people. It's easy to access information in all fields of science through the Internet.

E-learning offers advantages such as having a broad audience, saving significant transportation costs among cities or even continents, and getting rid of the enormous costs of physical infrastructure. In other words, it empowers people by skills and narrows the skill gaps among the people.

In this thesis, it was shown that teachers' productivity increased thanks to internet-based educational technologies. Although challenges have been observed regarding educators' engagement on social media, using the Internet and social media, we review the most important social media platforms and study how they can be useful comparing several positive and negative aspects, and how they have increased interaction among teenage students in the classroom.

Using different types of media to teach is one of the increasing tendencies in teaching. Transmedia storytelling, for instance, using a complementary video in a classroom or at home and on the Internet being subscribed to a specific YouTube channel or Instagram account, can help in better understanding for students, which can be decisive considering the "new media literacies" definition in 21st century, where using transmedia technologies is counted as an important factor in new generation's literacy.

Social media are now used as a resource of entertainment and information circulation for the most part of the users. This piece of technology can be used for many other purposes, such as education. Most teenagers frequently use social media and access it everywhere, so employing social media as a teaching tool can broaden learning hours and places. However, using social media can be challenging for teachers and learners how educators can control which content should be reached by teenagers. The latter problem can be treated by using more purposeful platforms for education, such as YouTube or online courses.

Instagram is one of the least studied social media for educational purposes, while it can be very effective thanks to its attractive visual nature. "Affinity spaces" are defined as virtual or physical places where people gather with the same interests. For example, on Instagram, there are

accounts and pages which are attended by interested users. Attending these places typically lead to more social interaction.

Mobile Instant Messaging services also can cause an increase in interaction among learners and educators. This interaction can lead to teamwork (collaborative learning) and emotional maturing.

AR (Augmented Reality) and VR (Virtual Reality) are the other tools used to revise and remake historical events or critical situations. AR and VR are used to create an immersive experience in education, such as putting learners in a simulated reality, where they can be trained technically and emotionally, such as driving or rescue programs.

Games are another attractive potential for learning. Many teenagers are significantly interested in games that release energy and dedication, which can be used for educational purposes by educators or themselves. For instance Fortnite (2017) has created features to create specific rooms within the game, for educational purposes, aiming to "incorporate" within it, in an informal digital space, the formal space of education.

Another example was the use of Discord, a community gaming platform, to create spaces for discussion and sharing materials, instead of the classic learning environemnt systems.

The pandemic of COVID-19 gave birth to an immense change in the humans' world. Many industries and businesses started remote working and communication as a serious alternative to their routine. Learning and teaching activities experienced a big shift from the traditional methods to use every potential of many different media from simple tools to more sophisticated platforms like Zoom or Facebook. In a perfect world, distance learning could be as effective as in-person learning, but in the real world, we learned that the quality of distance learning could vary depending on the availability of infrastructure, however in meanwhile many learners and teachers continued their career and graduated across the pandemic crisis; in other words, distance learning in somehow worked. This showed the uncovered potential for distance learning.

Considering that the Internet is being used vastly and growing, distance learning can be a serious candidate to complete the traditional learning process in many aspects. New technologies can take part in also traditional classrooms and fertilize the older methods. Despite the potential observed by the few studies that were carried out in the field, many pre-existing platforms are

not being used at full potential or have not been studied enough as learning tools, such as TikTok or Instagram. Using more technologies is a practical way to increase interaction and efficiency in learning, and it seems beneficial thanks to the spread use of the Internet. It may let the resources reach more people easily.

References

- Abbad, M. M., Morris, D., & de Nahlik, C. (2009). Looking under the Bonnet: Factors Affecting Student Adoption of E-Learning Systems in Jordan. The International Review of Research in Open and Distance Learning.
- Álvarez Monzonillo, J. M., & de Haro, G. (2017). Millennials. La generación emprendedora. Barcelona: Ariel/Fundación Telefónica
- Anderson, A. (2019). Virtual reality, augmented reality and artificial intelligence in special education: A practical guide to supporting students with learning differences. London: Routledge, Taylor & Francis Group.
- Anderson, B., Fagan, P., Woodnutt, T., & Chamorro-Premuzic, T. (2012). Facebook psychology: Popular questions answered by research. Psychology of Popular Media Culture, 1(1), 23–37. https://doi. org/10.1037/a0026452.
- Andrews, N., & Schwartz, F. (2014). Islamic state pushes social media battle with west. The wall street journal. August 22 https://www.wsj.com/articles/isis-pushes- social-media-battle-with-west-1408725614.
- Arceneaux, P. C., & Dinu, L. F. (2018). The social mediated age of information: Twitter and Instagram as tools for information dissemination in higher education. New Media & Society, 20(11), 4155e4176.
- Azuma, R. T., A Survey of Augmented Reality, Teleoperators and Virtual Environments, 1997; 355-385.
- Baghaei, N., Mitrovic, A., & Irwin, W. (2007). Supporting collaborative learning and problem-solving in a constraint-based CSCL environment for UML class diagrams. Computer-Supported Collaborative Learning, 2, 159–190.
- Ben Williamson, Rebecca Eynon & John Potter (2020) Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency, Learning, Media and Technology, 45:2, 107-114, DOI: 10.1080/17439884.2020.1761641
- Berk, R. A. (2009a). Multimedia teaching with video clips: TV, movies, YouTube, and mtvU in the college classroom. International Journal of Technology in Teaching and Learning, 5(1), 1-21.
- Berk, R. A. (2009b). Teaching strategies for the net generation. Transformative Dialogues: Teaching & Learning Journal Volume, 3(2), 1-24.
- Berry, B., Byrd, A., & Wieder, A. (2013). Teacherpreneurs: Innovative teachers who lead but don't leave. San Francisco, CA: Jossey-Bass.
- Border, S., Hennessy, C., & Pickering, J. (2019). The rapidly changing landscape of student social media use in anatomy education. Anatomical Sciences Education, 12(5), 577e579.
- Boulos, M., Hetherington, L. & Wheeler, S. (2007). Second Life: an overview of the potential of 3-D virtual worlds in medical and Health education. Health Information & Libraries Journal, 24, 4, 233–245.
- Bourgonjon, J., Grove, F. D., Smet, C. D., Van Looy, J., Soetaert, R., and Valcke, M. (2013) 'Acceptance of game-based learning by secondary school teachers', Computers in Education, 67: 21–35.
- Boyle, E. A., Hainey, T., Connolly, T. M., Gray, G., Earp, J., Ott, M., Lim, T., Ninaus, M., Ribeiro, C., and Pereira, J. (2016) 'An update to the systematic literature review of empirical evidence of the impacts and outcomes of computer games and serious games', Computers in Education, 94: 178–192.
- Burton, Erin Peters, Wendy Frazier, Leonard Annetta, Richard Lamb, Rebecca Cheng, and Margaret Chmiel. "Modeling augmented reality games with preservice elementary and secondary science teachers." Journal of Technology and Teacher Education, 2011; 19(3): 303-329.
- Caillois, R. (1962) Les jeux et les hommes (Man, play and games), Champaign, IL.: University of Illinois Press.

- Calvo-Ferrer, J. R. (2016) 'Educational games as stand-alone learning tools and their motivational effect on L2 vocabulary acquisition and perceived learning gains', British Journal of Educational Technology, 48(2): 264–278.
- Cambridge, UK: Cambridge University Press.
- Carpenter, J. P., & Green, T. D. (2017). Mobile instant messaging for professional learning: Educators' perspectives on and uses of Voxer. Teaching and Teacher Education, 68, 53e67. https://doi.org/10.1016/j.tate.2017.08.008
- Carpenter, J. P., & Krutka, D. G. (2014). How and why educators use Twitter: A survey of the field. Journal of Research on Technology in Education, 46(4), 414e434.
- Carpenter, J. P., Cassaday, A., & Monti, S. (2018). Exploring how and why educators use Pinterest. In E. Langran, & J. Borup (Eds.), Proceedings of the Society for In- formation Technology & Teacher Education International Conference (pp. 2222e2229). Waynesville, NC: AACE.
- Carpenter, J. P., Staudt Willet, K. B., Koehler, M. J., & Greenhalgh, S. P. (2020). Spam and educators' Twitter use: Methodological challenges and considerations. TechTrends, 64, 460e469.
- Carpenter, J. P., Tani, T., Morrison, S. A., & Keane, J. (2020). Exploring the landscape of educator professional activity on Twitter: An analysis of 16 education-related Twitter hashtags. Professional Development in Education. https://doi.org/ 10.1080/19415257.2020.1752287
- Carpenter, Jeffrey P et al. "How and why are educators using Instagram?." Teaching and teacher education vol. 96 (2020): 103149. doi:10.1016/j.tate.2020.103149
- Chein, J., Albert, D., O'Brien, L., Uckert, K., Steinberg, L. (2011) 'Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry: Peer influence on risk taking', Developmental Science, 14: F1–F10.
- Cho, V., & Jimerson, J. B. (2017). Managing digital identity on Twitter: The case of school administrators. Educational Management Administration & Leadership, 45(5), 884e900.
- Chou, H. W., Lin, Y. H., & Chou, S. B. (2012). Team cognition, collective efficacy, and performance in strategic decision-making teams. Social Behavior and Personality: An International Journal, 40(3), 381–394.
- Clark, A. (2003). Natural-born cyborgs: Why minds and technologies are made to merge. Oxford: Oxford University Press.
- Coffin, C., Bostandjiev, S., Ford, J., & Hollerer, T., Enhancing classroom and distance learning through augmented reality. In EdMedia+ Innovate Learning, pp. 1140-1147 Association for the Advancement of Computing in Education (AACE), 2010.
- Computers in Human Behavior, 57, 122–132.
- Contractor, N. S., Wasserman, S., & Faust, K. (2006). Testing multitheoretical, multilevel hypotheses about organizational networks: An analytic framework and empirical example. Academy of Management Review, 31(3), 681–703.
- Costa-Sánchez, Carmen & Guerrero-Pico, Mar. (2020). What Is WhatsApp for? Developing Transmedia Skills and Informal Learning Strategies Through the Use of WhatsApp—A Case Study With Teenagers From Spain. Social Media + Society. 6. 205630512094288. 10.1177/2056305120942886.
- Crews, T., & Green, B. (1997). Anchored Interactive Learning Environments. International Journal of AI in Education, 8, 1-29.
- Cronbach, L. J. (1980), Toward reform of program evaluation: Aims, methods and institutional arrangements. San Francisco, CA: Jossey-Bass Publishers.
- Csikszentmihályi, M. (1997) 'Flow and education', NAMTA Journal, 22: 2–35.

- Danielewicz, J. (2001). Teaching selves: Identity, pedagogy, and teacher education.
- David-Ferdon, C. and M. Feldman Hertz (2007), “Electronic Media, violence, and adolescents: an emerging public health problem”, Journal of Adolescent Health, Vol. 41/6, S. 1-5.
- De Freitas, S. (2008). Serious virtual worlds: a scoping study. Bristol: Joint Information Systems Committee. Retrieved April 27, 2009, from http://www.jisc.ac.uk/publications/publications/seriousvirtualworldsreport.aspx
- De Freitas, Sara, Rebolledo-Mendez, Genaro, Liarokapis, Fotis, Magoulas, George, and Poulovassilis, Alexandra. "Learning as Immersive Experiences: Using the Four-dimensional Framework for Designing and Evaluating Immersive Learning Experiences in a Virtual World." British Journal of Educational Technology 41.1 (2010): 69-85. Web.
- DeChurch, L. A., & Mesmer-Magnus, J. R. (2010). The cognitive underpinnings of effective teamwork: A meta-analysis. Journal of Applied Psychology, 95(1), 32–53.
- Dede, C. (2011) ‘Developing a research agenda for educational games and simulations’, in S. Tobias and J. D. Fletcher (eds.), Computer games and instruction, Hershey, PA: Information Age Publishers (pp. 233–250).
- Devole, A. (2015). Rrjetet sociale, si ndikon te adoleshentët përdorimi i tepërt i tyre. Retrieved April 4, 2016, from http://www.shekulli.com.al/p.php?id=363499
- Dewi, L. F., & Salam, H. (2018). The Utilization of Instagram as Digital Literacy to Enhance Learner Autonomy: A Case Study in English Intensive Class Universitas Islam NegeriSunanAmpel Surabaya.
- Dillenbourg, P. (1999). What do you mean by collaborative learning? Dillenbourg, P. (ed.). Collaborative-Learning: Cognitive and Computational Approaches. Oxford: Elsevier, 1-19.
- Dilon, C. (2020). Tiktok Influences on Teenagers and Young Adults Students: The Common Usages of The Application Tiktok. American Scientific Research Journal for Engineering, Technology, and Sciences. 68. 132-142.
- DiSessa, A.A. (2000). Changing minds: Computers, learning, and literacy. Cambridge, MA: MIT Press.
- E. Gutiérrez, E. Rey and L. Melo (2018) “Youtube” - Scolari, Carlos Alberto. Teensmedia and Collaborative Cultures. Exploiting Teens’ Transmedia Skills In The Classroom, Universitat Pompeu Fabra. 88-92,
- Ehrman, M., & Oxford, R. (1990). Adult language learning styles and strategies in an intensive training setting. The modern language journal, 74(3), 311-327.
- El-Hussein, M., Osman, M., & Cronje, J. C. (2010). Defining mobile learning in the higher education landscape. Journal of Educational Technology & Society, 13(3).
- Elhay, A. A., & Hershkovitz, A. (2018). Teachers’ perceptions of out-of-class communication, teacher-student relationship, and classroom environment. Education and Information Technologies, 24, 1–22. https://doi.org/10.1007/s10639-018-9782-7.
- Esteban-Guitart, M. (2015). The medium is the message: Online learning, com- munities, and identities. Theory & Psychology, 25(4), 546e548.
- Esteve, F., & Gisbert, M. (2011). El Nuevo paradigma de aprendizaje y nuevas tecnologías. Revista de Docencia Universitaria, 9(3), 55–73.
- F. Ucciferri, "Parents' Ultimate Guide to TikTok," Common sense media, 20 April 2020.
- Facer, K., Furlong, J., Furlong, R., and Sutherland, R. (2003) ScreenPlay: Children and computing in the home, London: Routledge.
- Fleck, B.K.B., Beckman, L.M., Sterns, J.L. & Hussey, H.D. (2014). YouTube in the Classroom: Helpful Tips and Student Perceptions. Journal of Effective Teaching, 14(3), 21-37. Retrieved December 1, 2020 from https://www.learntechlib.org/p/161216/.

- Forgie, S. E., Duff, J. P., & Ross, S. (2013). Twelve tips for using Twitter as a learning tool in medical education. Medical Teacher, 35(1), 8e14.
- Friesen, N., & Lowe, S. (2012). The questionable promise of social media for edu- cation: Connective learning and the commercial imperative. Journal of Computer Assisted Learning, 28(3), 183e194.
- Gangaiamaran, R., & Pasupathi, M. (2017). Review on use of mobile apps for language learning. International Journal of Applied Engineering Research, 12(21), 11242-11251.
- Gao, Q., Yan, Z., Wei, C., Liang, Y., & Mo, L. (2017). Three different roles, five different aspects: Differences and similarities in viewing school mobile phone policies among teachers, parents, and students. Computers and Education, 106, 13–25. https://doi.org/10.1016/j.compedu.2016.11.007.
- Gazzard, A. (2009). The avatar and the player: understanding the relationship beyond the screen. In G. Rebolledo-Mendez, F. Liarokapis & S. de Freitas (Eds), Proceedings of the IEEE Games and Virtual Worlds for Serious Applications conference, Coventry, UK (pp. 190–193). Proceedings of the 1st IEEE International Conference in Games and Virtual Worlds for Serious Applications, IEEE Computer Society, Coventry, UK, 23–24 March.
- Gee, J. (2004). Situated Language and Learning. London: Routledge, https://doi-org.ezproxy.biblio.polito.it/10.4324/9780203594216
- Gee, J. P. (2005). Semiotic social spaces and affinity spaces. In D. Barton, & K. Tusking (Eds.), Beyond communities of practice: Language, power and social context (pp. 214e232). Cambridge, UK: Cambridge University Press.
- Gee, J. P. (2011) 'Reflections on empirical evidence on games and learning', in S. Tobias and J.D. Fletcher (eds.), Computer games and instruction, Hershey, PA: Information Age Publishers (pp. 223–232).
- Gee, J., & Hayes, E. (2012). Nurturing Affinity Spaces and Game-Based Learning. In C. Steinkuehler, K. Squire, & S. Barab (Eds.), Games, Learning, and Society: Learning and Meaning in the Digital Age (Learning in Doing: Social, Cognitive and Computational Perspectives, pp. 129-153). Cambridge: Cambridge University Press. doi:10.1017/CBO9781139031127.015
- Gewerc, A., Montero, L., & Lama, M. (2014). Collaboration and social networking in higher education. Comunicar, 21(42), 55–62.
- Gilson, L. L., Maynard, M. T., Young, N. C. J., Vartiainen, M., & Hakonen, M. (2015). Virtual teams research 10 years, 10 themes, and 10 Opportunities. Journal of Management, 41(5), 1313–1337.
- Goldberg, K., ed. (2001). The robot in the garden: Telerobotics and telepistemology in the age of the Internet. Cambridge, MA: MIT Press.
- Gotschall M. (2000). E-learning strategies for executive education and corporate training. Fortune 141(10): 5–59.
- Greenhalgh, S. P., & Koehler, M. J. (2017). 28 days later: Twitter hashtags as "just in time" teacher professional development. TechTrends, 61(3), 273e281.
- Greenhalgh, S. P., Rosenberg, J. M., Staudt Willet, K. B., Koehler, M. J., & Akcaoglu, M. (2020). Identifying multiple learning spaces within a single teacher-focused Twitter hashtag. Computers & Education, 148, 103809.
- Gupta V. (2020) "How Tik Tok affecting Youth: Tik Tok Negative Impact On Young Generation," *Techchums,* 17 March 2020.
- Hart, J. E., & Steinbrecher, T. (2011). Omg! Exploring and learning from teachers' personal and professional uses of Facebook. Action in Teacher Education, 33(4), 320e328.

- Hartley, J. (2009). Uses of YouTube - Digital Literacy and the Growth of Knowledge. In J. Burgess, and J. Green, YouTube. Online video and participatory culture (pp. 126-143). Cambridge: Polity Press.
- Hattie, J. (2013). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.
- Hawi, N. S., & Samaha, M. (2016). To excel or not to excel: Strong evidence on the adverse effect of smartphone addiction on academic performance. Computers and Education, 98, 81–89. https://doi. org/10.1016/j.compedu.2016.03.007.
- Heflin, H., Shewmaker, J., & Nguyebm, J. (2017). Impact of mobile technology on students attitudes, engagement, and learning. Computers and Education, 107, 91–99. https://doi.org/10.1016/j. compedu.2017.01.006.
- Herrman J. (2019) "How TikTok Is Rewriting the World," The New York Times, 10 March 2019.
- Hillman, Thomas & Bergviken-Rensfeldt, Annika & Ivarsson, Jonas. (2019). Brave new platforms: a possible platform future for highly decentralised schooling. Learning, Media and Technology. 45. 1-10. 10.1080/17439884.2020.1683748.
- Hoffman, B., and Nadelson, L. (2010) 'Motivational engagement and video gaming: A mixed methods study', Educational Technology Research and Development, 58: 245–270.
- Holmes, W. (2011) 'Using game-based learning to support struggling readers at home', Learning, Media and Technology, 36: 5–19.
- Holmes, W. (2013) Level Up! A design-based investigation of a prototype digital game for children who are low-attaining in mathematics (Unpublished PhD thesis), University of Oxford.
- Holmes, W. (2018) "Digital Games-based Learning, Time to Adoption: Two to Three Years?" Education and New Technologies: Perils and Promises for Learners. 1st ed. Routledge. 196-212. Web.
- Hong, F. Y., Chiu, S. I., & Huang, D. H. (2012). A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students. Computers in Human Behavior, 28(6), 2152–2159.
- Hong, S., Jahng, M. R., Lee, N., & Wise, K. R. (2020). Do you filter who you are?: Excessive self-presentation, social cues, and user evaluations of Instagram selfies. Computers in Human Behavior, 104, 106159.
- Hootsuite.com
- Howard-Jones, P., Demetriou, S., Bogacz, R.,Yoo, J. H., and Leonards, U. (2011) 'Toward a science of learning games', Mind Brain and Education, 5: 33–41.
- Huang, H. Y. (2016). Examining the beneficial effects of individual's self-disclosure on the social network site.
- Huberman, M. (1995). Networks that alter teaching: Conceptualizations, exchanges and experiments. Teachers and Teaching, 1(2), 193e211.
- Huberman, M. (1995). Networks that alter teaching: Conceptualizations, exchanges and experiments. Teachers and Teaching, 1(2), 193e211.
- Huining Y. (2020). Secondary-school Students' Perspectives of Utilizing Tik Tok for English learning in and beyond the EFL classroom
- Huizinga, J. H. (1955) Homo ludens: A study of the play-element in culture, Boston, MA: Beacon Press.
- Iacovides, I., Aczel, J., Scanlon, E., Taylor, J., and Woods, W. (2011) 'Motivation, engagement and learning through digital games', International Journal of Virtual and Personal Learning Environments, 2: 1–16.
- Ibrahim, Rozhgar & Varol, Asaf. (2018). Distance Education Features using Facebook. International Journal of Interactive Mobile Technologies (iJIM). 12. 19. 10.3991/ijim.v12i6.9621.
- Ilie, Vali. (2019). Traditional Learning Versus E-Learning. 1192-1201. 10.15405/epsbs.2019.08.03.146.

- Jahnke, I., Bergström, P., Märell-Olsson, E., Häll, L., & Kumar, S. (2017). Digital didactical designs as research framework: iPad integration in Nordic schools. Computers & Education, 113, 1–15.
- Jenkins, H. (2003). Transmedia Storytelling. Moving characters from books to films to video games can make them. Retrieved July 28, 2017, from http://www.technologyreview.com/news/401760/transmedia-storytelling/
- Jenkins, H. (2006). Convergence Culture. Where Old and New Media Collide. New York (US): New York University Press
- Jenkins, H., Clinton, K., Purushotma, R., Robison , A., and Weigel, M. (2006). Confronting challenges of participatory culture: Media education for the 21st century. Chicago: MacArthur Foundation. Available from: http://digitallearning.macfound.org/
- Jenkins, H., Clinton, K., Purushotma, R., Robison, A. J., & Weigel, M. (2009). Confronting the Challenges of Participatory Culture: Media Education for the 21st Century. Building the Field of Digital Media and Learning (Vol. 21). Chicago (Illinois, US). Retrieved from http://digitallearning.macfound.org/atf/cf/%7B7E45C7E0-A3E0-4B89-AC9C- E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF
- Jenkins, H., Ito, M., & Boyd, D. (2016). Participatory Culture in a Networked Era: a Conversation on Youth, Learning, Commerce, and Politics. Journal of Identity and Migration Studies, 10(2), 214. http://doi.org/10.1017/CBO9781107415324.004
- Johnson, D. W., & Johnson, R. T. (1996). Cooperation and the use of technology. In D. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 785–812). London: MacMillan.
- Joița, E. (2006). Instruirea constructivistă [The Constructivist training]. Iași: Editura Polirom.
- Journal of Applied Psychology, 88(4), 587–604.
- K. Sehl, "Hootsuits," 2 March 2020. [Online]. Available: https://blog.hootsuite.com/what-is-tiktok/.
- Keller, C. & Cernerud, L. (2002).Students' perception of e-learning in university education. Learning, Media and Technology, 27(1), 55-67.
- Kelly, A.E., ed. (2003). Theme issue: The role of design in educational research. Educational Researcher 32:3–37.
- Khalitova, L., & Gimaletdinova, G. (2016). Mobile technologies in teaching English as a foreign language in higher education: A case study of using mobile application Instagram. In ICERI2016 Proceedings 9th International Conference of Education, Research and Innovation. Seville, Spain.
- Kienle, A. (2009). Intertwining synchronous and asynchronous communication to support collaborative learning—System design and evaluation. Education and Information Technologies, 14(1), 55–79.
- Kim, H., Lee, M. Y., & Kim, M. (2014). Effects of Mobile instant messaging on collaborative learning processes and outcomes: The case of South Korea. Educational Technology & Society, 17(2), 31–42.
- Kimmons, R., & Veletsianos, G. (2014). The fragmented educator 2.0: Social networking sites, acceptable identity fragments, and the identity constellation. Computers & Education, 72, 292e301.
- Klopfer, E., Squire, K., & Jenkins, H. (2002, August). Environmental detectives: PDAs as a window into a virtual simulated world. In Proceedings. IEEE International Workshop on Wireless and Mobile Technologies in Education (pp. 95-98). IEEE.
- Kop, R. (2012). The unexpected connection: Serendipity and human mediation in networked learning. Journal of Educational Technology & Society, 15(2), 2e11.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computersupported collaborative learning environments: A review of the research. Computers in Human Behaviour, 19(3), 335–353.

- Kress, G., & Selander, S. (2012). Multimodal design, learning and cultures of recognition. The Internet and Higher Education, 15(4), 265–268. https://doi.org/10.1016/j.iheduc.2011.12.003
- Lantz-Andersson, A., Lundin, M., & Selwyn, N. (2018). Twenty years of online teacher communities: A systematic review of formally-organized & informally- developed professional learning groups. Teaching and Teacher Education, 75, 302e315.
- LaRose, R., Gregg, J., & Eastin, M. (1998). Audio graphic tele-courses for the Web: An experiment. Journal of Computer Mediated Communications, 4(2).
- Lasky, S. (2005). A sociocultural approach to understanding teacher identity, agency and professional vulnerability in a context of secondary school reform. Teaching and Teacher Education, 21(8), 899e916.
- Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation.
- Lenhart, A. (2015). Teens, Social Media & Technology Overview 2015. Retrieved March 12, 2016, from http://www.pewinternet.org/2015/04/09/teens-social-media- technology-2015/
- Lenhart, A., Madden, M., & Hitlin, P. (2005). Teens and technology: Youth are leading the transition to a fully wired and mobile nation. Pew Internet and American Life Project (Vol. 86). Washington, D.C. (US).
- Lenhart, A., Smith, A., Anderson, M., Duggan, M., and Perrin, A. (2015) Teens, technology and friendships, New York, NY: Pew Research Center.
- Lewis, K. (2003). Measuring transactive memory systems in the field: Scale development and validation.
- Liarokapis, Fotis & Petridis, Panagiotis & Lister, P.F. & White, Martin. (2002). Multimedia Augmented Reality Interface for E-learning (MARIE). World Transactions on Engineering and Technology Education. 1. 173-176.
- Lim, F. (2020). DESIGNING DISTANCE LEARNING EXPERIENCES.
- Lim, F. V. (2021). Designing teaching with embodied teaching: Perspectives from multimodality. Routledge.
- Little, J. W. (2003). Inside teacher community: Representations of classroom prac- tice. Teachers College Record, 105(6), 913e945.
- Liu, Y., & Wang, H. (2009). A comparative study on e-learning technologies and products: from the East to the West. Systems Research & Behavioral Science, 26(2), 191–209.
- Livingstone, S., L. Haddon, A. Görzig and K. Ólafsson (2011), Risks and Safety on the Internet: the Perspective of European Children: Full Findings, EU Kids Online, LSE, London.
- Lundin, M., Lantz-Andersson, A., & Hillman, T. (2017). Teachers' reshaping of pro- fessional identity in a thematic FB-group. Qwerty-Open and Interdisciplinary Journal of Technology, Culture and Education, 12(2), 12e29.
- Macchiarella, P. (2013) Trends in digital gaming: Free-to-Play, social, and mobile games, Dallas,TX: Parks Associates.
- Maltz, L., Deblois, P. & The EDUCAUSE Current Issues Committee. (2005). Top Ten IT Issues. EDUCAUSE Review, 40 (1), 15-28.
- Mansor, N., & Rahim, N. A. (2017). Digital Written Discourse. Man in India, 97(20), 115-124.
- Marinescu, M. (2007). Tendințe și orientări în didactica modernă [Trends and orientations in modern didactics]. București: Editura Didactică și Pedagogică.
- Márquez and D. Lanzeni (2018) "Instagram" - Scolari, Carlos Alberto. Teensmedia and Collaborative Cultures. Exploiting Teens' Transmedia Skills In The Classroom, Universitat Pompeu Fabra. 98-101,
- Marwick, A. E. (2015). You may know me from YouTube: (Micro)-celebrity in social media. In P. Marshall, & S. Redmond (Eds.), A companion to celebrity (pp. 333e340). West Sussex, UK: John Wiley.

- Masanet M.J., Taddeo G., Tirocchi S (2020), “Toward a transmedia learning: practices, approaches and tools” in Frau Meigs D, Kotilainen S. and M. Pathak-Shelat Handbook on Media Education, Wiley-Blackwell.
- Mayer, R. E. (1989). Systematic thinking fostered by illustrations in scientific text. Journal of Educational Psychology, 81, 240-246
- Mayer, R. E. (2012). Cognitive Theory of Multimedia Learning. Retrieved from https://www.instructionaldesign.institute/uploads/3/1/2/2/31221959/mayer_richard_cognitive_theory_of_multimedia_learning.pdf
- Mayer, R. E. (2014). The Cambridge Handbook of Multimedia Learning. (2nd ed.). New York: Cambridge University Press.
- Mayer, R. E., & Moreno, R. (1998). A split-attention effect in multimedia learning: Evidence for dual processing systems in working memory. Journal of Educational Psychology, 90, 312-320.
- Mayer, R. E., Steinhoff, K., Bower, G., & Mars, R. (1995). A generative theory of textbook design: Using annotated illustrations to foster meaningful learning of science text. Educational Technology Research & Development, 43 (1), 31-43.
- Mazziotti, C., Holmes, W., Wiedmann, M., Loibl, K., Rummel, N., Mavrikis, M., Hansen, A., and Grawemeyer, B. (2015) Robust student k: Adapting to individual student needs as they explore the concepts and practice the procedures of fractions (workshop paper), Presented at the 17th International Conference on Artificial Intelligence in Education, Madrid.
- McGonigal, J. 2008 “Why I Love Bees: A Case Study in Collective Intelligence Gaming.”In The Ecology of Games: Connecting Youth, Games, and Learning, edited by Salen Katie, Cambridge MA, MIT Press, pp. 199-228.
- McLuhan, M. (1964). Understanding media: The extensions of man. New York, NY: McGraw-Hill.
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. Annual Review of Sociology, 27(1), 415e444.
- Messing, S., & Westwood, S. J. (2012). Selective exposure in the age of social media: Endorsements trump partisan source affiliation when selecting news online. Communication Research, 41(8), 1042e1063.
- Miangah, T. M., & Nezarat, A. (2012). Mobile-assisted language learning. International Journal of Distributed and Parallel Systems, 3(1), 309.
- Middelweerd, A., van der Laan, D. M., van Stralen, M. M., Mollee, J. S., Stuij, M., TeVelde, S. J., & Brug, J. (2015). What features do Dutch university students prefer in a smartphone application for promotion of physical activity? A qualitative approach. International Journal of Behavioral Nutrition and Physical Activity, 12(1).
- Mijwil, M. (2020). e-Learning Applications. 10.13140/RG.2.2.28663.24483.
- Morreale D. “Alternate Reality (is not a) Game: transmedia storytelling, esperienze immersive e intelligenza collettiva” in Gavatorta F., Milanesi R., Transmedia experience. Dallo storytelling alla narrazione globale. Milano, FrancoAngeli, 2020. ISBN: 9788891789723
- Morreale D., Milanesi R., “Alternate Reality Game e formazione: la narrazione transmediale del brand nelle comunità di pratica interne all’organizzazione” in Bertetti P., Segreto G., Transmedia branding. Narrazione, esperienza, partecipazione, Pisa, Edizioni ETS, 2020. ISBN: 9788846758460
- Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation. Computers & Education, 49(3), 581–596.
- Myers, K. K., & Sadaghiani, K. (2010). Millennials in the workplace: A communication perspective on millennials’ organizational relationships and performance. Journal of Business and Psychology, 25(2),

- Neville, C. C., Petro, R., Mitchell, G. K., & Brady, S. (2013). Team decision making: Design, implementation and evaluation of an interprofessional education activity for undergraduate health science students. Journal of Interprofessional Care, 27(6), 523–525.
- Oblinger, D., & Oblinger, J. (2005). Educating the net generation. Boulder: EDUCASE.
- OECD (2005). E-learning in tertiary education [Online]. Available at http://www.cumex.org. (Accessed 27 /02/ 2014).
- OECD (2012), The Protection of Children Online: Recommendation of the OECD Council: Report on Risks Faced by Children Online and Policies to Protect Them, OECD Publishing, Paris, www.oecd.org/sti/ieconomy/childrenonline_with_cover.pdf.
- OECD (2013b), Trends Shaping Education 2013, OECD Publishing, Paris, http://dx.doi.org/10.1787/trends_edu-2013-en.
- OECD (2014a), Trends Shaping Education 2014 Spotlight 5: Infinite Connections, OECD, Paris, www.oecd.org/edu/ceri/Spotlight%205-%20Infinite%20Connections.pdf.
- OECD (2014b), PISA 2012 Technical Report, PISA, OECD, Paris, www.oecd.org/pisa/pisaproducts/pisa2012technicalreport.htm.
- OECD (2015), Students, Computers and Learning: Making the Connection, PISA, OECD Publishing. http://dx.doi.org/10.1787/9789264239555-en
- Ogata, H., & Yano, Y. (2005). Knowledge awareness for computer-assisted language learning using handhelds. International Journal of Learning Technology, 5(1), 435-449
- Olson, B. J., Parayitam, S., & Bao, Y. (2007). Strategic decision making: The effects of cognitive diversity, conflict, and trust on decision outcomes. Journal of Management, 33(2), 196–222.
- Ozdamli, F., & Cavus, N. (2011). Basic elements and characteristics of mobile learning. Procedia-Social and Behavioral Sciences, 28, 937-942.
- Pariser, E. (2011). The filter bubble: What the Internet is hiding from you. New York, NY: Penguin.
- Pea, R. D. (1994). Seeing what we build together: Distributed multimedia learning environments for transformative communications. The Journal of the Learning Sciences, 3(3), 219–225.
- Peltokorpi, V. (2008). Transactive memory systems. Review of General Psychology, 12(4), 378–394.
- Perrin, A., & Anderson, M. (2019). Share of U.S. adults using social media, including Facebook, is mostly unchanged since 2018. Pew Research Center. Retrieved from https://www.pewresearch.org/fact-tank/2019/04/10/share-of-u-s-adults-using- social-media-including-facebook-is-mostly-unchanged-since-2018/.
- Petruzzi, V., 2015. Il potere della Gamification. Usare il gioco per creare cambiamenti nei comportamenti e nelle performance individuali. Milano: Franco Angeli.
- Pimmer, C., Brühlmann, F., Odetola, T. D., Oluwasola, D. O., Dipeolu, O., & Ajuwon, A. J. (2019). Facilitating professional mobile learning communities with instant messaging. Computers & Education, 128, 102–112.
- Pittard, E. A. (2017). Gettin'a little crafty: Teachers Pay Teachers, Pinterest and neo- liberalism in new materialist feminist research. Gender and Education, 29(1), 28e47.
- Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. Computers in Hu- man Behavior, 62, 155e167.
- Plumb, A. M. (2013). Student perceptions of social networking as a supplemental learning tool in the communication disorders classroom. Contemporary Issues in Communication Science and Disorders, 40, 170.

- Prasolova-Førland, E., Sourin, A. & Sourina, O. (2006). Cybercampuses: design issues and future directions. Visual Computing, 22, 12, 1015–1028.
- Pratiche didattiche durante il lockdown - Report Preliminare, INDIRE
- Prayitam, S., & Dooley, R. S. (2009). The interplay between cognitive and affective conflict and congnition- and affect-based trust in influencing decision outcomes. Journal of Business Research, 62, 789–796.
- Purvanova, R. K. (2014). Face-to-face versus virtual teams: What have we really learned? The Psychologist-Manager Journal, 17(1), 2–29. https://doi.org/10.1037/mgr0000009.
- Rambe, P., & Bere, A. (2013). Using mobile instant messaging to leverage learner participation and transform pedagogy at a south African University of technology. British Journal of Educational Technology, 44(4), 544–561.
- Ranieri, M. (2011). Le insidie dell'ovvio. Tecnologie educative e critica della retorica tecno centrica. Pisa: ETS.
- Raskauskas, J. and A.D. Stoltz (2007), "Involvement in traditional and electronic bullying among adolescents", Developmental Psychology, Vol. 43/3, pp. 564-75.
- Rawson, M. (2020). Update on distance learning and remote teaching
- Rehm, M., & Notten, A. (2016). Twitter as an informal learning space for teachers!? The role of social capital in twitter conversations among teachers. Teaching and
- Ren, Y., & Argote, L. (2011). Transactive memory systems 1985–2010: An integrative framework of key dimensions, antecedents, and consequences. The Academy of Management Annals, 5(1), 189–229.
- Retrieved from http://learning.media.mit.edu/content/publications/EA.Piaget%20_%20Papert.pdf
- Rico, R., Hinsz, V. B., Burke, S., & Salas, E. (2017). A multilevel model of multiteam motivation and performance. Organizational Psychology Review, 7(3), 197–226.
- Robson, J. (2018). Performance, structure and ideal identity: Reconceptualising teachers' engagement in online social spaces. British Journal of Educational Technology, 49(3), 439e450.
- Roodt, S., & De Villiers, C. (2011). Using YouTube as an innovative tool for collaborative learning at undergraduate level in tertiary education. Proceedings of the AIS SIG-ED IAIM 2011 Conference.
- Roodt, S., & Peier, D. (2013). Using YouTube in the classroom for the net generation of students. Issues in Informing Science and Information Technology, 10, 473-487
- Rose, F. 2013 The Art of Immersion. How the Digital Generation is Remaking Hollywood, Madison Avenue, and the Way we Tell Stories, New York, W. W. Norton & Company (tr. it. Immersi nelle storie. Il mestiere di raccontare nell'era di internet, Torino, Codice).
- Rosell-Aguilar, F. (2018). Twitter: A professional development and community of practice tool for teachers. Journal of Interactive Media in Education. https:// doi.org/10.5334/jime.452
- Rozen, C. (2018). Teachers turn lessons into Instagram-worthy photos. Dec 4. Retrieved from https://www.npr.org/2018/12/04/670829785/teachers-turn- lessons-into-instagram-worthy-photos.
- Rubio-Romero, J., & Perlado, M. (2015). El fenómeno WhatsApp en el contexto de la comunicación personal: una aproximación a través de los jóvenes universitarios. Icono, 14(13), 73–94. https://doi.org/10.7195/ri14.v13i2.818.
- Rummel, N., Mavrikis, M.,Wiedmann, M., Loibl, K., Mazziotti, C., Holmes,W., and Hansen,
- Russo, P., & Beyerbach, B. (2001). Moving from polite talk to candid conversation: Infusing foundations into a professional development project. Educational Foundations, 15(2), 71e90.

- Ryu, H., & Parsons, D. (2012). Risky business or sharing the load?–social flow in collaborative mobile learning. Computers & Education, 58(2), 707–720.
- Sage Elwell, J. 2014 “The Transmediated Self: Life Between the Digital and the Analog”, in Convergence: The International Journal of Research into New Media Technologies, Sage, Vol. 20(2), pp. 233–249.
- Saidin, Nor Farhah, N. D. A. Halim, and Noraffandy Yahaya. "A review of research on augmented reality in education: Advantages and applications." International education studies, 2015; 8.13: 1-8.
- Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. Computers in Human Behavior, 29, 2632–2639.
- Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. Computers in Human Behavior, 29, 2632–2639.
- Salen, K., Tekinbaş, K. S., & Zimmerman, E. (2004). Rules of play: Game design fundamentals. MIT press.
- Saliq, A. & Divya, M. & Dhawan, A. & Sonwani, H. (2020). Emerging Trends In E-Learning. 6. 88-97.
- Salomon, D. (2013). Moving on from Facebook: Using Instagram to connect with undergraduates and engage in teaching and learning. College & Research Libraries News, 74(8), 408-412.
- Santos, I. M., Bocheco, O., & Habak, C. (2018). A survey of student and instructor perceptions of personal mobile technology usage and policies for the classroom. Education and Information Technologies, 23(2), 617–632. https://doi.org/10.1007/s10639-017-9625-y.
- Sara de Freitas, Genaro Rebolledo-Mendez, Fotis Liarokapis, George Magoulas and Alexandra Poulovassilis, British Journal of Educational Technology Vol 41 No 1 2010 69–85 doi:10.1111/j.1467-8535.2009.01024.x
- Sarsini, D. 2020. Alcune riflessioni sulla didattica a distanza. Studi sulla Formazione/Open Journal of Education. 23, 1 (Jul. 2020), 9-12. DOI:https://doi.org/10.13128/ssf-11826
- Sawyer, A. G., & Myers, J. (2018). Seeking comfort: How and why preservice teachers use Internet resources for lesson planning. Journal of Early Childhood Teacher Education, 39(1), 16e31.
- Sawyer, A., Dick, L., Shapiro, E., & Wismer, T. (2019). The top 500 mathematics pins: An analysis of elementary mathematics activities on Pinterest. Journal of Tech- nology and Teacher Education, 27(2), 235e263.
- Schneider, Samantha L., and Martha Laurin Council. "Distance Learning in the Era of COVID-19." Archives of Dermatological Research (2020): 1-2. Web.
- Schroeder, S., Curcio, R., & Lundgren, L. (2019). Expanding the learning network: How teachers use Pinterest. Journal of Research on Technology in Education, 51(2), 166e186.
- Schultz, F., Utz, S., & Go€ritz, A. (2011). Is the medium the message? Perceptions of
- Scolari, C. A. (Ed.). (2018). Teens, Media and Collaborative Cultures. Exploiting Teens’ Transmedia Skills in the Classroom. Barcelona: Transmedia Literacy. H2020 Research and Innovation Action/Universitat Pompeu Fabra.
- Sedighi, F., & Zarafshan, M. A. (2006). Effects of attitude and motivation on the use of language learning strategies by Iranian EFL university students.
- Sefton-Green, Julian. (2004). Literature Review in Informal Learning with Technology Outside School.
- Shane-Simpson, C., Manago, A., Gaggi, N., & Gillespie-Lynch, K. (2018). Why do college students prefer Facebook, twitter, or Instagram? Site affordances, ten- sions between privacy and self-expression, and implications for social capital. Computers in Human Behavior, 86, 276e288.

- Sheehy, Kieron, & Holliman (2018) "New Technologies and a World of Differences: Introducing the Perils and Promises for Learners." Education and New Technologies: Perils and Promises for Learners. 1st ed. Routledge. 1-12. Web.
- Shefketi, Batije & Hamiti, Mentor. (2019). Challenges of Facebook Integration in High Education. SEEU Review. 14. 207-225. 10.2478/seeur-2019-0012.
- Shelton, C. C., & Archambault, L. M. (2018). Discovering how teachers build virtual relationships and develop as professionals through online teacherpreneurship. Journal of Interactive Learning Research, 29(4), 579e602.
- Shelton, C. C., & Archambault, L. M. (2020). Learning from and about elite online teacherpreneurs: A qualitative examination of key characteristics, school en- vironments, practices, and impacts. Teachers College Record, 122(7).
- Shelton, C., Curcio, R., & Schroeder, S. (2020). Instagramming their hearts out: Teacher influencers on Instagram. In D. Schmidt-Crawford (Ed.), Society for in- formation technology & teacher education international conference (pp. 1470e1476). Waynesville, NC: Association for the Advancement of Computing in Education (AACE).
- Sherer, P., & Shea, T. (2011). Using online video to support student learning and engagement. College Teaching, 59(2), 56-59.
- Singhal, Samarth, Sameer Bagga, Praroop Goyal, and Vikas Saxena. "Augmented chemistry: Interactive education system." International Journal of Computer Applications, 2012; 49(15).
- Sivakumar, Ramaraj. (2016). WhatsApp in Education.
- Skiba, D. (2007). Nursing education 2.0: YouTube. Nursing Education Perspectives, 28(2), 100-102.
- Smith Risser, H. (2013). Virtual induction: A novice teacher's use of twitter to form an informal mentoring network. Teaching and Teacher Education, 35, 25e33.
- Snickars, P., and Vonderau, P. (2009). The YouTube Reader. Stockholm: National Library of Sweeden.
- Statista. (2020). Most popular social networks worldwide as of April 2020, ranked by number of active users. Retrieved from https://www.statista.com/statistics/ 272014/global-social-networks-ranked-by-number-of-users/.
- Staudt Willet, K. B. (2019). Revisiting how and why educators use Twitter: Tweet types and purposes in #Edchat. Journal of Research on Technology in Education, 51(3), 273e289.
- Staudt Willet, K. B., & Carpenter, J. P. (2020). Teachers on Reddit? Exploring con- tributions and interactions in four teaching-related subreddits. Journal of Research on Technology in Education, 52(2), 216e233. https://doi.org/10.1080/ 15391523.2020.1722978
- Steinkuehler C., Squire K., & Barab S. (Eds.), Games, learning, and society: Learning and meaning in the digital age (pp. 129e155). Cambridge, UK: Cam- bridge University Press.
- Stockwell, G., & Hubbard, P. (2013). Some emerging principles for mobile-assisted language learning. The International Research Foundation for English Language Education, 1-15.
- Sung, Y. T., Chang, K. E., & Liu, T. C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. Computers & Education, 94, 252–275.
- Taddeo G., Tirocchi S. (2019), "Transmedia teens: the creative transmedia skills of Italian students", Information, Communication & Society, DOI: 10.1080/1369118X.2019.1645193
- Takeuchi, L. M., and Vaala, S. (2014) A national survey on teaching with digital games, New York, NY: Joan Ganz Cooney Center.

- Tang, Y., & Hew, K. F. (2017). Is mobile instant messaging (MIM) useful in education? Examining its technological, pedagogical, and social affordances. Educational Research Review, 21, 85–104.
- Teacher Education, 60, 215e223.
- The Cognition and Technology Group at Vanderbilt. (1990). Anchored Instruction and Its Relationship to Situated Cognition. Educational Researcher, 19(6), 2-10. Article Stable URL: http://www.jstor.org/stable/1177136
- Thomas, T., Alexander, K., Jackson, R., & Abrami, P. C., (2013). The differential effects of interactive versus didactic pedagogy using computer-assisted instruction. Journal of Educational Computing Research, 49 (4), 403-436. doi:10.2190/EC.49.4.a
- Tik Tok. (2020). Literacy for All: 2019 Tik Tok Data Report. Retrieved March 5, 2020, from http://www.199it.com/archives/993771.html
- Tracy Fullerton, Game Design Workshop: A Playcentric Approach to Creating Innovative Games 4th Edition, ISBN 9780240809748,
- Tufekci, Z. (2017). Twitter and tear gas: The power and fragility of networked protest.
- Urbina, S. & Salinas, J. (2014). Campus virtuales: Una perspectiva evolutiva y tendencias. Revista de Educación a Distancia (RED), 42. http://www.um.es/ead/red/42. Accessed Sep 2018.
- Urien, Begoña & Erro, Amaya & Segovia, Amparo. (2019). WhatsApp usefulness as a communication tool in an educational context. Education and Information Technologies. 1-18. 10.1007/s10639-019-09876-5.
- Vaidhyanathan, S. (2018). Antisocial media: How Facebook disconnects us and un- dermines democracy. New York, NY: Oxford University Press.
- van Leeuwen, T., Djonov, E., & O'Halloran, K. L. (2013). 'David Byrne really does love PowerPoint': Art as research on semiotics and semiotic technology. Social Semiotics, 23(3), 409–423. https://doi.org/10.1080/10350330.2012.738998
- Varis, P., & Blommaert, J. (2015). Conviviality and collectives on social media: Vir- ality, memes, and new social structures. Multilingual Margins: A Journal of Multilingualism from the Periphery, 2(1), 31-31.
- Veletsianos, George. (2010). Emerging Technologies in Distance Education.
- Viberg, O., & Grönlund, Å. (2012). Mobile assisted language learning: A literature review. In 11th World Conference on Mobile and Contextual Learning.
- Vivanet, G.. "Sull'efficacia delle tecnologie nella scuola: analisi critica delle evidenze empiriche." Journal on Educational Technology 22 (2014): 95-100.
- Volet, S., Summers, M., & Thurman, J. (2009). High-level co-regulation in collaborative learning: How does it emerge and how is it sustained? Learning and Instruction, 19 (2), 128-143. https://dx.doi.org/org/10.1016/j.learninstruc.2008.03.001
- Vygotsky, L. S. (1978) Mind in society: Development of higher psychological processes, Cambridge, MA: Harvard University Press.
- Wegner, D. (1987). Transactive memory: A contemporary analysis of the group mind. In B. Mullen y G. R. Goethals (Eds.). Theories of group behaviour (pp. 185–208). Nueva York: Springer-Verlag.
- Wentling T.L, Waight C, Gallagher J, La Fleur J, Wang C, Kanfer A. (2000). E-learning - a review of literature. Knowledge and Learning Systems Group NCSA 9.1–73.
- Yoon, C., Jeong, C., & Rolland, E. (2015). Understanding individual adoption of mobile instant messaging: A multiple perspectives approach. Information Technology and Management, 16(2), 139–151.

- YU-KAI CHOU, 2017. The 8 Core Drives of Gamification (#4): Ownership and Possession [online]. Disponibile su:http://yukaichou.com/gamification-study/8-core-drives-gamification-4-ownership possession/#.WykAZRIzaqA [Data di accesso: 08/06/2018].
- Zhao, Ying, Guo, Yong, Xiao, Yu, Zhu, Ranke, Sun, Wei, Huang, Weiyong, Liang, Deyi, Tang, Liuying, Zhang, Fan, Zhu, Dongsheng, and Wu, Jie-Ling. "The Effects of Online Homeschooling on Children, Parents, and Teachers of Grades 1–9 During the COVID-19 Pandemic." Medical Science Monitor : International Medical Journal of Experimental and Clinical Research 26 (2020): E925591-1-925591-10. Web.