NEW TRENDS IN EDUCATION: THE USE OF ICT IN DIFFERENT WAYS

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Abstract

In the 21st century and due to the exponential growth of the Internet and Information and Communication Technologies (ICT), people live in a technological age, in all areas and in all contexts, we have daily contact with technology, with access to Information. This dynamic requires a constant update of the services and technological tools that change the method that we study, work, communicate and socialize on an unprecedented scale. These constant changes force everyone, regardless of age, gender or profession, to possess a range of functional and critical thinking skills, such as information literacy, media literacy and technological literacy. The evolution of technologies, forces the promoters of education, to always be aware of the changes that society is introducing outside the classroom. Today, students don't have the same pattern as before, regardless of age, they are very active and are no longer the same introverted child who studied a few years ago in the classroom. According to this, students are eager for different forms of motivation inside and outside the classroom, they need the learning and teaching process to move along with changes in society and ICT. To ensure the success of today's students, it is important to provide them with the technological skills to make the correct use of ICTs, to perform tasks essential to their learning process, such as researching and selecting information, creating content, information sharing, use of collaboration tools or environment simulation tools. The main objective of this chapter is to show how ICT tools that can be used in educational environments to help students, helping them develop key skills in their training process, is also relevant to show how these tools can help teachers achieve these goals in daily activities with their students.

Keywords: ICT; Education; New Trends; Tools.

1 INTRODUCTION

The world is changing very quickly, the evolution of the Information, Communication Technologies (ICT) is rapidly invading all the areas of knowledge, *we have daily contact with technology, with access to information, linked to it, and we have a constant update of technological services and tools* [1]. Apart of that, *the old-fashioned notion of a three-stage approach to our working lives is ending: education, work and retirement* [1], with the growing of life expectation like is stated in [2] the society needs to take measures to adapt to new situations. Many authors point out this exponential evolution and their influence on society, this *changes oblige everyone across the board regardless of age, gender or profession to possess a range of functional and critical thinking skills* [3], [3] state that ICT are being used in different areas such as: developing course materials; delivering content and sharing content; communication between learners, teacher's, and the outside world; creation and delivery of presentation and lectures; academic research; administrative support and student enrolment. So the change is here, and is entering the door, *it is also true that pupils' learning is more lasting when they deal with real life situations* [4]*,* so we need to *create learning environments that utilizes concrete materials and tools. ICT have potential in this sense* [4], [5]. So combining the facts, students of XXI century and new soft skills needed, social changes on employment area, revolutionary ICT tools across the majority of areas, Education should integrate this modifications of the society, that's why it is so important to analyse and see the wide range of different tools that we have at our disposal. Teachers should have enough knowledge and skills to be update regarding the constant evolution of society, and ICT changes should be bring inside the classroom. It is evident that the new ICT tools that could, and should, be used by the teacher affects the students' understanding and their attraction to education. Again this urges teachers to adapt the curriculum with different strategies that have proved to be efficient in so many areas and to employ the technological innovation and creativity while teaching.

2   DIFFERENT *WEBS*

Whatever is the action that we perform nowadays, it is necessary for sure to possess enough knowledge in the field of ICT, and labour market requires the ability to use, interpret, adapt, and create digital images in the most diverse formats, platforms or devices. Like [6] had state the use of totally different ICT tools in so many areas should forces us, the teachers/researchers, to also analyse their possible use. So it's important to understand and see this tools characterized in a possible three literacy dimensions:

- – Information literacy;
- – Media Literacy;
- – Information, Communication and Technology Literacy.

The first could be *the hyper ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand* [7], the purpose of the second *is to help individuals of all ages develop the habits of inquiry and skills of expression that they need to be critical thinkers, effective communicators and active citizens in today's world* [8] and the third is *the ability to use digital technology, communication tools, and/or networks appropriately to solve information problems in order to function in an information society. This includes the ability to use technology as a tool to research, organize, evaluate, and communicate information and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information* [9]. Is widely accepted that *Web 2.0 has changed the way we communicate in society, learn, teach, and work* [10], and we are going towards Web 3.0.

Before proceeding, it's good to look back, and check the differences of Web 1.0, Web, 2.0 and Web 3.0. The Web 1.0, *was a static information dump where people read websites but rarely interacted with them* [11], there was a few group of people able to interact and produce content, now crossing Web 2.0, *an interactive and social web facilitating collaboration between people* [11], everybody can make contents for everybody, and now moving to Web 3.0, bringing a *fundamental change both in how websites are created and more importantly, how people interact with them* [11], something that we could specify like the connection with the objects that surround us in the daily life. But in the middle, there is what the authors of this article called a Web 2.5, a process between the web from everybody to everybody, and the connection of the web to the daily objects. We believe that the fully passage from the 2.0 to the paradigm of 3.0 will take long, taking new challenges to society and the academic community.

3   DIFFERENT TOOLS

According to the new Web paradigm quoted in the previous section, the tools will be much more powerful and with a wide variety of uses, so we will analyze the so called top 200 tools for Education[1], compiled by Jane Hart (2019) at the Centre for Learning & Performance Technologies. Starting from this list, we can have a separation in four dimensions:

- – Instructional Tools;
- – Content Development Tools;
- – Social Tools;
- – Personal Tools.

Now we will see in more detail this dimensions, there are a huge range of totally different tools that we have at our disposal, so it's important to see each of them, the pros and cons.

3.1   Instructional Tools (IT)

In this subsection we have the different types of software that we can use in Education separate in other subsets, Figure 1:

- • Course authoring tools: Camtasia, Articulate, and EasyGenerator;
- • Learning Management Systems (LMS) and Learning Platforms: Moodle, Canvas, and Google Classroom;
- • Portfolio platforms: Mahara, Pathbrite and e-Portofolio;

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[1] https://www.toptools4learning.com/

- Webinar tools: WebEx, Adobe Connect, and GoToMeeting;
- Classroom and audience response tools: Kahoot, Socrative, and Poll Everywhere;
- Educational tools: Quizlet, Turnitin, and Grammarly.

Figure 1. Logos related to IT, taken from the original websites of the different companies.

From this list, the software's that are most used are the Moodle, Canvas, E-Portfolio, Google Classroom, Kahoot and Quizlet. The Moodle is a freeware LMS, very simple to use and very common in institutions connected to Education. The Kahoot and Quizlet are used for evaluation and helping to sustain new concepts. Students are very connected to the last two due to their simplicity and the environment of game that is strongly attached them. There are also other tools and studies that have been carried out on the potentials of technological instructional tools. An example of this is the one developed by Mohamad, Embi & Nordin (2016) [12] on the benefits of E-Portfolio in Higher Education. The authors highlight the great advantage of the E-Portfolio tool to enhance student learning and their assessment as well as to establish a better relationship between students and teachers. In addition, the E-Portfolio provides a new working space, more closely related to the Knowledge Society [13], which promotes inclusion [14]. This study presents Google applications as a teacher partner, offering tools and strategies needed for designing instructional processes. Specifically, its study "How Chrome apps and extensions can be used to support literacy, mathematics, organization, and planning in inclusive settings" (p. 204).

However, the irruption of technology demands that teachers be ready to use new virtual learning environments. In this regard, studies such as Patterson & Han (2019) [15] provide keys to facilitate this goal. In their study, they suggest recommendations to ensure successful teaching and learning processes using virtual reality (VR). From a mixed research design, contextualized in secondary education, they point out that the involvement of teachers to use technological tools is essential. Another key aspect is the relevance of including technology strategies in school curricula, encouraging teacher collaboration in their design. Finally, integrated programmes and teaching staff encourage a more active role in students, increasing their motivation, not only for pedagogical use of technology, but also for improving their own teaching and learning processes. In this regard, research has pointed out that there is also a direct relationship between active learning and multimedia content design [16]. From a set of research experiences in which they were shown multimedia material created by teachers or students were asked to record multimedia material about the subject, the main advantages in the use of this strategy were identified, highlighting: technological literacy; less time in learning curricular matters, improvement of communicative skills, creativity and motivation and greater quality in the learning acquired. However, it requires some academic maturity and a background in previous knowledge, so it is recommended to be used in higher courses.

3.2 Content Development Tools (CDT)

Regarding the content development tools, Figure 2, we have the following:

- Documentation tools: Google Docs, Pixton, and Scrivener;

- Presentation tools: Canva, Google Slides, Prezi and Slideshare;
- Animated explainers: Powtoon, GoAnimate, and Moovly;
- Video mashup tools: TED-Ed, EdPuzzle, and ThingLink;
- Video/Moviemaking/editing/platform: YouTube, Vimeo, Animoto, and WeVideo;
- Screen capture and screencasting tools: Screencast-O-Matic and Clarify;
- Photo/imaging tools: Pixel;
- Graphics and diagramming tools: Canva and Piktochart;
- Blogging and website tools: WordPress, Blogger, and Weebly;
- Survey forms: Google Forms and SurveyMonkey.

Figure 2. Logos related to CDT, taken from the original websites of the different companies.

The most known and use are Google Docs, Prezi, Slideshare, Wordpress, Blooger, Youtube, and SurveyMonkey. This first five are use in an exchange information basis, between teachers and/or students, Youtube is a separate case, because the most common use is related to the visioning of videos, but there is a new world to discover regarding education with very good documentaries, the last, SurveyMonkey, is used by teachers/researchers to make questionnaires or surveys regarding classroom projects. In the area of educational technology there have been many studies dedicated to deepen the didactic possibilities offered by Content Development tools. Research such as Beltrán-Pellicer et all (2018) [17] and the one developed by Orús et all (2016) [18] have focused on the impact that Youtube has on student learning and their learning motivation, particularly in specific didactics. However, both warn about the important role of the teaching staff in selecting didactic videos that fit the students' needs and interests and are meaningful in their learning processes. Aside from Youtube, other studies have focused on the use of blogs and the creation of online learning communities. An example of this is Caldwell and Heaton's (2016) [19] study which states that these tools *are both useful tools for demonstrating reflective and self-directed learning. They enable the generation of socially shared content within learning communities, and promote the use of technology-based teaching practices.* (p. 154).

3.3   Social Tools (ST)

The social tools are wide known, special by students, that are always eager to use in a daily basis, but the use of the tools belonging to this category is more vast and dense, Figure 3. We have the following:

- Team/group messaging apps: Skype and WhatsApp;
- Group Video tools: Skype and Google Hangouts;
- Collaboration tools: Google Docs and Padlet;
- File synchronization, and sharing: Google Drive and Dropbox;
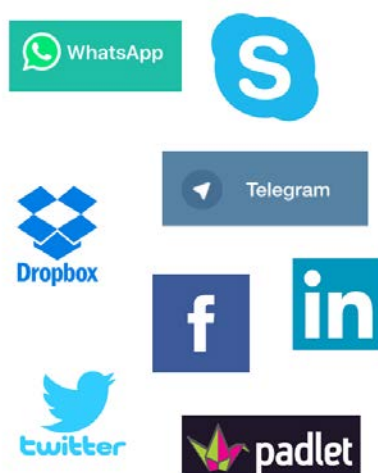- Public social networks: Twitter, Facebook, and LinkedIn.

Figure 3. Logos related to ST, taken from the original websites of the different companies.

Regarding this ST-tools, almost all the teachers and students know them very well, specially, Skype, WhatsApp, Facebook, Twitter and Telegram. They are used in a communication outside of the classroom, but there are more investigations that show the different possibilities of using not only outside, but also inside of the classroom. Collaborative social networking is an emerging issue. Despite the fact that most of the studies on social tools are aimed at achieving better teaching collaboration, through different platforms and social networks, others focus on didactic opportunities to achieve better student outcomes. Most of the studies are contextualized in higher education, being twitter and Facebook the social networks most used for designing this type of experiences. For example, the study of Gleason and Manca (2019) [20] was developed with university students of different degrees with the twitter tool. One of the findings found by the authors is the increasing participation of students, facilitating the understanding of theoretical subjects and using this tool as a way to support students' social and emotional development, increasing engagement and promoting interaction between students, education practitioners and faculty and students. Regarding Facebook, investigations have been found that have asked about the real didactic potential of this social network, considering whether they benefit student learning or are distracting [21]. Among the arguments that argue for its didactic opportunities, greater teacher-student and student-student interaction, better performance, the convenience of learning and greater participation stand out. From a positive perspective towards the use of Facebook for didactic purposes, Chugh and Ruhi (2018) [22] carried out a systematic review of this social network as an educational tool in Higher Education. From the analysis of 88 articles, the authors highlighted its usefulness in language learning. In addition, they identified other benefits such as better communication skills, collaboration and exchange of resources, critical awareness development, higher student satisfaction rates, both face-to-face classes and asynchronous learning. In turn, they pointed out the main challenges linked to the use of Facebook, highlighting *educators' dominance, inactive behaviour, lack of academic language usage, technological and privacy concerns, and discrimination* (p. 610). They conclude the article with a set of recommendations to take into account for teachers who want to include Facebook in their teaching practices, being the rewards mechanism for using Facebook, a teacher's proactive attitude, permanent visibility of the contents, publishing post regularly with questions and discussions on the subject and encouraging students to publish their own posts, the most effective mechanisms to encourage the didactic use of social networks.

Also related to professional learning communities is the study by Mei, Aas and Medgard (2019) [23]. In this paper, the authors assume that Digital learning tools promote learning, pointing out multiple benefits of the use of these tools for teacher professionalization, while demanding that teachers update the education content and not only the technological knowledge. Regarding the technological tools most used for educational purposes, the following stand out *university colleges own digital learning management system (Fronter), streaming of lectures (both flipped classroom and direct transfer), along with social media platforms such as Facebook, and some student activating tools like Kahoot"* (p. 529).

3.4 Personal Tools (PT)

The PT, Figure 4, like the name expresses, are used by the teachers/students to help them developing their ideas, being so as first intention to develop personal projects:

- Online Resource Collections: YouTube, Slideshare, TED Talks, and Vimeo;
- Online Courses/Learning Platforms: Coursera, Khan Academy, and Duolingo;
- Bookmarking and Curation Tools: Pinterest, Diigo, and Scoopit;
- Search & Research Tools: Google Search, Wikipedia, and Google Scholar;
- Mind Mapping Tools: MindManager and XMind;
- Note-Taking: Evernote and OneNote;
- Personal Productivity Tools: Pocket and Google Translate.

Some of them, like Slideshare, TED Talks, Youtube, Duolingo and Khan Academy, had cross the border and are used more than a PT and several times they enter in the area of IT.

Figure 4. Logos related to PT, taken from the original websites of the different companies.

Social media platforms are increasingly important in education. Due to this growing attention, studies such as the one developed by Atanda (2018) [24] have focused on identifying the social media tools most used by teachers in their teaching practices. From a questionnaire to 330 undergraduate faculty of education found that teachers tend to integrate more tools whatsapp, facebook, google+ and wikipedia, than wordpress or slideshare. The literature also includes research on Mind Mapping Tools, indicating that the use of these tools facilitates the understanding and integration of learning in the student body. Supported by Ausubel's theory of learning, [26] justify their use in different areas of knowledge and conclude with a list of Mind Mapping Tools and their characterization, indicating the opportunities offered by each of them. Vitulli & Giles (2016) [27] consider that mind mapping is "a tool for teaching language that helps the teacher introduce or bring together multiple words linked to one subject or theme (...) are effective in teaching and learning because they help easily clarify the communication of complex concepts" (p. 4). In addition to justifying the reasons that place mind mapping as a tool to facilitate learning, they identify software options to create a mind map. [28]

4   POSSIBILITIES AND EXPECTATIONS

The tools presented before assume different roles depending the time, the environment and the person that uses them. The most important is to know how to adapt them according to the needs and objectives to achieve. However in order to be effective, *the relationship between the teacher and student should be good, as it helps to improve academic success* [11]. So, even if schools are full of technology *such as Smart Classrooms, Flipped Classrooms, Virtual Classrooms, Blended Learning, and mobile learning* [12, 28], the developing of a structural methodologies, tested in practice, are needed and mostly require.

Associated to the developing of the Information Communication Technologies (ICT) is the speed that internet suppliers bring nowadays to us, assuring the possibility to almost everyone access to the wide variety of tools everywhere, every time, almost every hour we desire, using for that smartphone and tablets. This devices are winning quickly the race to laptops or computers. It's important to check some data:

- *52.2% of all website traffic worldwide was generated through mobile phones in 2018 [29];*

- *In 2015, over half (52.7%) of global internet users access the internet using mobile devices. By the end of 2019, increasing mobile consumption will have driven this number to nearly 80% [28];*

- *Users do not have the patience for mediocre performance and can be brutal if they feel their time is being wasted. If your mobile site takes longer than 3 seconds to load, you are likely to lose more than half of your potential customers [29].*

So the success and path of education is on the details that we take inside of the classroom, the data presented before show the path and speed that ICT is going to, education should take advantage of the revolution that is going on outside. It seems incredible, but some years ago to solve a problem student raise the hand inside the classroom, making the question and discussing the feedback with teacher and colleagues. Today we have students inside the classroom putting questions in a social network and receiving totally different answers from a wide variety of people [29], some they know, and others probably live far away from them for sure. So the world is giving answers with an incredible speed, increasing even more the role of the teacher to teach student to carefully choose properly the information.

The report experiences presented before, supported in the researches done by investigators across the world indicated that there is no turning back for the inclusion of ICT in Education, whatever is the tool, the process, event or theme. The next years should be devoted to the full inclusion of proper ICT tools in the Education process of teaching and learning.

5 CONCLUSIONS

The ICT tools presented before are educational tools with a huge potential. It is undeniable the power that they have in daily school life, no matter the age, or school level, of the students, and this

> *… is a consequence of the many changes currently taking place in society. The rapid development of technology and work practices is challenging the traditional aims of education. At the same time the advancement in theories of learning and new technologies provide us with qualitatively new methods for coping with these challenges. Knowledge and technical tools for creating, storing and manipulating knowledge are the most critical resources for social and economic development in the advanced information society. [30]*

They can be used in the improvement of learning and to assist the teaching process, also facilitate the introduction of some innovative approaches in the curriculum. Besides, its use in school context should be promoted for social reasons, once students must be prepared to face a technological society outside the borders of school environment. The society demands proficient and active students, able to use new technologies to solve different problems.

We have been witnessing the rise of a distinctive model in education, starting in primary school. On one hand, teaching is very student-centred, on the other; technology is spreading and taking room in school environment. Consequently the roles of the teacher/pupil/parents and the interaction itself have changed.

When we pay attention to the world, we are able to see that a forth revolution is on his way.

> *Previous industrial revolutions liberated humankind from animal power, made mass production possible and brought digital capabilities to billions of people. This Fourth Industrial Revolution is, however, fundamentally different. It is characterized by a range of new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries, and even challenging ideas about what it means to be human. [31]*

The Education community, teachers especially, should pay attention to the changes inside of society, look for the possible different combinations that ICT tools can bring to the teaching and learning process. Our student will create the next century society, their competencies and skills are totally different than

the ones that we had. So Education should adapt to this new paradigm and help students to acquire in the best way tools to deal with the world that they will live on. So, it's very important to give everyone, teachers and students especially, enough knowledge and skills to be prepared for the constant evolution of society and the changes that ICT has promoted in the world.

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