Journal of Positive School Psychology http://journalppw.com
2022, Vol. 6, No. 6, 2837 – 2854

STORYTELLING VIA M-LEARNING: THEORETICAL REVIEW AND VARIABLES ANALYSIS

[1]Orlando Daniel Campoverde Campoverde, [2]Lidya Dolores Alulima Alulima, [3]Elsa Josefa Pezo Ortiz, [4]Leonor Margarita Mena Chiluisa

[1]Instituto Superior Tecnológico Tecnoecuatoriano, dcampoverde@istte.edu.ec
[2]Universidad Tecnológica Indoamérica, lidyaalulima@uti.edu.ec
[3]Instituto Superior Tecnológico Tecnoecuatoriano, epezo@istte.Edu.ec
[4]Instituto Superior Tecnológico Tecnoecuatoriano, margaritamenaedu@gmail.com

Abstract

This research work is especially focused on the analysis of the theory that frames the studies related to the development of strategies based on Storytelling and related to M-learning. The proposed objective is to investigate the different sources of information that support the main theories on the improvement techniques for the learning process around the mediation with information and communication technologies. The methodology of this research is mainly based on the basic bibliographic modality with a qualitative approach. The results help to establish a dynamic solution to the problem detected, in which it is evident that they do not know about the Storytelling and digital narrative technique, so it is necessary to publicize the usefulness and benefits provided by the use of these techniques in classes with students in conjunction with mobile technologies. Therefore, a Storytelling via M-learning guide is proposed to be designed to improve the digital performance of teachers and the active and visible learning of students.

Keywords: M-Learning, TIC, Storytelling, digital narrative.

1. Introduction

This work focuses on the line of research regarding technologies applied to learning in digital environments, which supports the theme "Storytelling via M-learning" this takes great importance since these tools are considered as a mediating instrument in the learning processes, allowing students to establish a relationship of prior knowledge through participation. Likewise, within this possibility, inclusive learning is characterized as the main factor, as UNESCO (2009) states:

Inclusive education is not a marginal issue but is of crucial importance for achieving good quality education for all learners and the development of more inclusive societies. Inclusive education is fundamental to achieving social equity and is a constituent element of lifelong learning (p. 5).

In this sense, it emphasizes the characteristics, capacities, and learning needs with a different approach, and therefore the educational systems must be designed to meet the great diversity of such characteristics and needs that may arise in educational institutions. In the legal framework of Ecuador, the Organic Law of Higher Education in Art. 71.- Principle of equal opportunities. In this regard, the LOES (2018) states:

The principle of equal opportunities consists of guaranteeing all the actors of the Higher Education System the same possibilities in access, permanence, mobility, and graduation from the system, without discrimination of

gender, creed, sexual orientation, ethnicity, culture, political preference, socioeconomic status, mobility or disability (p.32).

In other words, the dimensions of inclusive cultures, policies, and practices denote the social awareness of the role that the educational institution Tecnoecuatoriano provides and offers equal opportunities for progress to all those involved in the educational process with or without disabilities. In this regard, the study has chosen to conduct a qualitative-descriptive literature review of the different technological tools that facilitate the learning processes inside and outside the classroom with a dynamic, attractive, interactive, and personalized approach.

Since the '80s, the first tools were already in evidence, but with a more business and commercial approach, but little used in the educational field, very limited by their complex use and lack of interaction.

Thus, by the 1990s, these tools were already heading towards incorporation in the context of learning, since developers saw the need to facilitate the use of these tools to the user. In this regard, Barquero & Calderón (2016) mention: "The rise of globalization brings with it the modernization of all schemes and systems of global operation. In the techno-scientific era, there is a leap to the invention of new mechanical, scientific, information, and communication technologies" (p. 3), currently, the accelerated technological transition accompanied by the set of technological elements allow to perform different activities in all sectors whether economic, political, social, industrial, educational, among other sectors, in which the importance of incorporating technological tools has been evidenced, because through these technologies processes are facilitated and thus achieve the efficiency of the results expected to be obtained applied to any sector.

All these transformations are contained in the new digital era of the XXI century, also known as the Information Age or Computer Age sustained in ICT, greatly influencing the current knowledge society, an example of the most used technology is "Internet" and it is known in different ways and everyone defines it as it best suits their needs, but in itself, the internet is defined by Belloch (2012) "NETWORK OF NETWORKS, also called global network or worldwide network. It is a global communications system that allows access to information available on any world server, as well as interconnecting and communicating citizens who are temporarily or physically distant" (p.2). It is an integration of thousands of networks and computers interconnected throughout the world through cables and telecommunication signals, which use a common technology for data transfer, using communication protocols such as TCP/IP (Transmission Control Protocol/Internet Protocol). The Internet itself has some characteristics and is considered the central soul of the web.

From the educational approach, it is necessary to emphasize that the knowledge society is increasingly looking for more dynamic ways of learning. In that sense, the current computer era offers a lot of processes to transmit information and knowledge, among these different tools can be used which allow for the building of digital educational resources.

In the network, there are some ways to establish learning sequences, including the use of multimedia tools that allow configuring digital content and are accompanied by multimedia elements such as audio, hypertext, video, or illustrations.

Digital narratives or Storytelling is one of the configurable techniques with technological tools and behaves like a good factor for the learning process, are coupled to the different tools hosted on the Web, these contents can be designed, configured, and structured in free or subscription sites on the Web can be visited by all users from anywhere in the world from a computer or mobile device.

This research addresses the theoretical basis of primary and secondary sources of information on Storytelling and M-learning in education and through the proposal to encourage teachers of the Instituto Superior Tecnológico

Tecnoecuatoriano to use these methodologies and technological tools so that students can: motivate, analyze, and understand the subject under study, as well as produce a more interactive and enjoyable class between teacher and students through access to digital educational resources on the Web, based on the multimedia content configuration from Powton and Genially.

2. Objectives

2.1 General objective

To analyze, from a bibliographic perspective, the theory related to Storytelling and M-learning as well as its application in the strategies designed for the active and visible learning of the students of the Instituto Superior Tecnológico Tecnoecuatoriano.

3. Methodology

This research on Storytelling Via M-learning is based on the qualitative process that allows covering a series of skills to be able to visualize a problem in the learning context. Regarding the qualitative paradigm Hernández Sampieri et al. (2014), state: "It uses the collection and analysis of data to refine research questions or reveal new questions in the process of interpretation" (p. 7). Following this guideline, the registration and analysis of data, primary, and secondary bibliographic sources on the learning techniques Storytelling and M-learning, and the technological tools were carried out.

3.1 Type of research

It should be noted that this work is based on exploratory and descriptive research. Garcia (2019), for his part, mentions: "Exploratory research is intended to offer an approximate overview of a given reality, while descriptive research is used for frequencies, averages, and other statistical calculations" (p. 5-13). In other words, they are investigations that allow adapting, planning, and solving a problem. As mentioned by the author, in the exploratory aspect, to have a general vision of the reality, and in the descriptive aspect, to strengthen the measurement of a series of fundamental characteristics of a certain instant and thus, with the help of the variables, describe the phenomenon of interest.

In this way, these types of research are determined for the proposed work:

Exploratory: To make this research possible, each of the physical interaction classrooms is visited, then the virtual learning environments of the Instituto Tecnoecuatoriano, where the behavior of the teaching-learning process is observed and it is verified that both the physical and virtual have an appropriate technological infrastructure but the use of innovative learning processes in this case (Storytelling mediated by M-learning) by teachers to allow the student active learning, which compromises the interaction, compression, structure of pedagogical content, collaboration, etc.

Descriptive: This modality is possible according to the information collected by the actors in the learning process, teachers, and students of the Instituto Tecnoecuatoriano, and to determine the preferences among the variables through the analysis and interpretation of significant results that allow contributing to the knowledge and solution of the problem.

4. Results

According to different researches regarding Storytelling and M-Learning are factors of innovation in current education that contribute to improving the different ways of relating, either inside or outside the classroom, the way of linking technology with the educational environment requires sufficient techniques, strategies, and methodologies that allow them to adapt to pedagogical content each time. These researches point out that new educational models are currently being established which go hand in hand with technified processes that allow them to carry out learning at all levels in an interactive, practical, and dynamic way. For his part, Buenaño (2016), in his thesis entitled "The Storytelling technique and the reading competence of the English language" highlights the usefulness of this technique since through it

the reading competence is developed, and that in turn contributes to a better academic training and the correct learning of the English language.

Likewise, Molina (2013) conducted the study entitled "Storytelling and Transmedia" and states that Storytelling has become one of the most effective ways to communicate and relate. In this sense, this technique is becoming more common in all sectors, especially in the educational sector, where its use is becoming more frequent because it allows learning to be carried out dynamically and creatively and this increases the interest of students, its combination and structure depend on the way it is configured with the different ICT tools.

Regarding this technique, it should be emphasized that it is a highly important process coupled with technological transfer and that it can be developed inside and outside the classroom through different mobile devices, a process that is part of M-Learning. In this regard, some research on M-Learning shows that this learning strategy allows carrying out portable educational content that can be reviewed and developed through mobile devices. Ramón (2015), in his research "Proposal of a Theoretical Teaching Model for Mobile Learning Environments in Visual Arts Education" points out that technology is increasingly used in all social spheres. According to the above mentioned, the use of mobile devices is very noticeable nowadays, from the most basic and with more functionalities to the sophisticated technology that allows operating, processing, transferring information, etc., to the use of mobile devices.

4.1 Analysis of the Storytelling and M-learning variables.

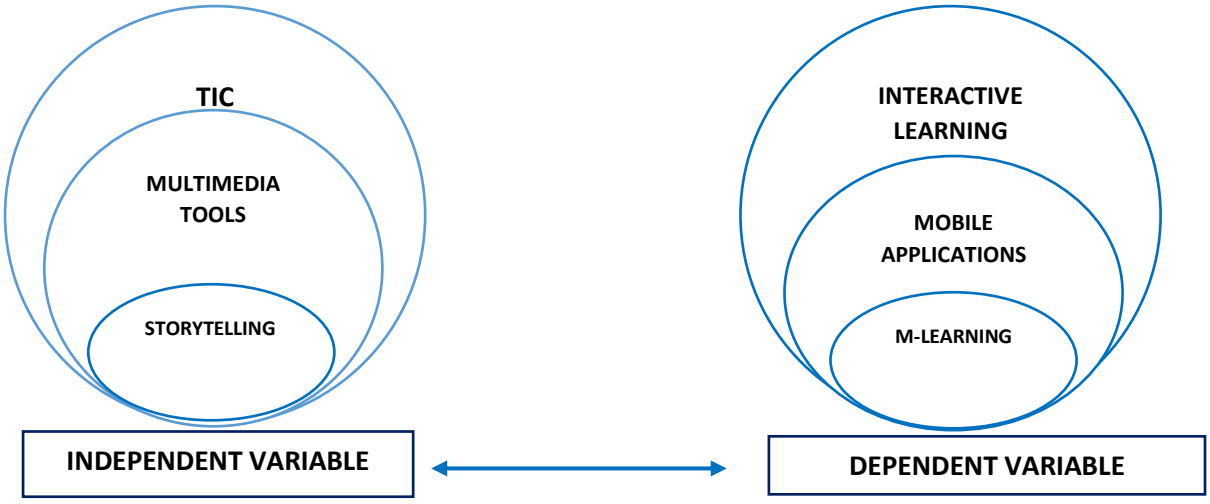

Figure 1. Logical Variable Organizer

Source: Own elaboration

4.1.1 Development of the independent variable

ICT

The meaning of the acronyms is the following: New Information and Communication Technologies, are those that allow multitasking based on the recovery, storage, and distribution of the communication and information process optimizing time, space, and economic resources. In this sense, according to (UNESCO, 2002, p. 10), it refers to the following:

ICTs are conceived as the universe of two sets, represented by the traditional Communication Technologies (CT) - constituted mainly by radio, television, and conventional telephony - and by the Information Technologies (IT) characterized by the digitalization of content recording technologies (computing, communications, telematics, and interfaces).

In this regard, there is a great diversity of technological tools with technical and expressive character. By mentioning these two terms, it is preferred that the technology is based

on immateriality, digitalization, and automation, while the expressive tends to be hypertextual, hypermedia, multimedia, and virtual reality. In this way, it is necessary to emphasize the diversity with which the potentialities are generated towards new communication environments, and new ways of accessing, generating, and transmitting the information. All this is possible through the scientific, technological, and engineering dynamics coupled with the new paradigms of interaction between machines and human beings.

Multimedia tools

The combination of different elements such as text, images, and video among other digital formats converts a multimedia process used for accompaniment in the digital market, digital transformation, and educational processes among other uses. In this regard, Belloch (2012) highlights the "combination of different media: text, image, sound, animation, and video. Computer programs that use in a combined and coherent way with their objectives different media, and allow interaction with the user are interactive multimedia applications" (p.1). Multimedia as such has its digital dimension, which is an important reason for compact interaction with different resources with attractive design for the user.

The construction of multimedia contents or resources is possible with the use of special technological tools to be able to structure, configure, render, and package all possible elements to obtain as a result a product that when used in any specific field tends to facilitate the processes and expectations of the user.

The multimedia tools are those that allow building each content from the simplest to the most complex, but if you must take some special characteristics of these tools according to Belloch (2012), these tools can take the course according to the professional level, if these programs can be: "Closed programs, semi-open, open". He indicates that closed programs cannot be modified, semi-open ones can be modified in some characteristics and open ones are modifiable so that the user can use and adapt them according to his needs.

Next, some tools that allow building multimedia content or resources with digital characterization are shown. In this sense, some examples of specialized programs for the design and construction of interaction dynamics of educational and commercial learning, among other usabilities in the digital context, are exposed.

Genially: web tool with animation, interaction, and integration-based features, free to use and subscription based, that allows building visual and audiovisual material with a wide range of functions to create presentations, gamification, infographics, interactive graphic organizers, etc.

Google Slides application that allows creating presentations, modifying them online, network collaboration, building games, etc. It is free to use, but it is necessary to create an account to access its functions.

Keynote: is a powerful tool that allows creating presentations through the use of its functions and its great diversity of mind-blowing effects typical of this application. They work with different operating systems and are compact with some hardware devices.

PowToon: is an online platform for creating animations and all kinds of video presentations. It is a multimedia tool with a large number of functions that allows editing and design of resources according to the need the ease and advantage of the tool do not need to be installed on computers, can be used online for creating animated presentations and academic activities where you can take advantage of all the functionality available for creative tasks, small narrations accompanied by voice and music, text, images, etc.

Storytelling

Definition

Regarding Storytelling, there is a great number of concepts, all of them according to their use and application, from the commercial approach to the pedagogical one, a definition that helps to understand this technique in a better way. For its part, HULL & KATZ (2006) define this technique as follows:

Digital Storytelling is a novel narrative technique that facilitates the presentation of ideas, communication, or transmission of knowledge, through a particular way of organizing and presenting multi-format information, supported by the use of technological and digital media of various kinds, including Web 2.0 tools. Its process of construction and elaboration of stories provides the opportunity to generate attractive scenarios for learning, in which everyone can adopt the role of producer of audiovisual content.

In this regard, digital storytelling takes a characteristic based on story composition and becomes a communication tool of great influence in different social sectors, but this form of communication and transmission gathers the literary approach with the linguistic, rhetorical, grammatical, textual, narratology, etc. dimension. But this dynamic is not possible without the intervention of technological tools mediated by multimedia elements to make this technique more accessible, interesting, motivating, and above all a great contribution to teaching-learning processes.

History

According to several kinds of research, Storytelling is one of the most ancient activities, but with time it improved according to the different forms of evolution and the way of communicating starting from the development of oral and written language. People had a great fascination and charm to tell stories to entertain, reflect, advise, and moral lessons. This is how they tried to understand stories or give reasons for inexplicable facts or events. Characters such as Homer, Tolstoy, Sophocles, and Shakespeare told stories that allowed understanding of universal myths.

This is how it takes a greater significance in the United States said (Salmon, 2008) in his work "the machine of making stories and formatting minds" and as time goes by it takes importance in the rest of the world, as digital storytelling has emerged in recent years as a powerful teaching and learning tool that involves both teachers and their students. However, until recently, little attention has been paid to a theoretical framework that could be employed to increase the effectiveness of technology as a tool in the classroom environment.

Approach

The combination of different forms of communication between human beings is through oral and written language and to understand an event we must opt for the story from the point of view Storytelling is the narrative that has been practiced for a long time and nowadays it is more transcendental mediated by technologies that is why it presents a digital narrative approach, and that can be transmitted from different media.

Digital feature

The characteristics of any digital resource vary according to the adequacy, suitability, priority, need, interactivity, and transferability. For his part, López (2016) states that "Digital educational resources can be understood as any material that has been created with a formative purpose and that is available in electronic media. These materials cater to different topics, formats, and conditions of use". Regarding the digital characteristics, the author refers that this moves around the formats where the textual, sound, visual, audiovisual, and multimedia concession is involved.

To understand the digital characteristics of Storytelling, some layers of the stories are considered according to Lambert (2009), who exposes in his work the following: "The audio layers are recorded voice-over, recorded voice-over concerning sound, either music or ambient sound, music alone or in contrast to another piece of music". That is, it is a multi-format nexus that tends to be interactive, instantaneous, non-linear, articulation of word and image, so in this way, its objective is that learning is routed with constructive dialogue, under the asynchronous and synchronous approach, and between the various actors using digital media to communicate and interact.

Elements of digital storytelling

Most of the stories are told using components such as argument, plot, structure, and suspense, these in turn tend to be components of the stories

where the event, characters, time, and space intervene. When relating this set of elements to multimedia mediation, the following elements are considered as part of a digital narrative, as mentioned by Bull & Kajder (2004), who mention seven elements:

- The point of view of the author-narrator.
- Dramatic issue.
- Emotional content.
- The author's voice.
- The power of the soundtrack.
- The economy is the details of the story.
- And the rhythm of the narrative.

Digital stories by incorporating all these elements according to the author allow the action of storytelling supported by technologies that when combined with different multiformat help the creation of motivating and interesting stories, thus becoming a further contribution to learning through didactic, reflective, and persuasive dynamics.

Importance

When people need to attract the attention of the public in some way, some strategies or methods are necessary to reach different social groups to offer a product or service, some may work, others may not, depending on how the information about each of the products is delivered, these may be services related to education, politics, economics, among other sectors. In this sense, Chávez (s. f) explains that "The importance of Storytelling in digital content is to highlight that consumers are not only interested in acquiring a product, in other words, but a story must also represent values. This is where the importance of Storytelling comes to the fore because this technique accompanied from the point of view of all possible elements for digital storytelling helps to present a consensual, structured story that manages to attract the attention of the public and thus share an emotional, motivating, reflective link about a brand or social action.

Benefits

The diversity in terms of benefits of Storytelling depends on the area to be used, big brands usually use this strategy to reach the public to offer their products through the use of digital storytelling which makes more interesting the acceptance of the select or non-selective public. In short, thanks to this communication strategy can be achieved the acceptance of the community inclined by any sector, in that aspect seven benefits are linked to the business management (DigitalMenta, 2020):

- Generates confidence in users.
- Get the user's attention.
- Humanize the brand.
- It favors a long-term relationship with the potential customer.
- The brand becomes your followers' favorite.
- Storytelling is capable of transforming anything into something extraordinary.
- Share all the information desired in a very natural way.

According to the author, these seven benefits have the efficacy of communication because they allow identification with the contents through effective involvement.

Now in terms of learning, the most outstanding benefits are also highlighted according to Haven (2000), "Motivation, meaning, fluency in oral and written comprehension, fluency in oral and written expression, language awareness, and communication" while Hamilton & Weiss (2005), mentions "Improved visual perception and representation through the mastery of expressions". In this context, traditional narratives tend nowadays to be more transmitted because they acquire new dimensions based on the incorporation of technological tools that foster interest and motivation, and also promote an emotional implication because in this way the messages facilitate a more fluid communication and bidirectional interaction.

Digital storytelling steps

To establish the steps of digital storytelling, it is necessary to consider the type of stories to be designed and structured to be transmitted by different media, these stories can be personal, historical events, informative or instructive. Figure 1 shows the eight steps suggested to build a digital narrative.

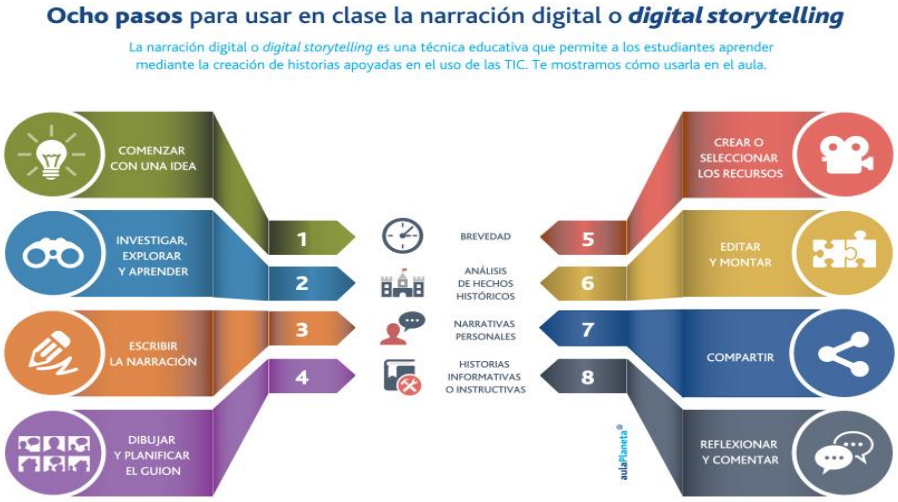

Figure 1. Eight steps to create a digital story.

Source: aulaPlaneta (2015).

The creation of a digital story involves acquiring the audience through the different types and elements to generate a more effective communication of the message that carries these stories to deepen the pedagogical strategies around the creation of digital stories, so then according to the eight steps in Figure 1. There are several elements to take into accounts such as selecting the theme, structure, characters, and specialized programs for the incorporation of the various multimedia elements. According to these considerations, the type of story to transform into a digital narrative must be chosen, which involves planning before the outlining the structure of the story, thus starting from an initial, basic and advanced level. Figure 2 shows how the story is structured.

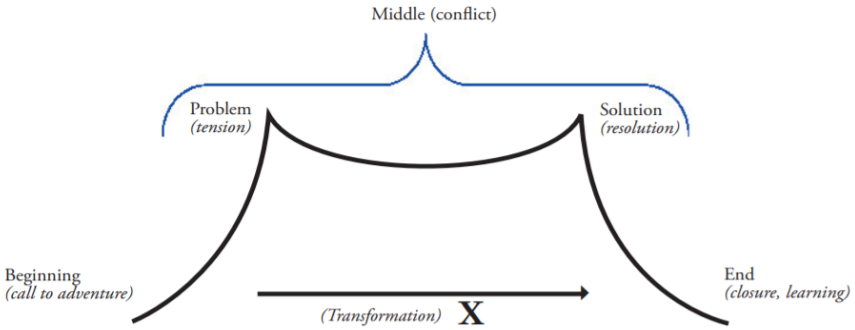

Figure 2. Visual Diagram of the Portrait of History.

Source: (Dillingham, 2001), transformation (ohler, 2003).

Processes of digital narrative construction with software

To create digital narratives, it is possible to create them with tools already structured based on easy editing without major knowledge in computer language programming, these tools have already structured blocks to be configured easily and dynamically. In this regard, there are special tools, which do require a degree of

programming knowledge to create digital narratives from scratch with open or closed sources.

So, in this way, it is necessary to understand what is software? To answer this question, it is necessary to take as a reference the definition of the following authors (Ocampo & Sanchez, 2015), "Software or programs are the intangible and logical elements of a computer equipment". In itself, these programs are classified into three categories: system, application, and programming, by any of the three categories all, are a set of instructions based on data or well known as the binary language that in practice is stored in a memory and need an executable for the processor to understand the instructions and deliver the results expected by the user.

To build a digital narrative based on the technical process, some considerations must be taken into account depending on the type of story and the program to be used:

- Type of software to be used (open or closed source)
- Multimedia language
- Avatar-based characters
- Object or block programming logic
- Computational thinking
- Variables
- Conditionals
- Operating system features

Digital storytelling configured from PowToon

This is what PowToon is all about:

PowToon is an online educational tool for creating animations and all kinds of video presentations. The platform has a very intuitive English interface that allows us to create customized animated presentations and videos with a high-quality results TSP PROJECT (2015).

The environment of this program makes programming very creative and above all accessible, from its intuitive and graphical interface. It offers a range of possibilities and options to configure each of the blocks allowing a series of actions on the objects so that they can have a certain behavior and action. The stories built from this software allow maintaining creative thinking, abstract reasoning, computational thinking, problem-solving, autonomous learning, and collaborative work. To demonstrate the configuration of the story through the digital narrative, we will take as an example the aforementioned story of "The story of the BIOS kidnapping". This is an invented story that is very useful for the students of the TECNOECUATORIANO Institute to empower themselves with the tools offered by ICT and to understand the computer terms since some of the students do not have greater motivation in learning, this story is based on the kidnapping of BIOS, to convert it to the digital narrative we have taken Powton as an ideal tool where some multimedia elements such as audio, hypertext, illustrations participate.

Likewise, with this program, the interactive blocks were proceeded to configure so that the digital narrative is told from this same program with textual and graphic behavior. From there it can be used by other users of the network and it depends on whether they use it to tell it via mobile, podcast, textual, video, or expository without losing the digital thread of the narrative through the different transmedia media.

4.1.2 Development of the dependent variable

Interactive learning

In this regard, Abreu Alvarado et al. (2018) state that the teaching-learning process (TLP) is conceived as the space in which the main protagonist is the student and the teacher fulfills the role of facilitator of the learning processes. It is the students who construct knowledge by reading, contributing their experiences, and reflecting on them, exchanging their points of view with their classmates and the teacher (p. 611).

The authors refer to the production through the appropriation of knowledge especially considering the point of view of the integral development of the students, they are the learners who promote this structure of

knowledge from their reflections through participation, communication, and collaboration within the educational environment.

Interactive learning according to Quiroz et al. (2016), “Is a learning dynamic that is based on learning by doing, where the axis is the interactivity between users, generating spaces for socialization and feedback within the virtual learning community”. In this aspect, the student's knowledge structure can be accompanied by different technological tools to maintain interactive learning. In this dynamic of interactive learning, the teacher has the challenge of learning how to use technological resources and take advantage of the essential characteristics offered by virtual learning environments and thus enhancing the collaboration and participation of students to develop the skills of search and organization of information and share it with the entire educational community, to promote an active adaptation in solving problems within the context through the use of technologies and with the accompaniment of recreational activities that harmonize active learning in the student.

Mobile applications

Mobile applications, according to Enriquez & Casas (2017), are “programs developed to run on mobile devices”. These small programs are designed to work on different platforms such as Google Play Store, Android, and iOS, among other platforms that allow its functionality and interaction with the user to transmit, carry and share information quickly and from anywhere. Currently, there is a large ecosystem of mobile applications that facilitate business, communication, and educational processes. They are very important in today's society, covering an immediate need, and customizable with content. Taking advantage of these possibilities in the educational aspect is the direct support for the articulation of innovative learning strategies using the most accurate segmentation criteria.

The following are the main mobile applications of the many that are currently available that are related to learning.

Kahoot! Reinforcement of student learning through interactive quizzes that can be completed from a computer and mobile device.

QuickMark. Program to decrypt the information stored in a QR code pattern. Widely used in the educational field allows access to the web quickly through the previously configured links, and allows one to obtain detailed information about a product or content by focusing the camera from any mobile device.

Storyline creator. Small program to create Storytelling effectively with ease of incorporating characters, notes, and scenes among other alternatives offered by this application to create timelines, etc.

GifX. Program composed of more than 200 GIF effects, ideal for creating digital narratives by integrating voice and images.

M-learning

Definition

M-learning is defined by Lagos (2018) as the use of small portable digital devices such as smartphones and tablets, which allow to establish data and information communication wirelessly with speed and versatility. Mobile learning has benefits such as accessibility, connectivity, and ubiquity, i.e., access at any time and place, thus breaking the barriers of time and space. M-learning is the improved version of e-learning (online or virtual learning), which is universalized in all fields of human action. The use of such devices and their applications implies adapting digital materials to be better used.

The m-learning process, as its name indicates, translated into Spanish as mobile learning, occurs through different mobile applications, gamification, social interaction, augmented reality, etc. Also, UNESCO (2012) defines mobile learning as “that which is facilitated by cell phones, alone or in combination with other technologies”. This new innovative approach allows to facilitate the construction of knowledge as well as to develop in learners the necessary skills for problem-solving in terms of learning, this methodology associates the educational dimensions of behaviorism,

cognitivism, constructivism, network collaboration, and therefore connectivism.

Characteristics

Among some characteristics of m-learning, Mejía (2020) mentions: (1) the use of mobile devices is characterized by being portable to access information wirelessly. (2) It also allows functional learning, since it can take place anywhere or at any time. (3) This allows self-learning by accessing information in real time. (4) It also allows objective learning, because many resources can be accessed from different authors. (5) It allows the use of applications for learning or content creation. (6) It has sensors such as an accelerometer, GPS, camera, etc., (7) each user can use his mobile device for personal use, and (8) the touch screen allows the use of other functions (p. 2).

According to the author, the characteristics of m-learning are attached to the educational process, its characterization allows for active and participative student learning due to its multifunctionality, connectivity, instantaneous, digitalization, interactivity, flexibility, ubiquity, accessibility, and portability.

Because of these characteristics, it should be mentioned that they also tend to have a special effect due to their portability, technological in terms of their innovation; they are also temporary in terms of their short use and constant updating of mobile technological resources, hardware, and software, in this case, the applications. Figure 3 shows the characteristics of m-learning in a more structured way, considering how these characteristics are interconnected.

Figure 3. Characteristics of m-learning.

Source: Evirtualplus (2018).

Thanks to these features of m-learning, self-learning can be managed through real-time access to information and digital educational resources.

Technological resources

Technological resources are defined as follows according to Encyclopedia Economica (2019), “Technological resources are means by which technology is used to accomplish a purpose. These can be physical, called tangible; or invisible, called intangible or transversal”. According to the author, these resources fulfill very useful functions because they allow the development of tasks to be carried out quickly and easily. For their part, Morán Peña et al. (2017) assert that “technological resources constitute a systematic way of designing, conducting, and evaluating the total teaching process from the use of various resources that enhance the task of teaching”. They refer to how

to use or integrate computer, telematic, and multimedia resources. In this sense, considering the technological resources that are part of the set of information technology in the m-learning aspect are the portable devices and as such the programs or applications that allow working, access, and research information from different devices and from anywhere. The following is a list of technological resources based on the use of m-learning. The types of mobile devices (Hardware) are:

- Smartphones
- PDA
- Tablets
- Portable video game consoles
- MP3 players
- Notebooks
- Smart speaker with Alexa
- Smartwatches

Types of mobile applications (interaction software)

- Facebook
- Instagram
- LinkedIn
- Telegram
- Docs To Go
- WhatsApp
- ScreenCast
- Moodle
- Commands For Alexa
- YouTube
- Google
- Fastory
- Quizlet

Advantages of its use in the classroom

The advantages of m-learning are very propitious in terms of its use, in this way it is possible to learn from anywhere and at any time, facilitating personalized learning and allowing instant responses from teachers, as well as encouraging continuous cooperative and collaborative learning. Some of the advantages offered by m-learning are shown in Figure 4.

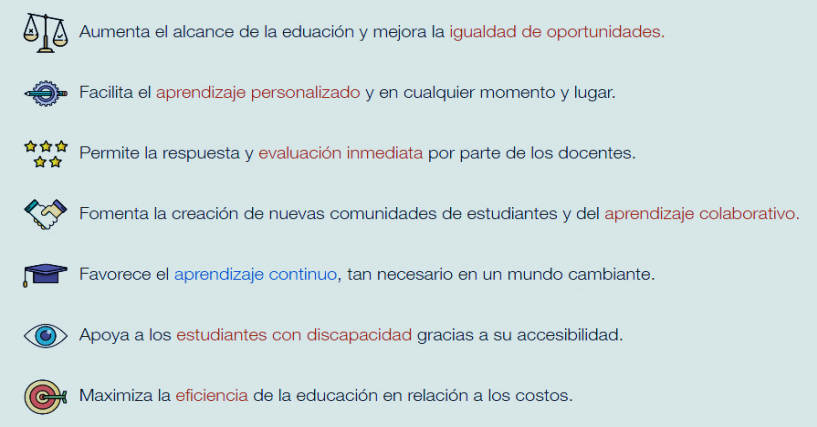

Figure 4. Advantages of mobile learning.

Source: Iberdrola (2021).

In terms of equal opportunities, m-learning highlights this advantage because it allows all users to interact and use these media optimizing economic resources and access to any content on the web and different social networks among other content or learning platforms, thus helping to overcome the digital divide for all users.

Disadvantages

One of the main disadvantages of m-learning is that these tools to function synchronously need

internet access to be able to share and collaborate among other activities more related to mobile learning. Among other disadvantages of the applications according to Mosquera Gende (2018), "there is no responsible use. Misuse of photo and video camera: cyberbullying. Discussions by Whatsapp". Users to make responsible use of these resources need control by themselves, derives, in this case, the ethics and morals of each user technology is not handled by itself requires the intervention of people prepared in values in the social aspect, in the technical aspect some disadvantages are exposed:

- Some applications do not work without internet access.
- Limited functions without payment or subscription to them.
- Excess of advertisements.
- Compatibility with other operating systems.

Types of operating systems

The operating system is a general program that allows the control and management of hardware resources and software applications. It is necessary to consider what Stallings (2005) mentions, "it exploits the hardware resources of one or more processors to provide a set of services to the users of the system. The operating system also manages secondary memory and I/O (input/output) devices for its users". In this regard, operating systems offer the user the most accurate form of communication through the graphical interface of human-machine interaction.

In this sense, when referring to m-learning, the operating systems fulfill a similar function but with different compatibility in all the management performed by each of the operating systems (OS), for mobile devices, some types of OS allow operating each of the sections of these devices among these sections are established the following: GSM communication section, synchronization, messaging, sensors, webcams, GPS, audio, battery, screen, etc. All these functions work with the following types of OS:

- Android OS: open-source multitasking can be modified based on Linux.
- Ios: closed source cannot be modified.
- Symbian OS: allows the design of cross-platform applications.
- Blackberry OS: can work with Novell GroupWise, Microsoft Exchange Server, and Lotus Notes synchronization tools.
- Windows Phone OS: office versions can be used on the PC, but in terms of applications it is very unlimited.

Competencies

Competence is understood as the capacities and knowledge retention skills that each individual has to be able to perform an activity in the context as well as in the solution of problems. For his part, Attewell (2009) states that "Competence is the ability to do something, but the word competence also connotes a dimension of increasing ability". According to the author, competence is an ability or skill that every person must have to be able to perform personally, at work, and professionally. By relating these characteristics of competence to m-learning, he bets on innovative learning.

Within the competencies, actors are considered and these are the teacher, institution, and student, in other words, it is necessary to understand the dynamics of m-learning. In the pedagogical aspect related to m-learning the authors (Flétscher Bocanegra & Morales González, 2007, p. 21) mention the following:

To guarantee the use of the model, it is required that the new actors, students, teachers, and institutions, possess characteristics mediated by the management, adoption, and appropriation of technologies and focused on the exploration of active pedagogies based on direct experimentation.

The author in this case refers to the adoption and appropriation of technologies to maintain active learning, then the issue of technological mobility as a useful tool for academic processes and activities becomes important, emphasizing the interactions and competencies around speed,

connectivity, participation, communication, digitalization, key points in the teaching-learning process.

Interaction

It is a scenario of communication between two or more individuals in the social context, with the subject occupying a central place in the process in which different ways of interrelating intervene, using instruments such as symbolic language, codes, etc. In other words, according to Rizo (2004), "Human beings establish relationships with others through interactions that can be qualified as social processes. Thus, communication is fundamental in every social relationship; it is the mechanism that regulates and makes the interaction between people possible" (p.56). It is necessary to highlight what the author mentions about the interaction or the way of relating, for that to happen it is necessary to consider the elements involved in communication that are very important to maintain a precise interaction in the visual, verbal, and vocal aspect:

- Sender
- Receiver
- Communication channel
- Information or message to transmit
- Code or sign system
- Context

A key aspect today is the way of communicating through different means or technological resources which transforms the ties and links between people in a faster and more effective way known as virtual interaction, are the facilities offered by technology. These modes of interaction are mediated by technology, especially the Internet as the main resource that makes possible network communication between different devices to share and process information.

Something similar happens in the m-learning process where the same dynamics of receiving, processing, and returning information are established, here the advantages of technology are highlighted and how it influences the learning process where the main dynamics of interaction stand out:

- Collaborative work in network.
- Graphical device-human communication interface.
- Teacher-student-content interaction.
- Information exchange.
- Simulation with augmented reality.
- QR code.
- Constant participation.
- Synchronization of information.
- Remote access.
- Digitalization of content.
- Interaction on social networks.
- Gamification.

5. Conclusions

The importance of knowing the origin and meaning of elements such as Storytelling and the tools that allow taking advantage of the strategies designed through M-learning, to enrich the teaching-learning processes in an environment where education, as well as many other sectors, have been exposed to experience changes of globalization and technological advances that facilitate the fulfillment of certain tasks, have been exposed to experience changes due to globalization and technological advances that facilitate the fulfillment of certain tasks, therefore, managing an inclusive language regarding the new tools created to dynamize the generation of new knowledge, ensures that their relationship with students and teachers, is successful and of great benefit to all stakeholders related to educational institutions.

Regarding ICT tools, a diagnosis of some of them was made considering their importance and benefit to carry out the learning process through the use of fixed and mobile devices, recognizing their benefits that these allow supporting education in classroom and

electronic form for its great ability to transmit information and communication instantaneously, which is good support for teachers to interact with the student.

Due to the lack of knowledge of teaching techniques in the Instituto Tecnoecuatoriano, the different techniques that support the learning process were analyzed and Storytelling was selected, which allowed the creation of stories that helped both teachers and students to connect with their emotional part and to establish from their dynamics the methods to solve the different situations raised in the academic context. All this was possible through the structured digital narrative with the sequence or the suggested steps and with the support of multimedia tools Powton and Genially that allowed to digitalize the stories and share them in the network through mobile devices.

6. Recommendations

Design training strategies by the educational management to keep the teaching staff updated in the use of technological tools to diversify teaching methodologies, as an added value in search of the perceived quality in the teaching-learning processes, seeking with this the motivation of teachers through the generation of skills that allow the correct and effective use of technological resources.

Encourage teachers of the Instituto Tecnoecuatoriano to use the storytelling technique in their classes, since in this way they can offer interactive and attractive contents where they can easily understand even complex topics, and in this way, students can develop their cognitive skills collaboratively and individually.

It is necessary that teachers are interested in implementing in the guides or syllabi continuously strategies, and innovative interactive resources that allow them to strengthen and motivate the learning of students by allowing them to perform their activities through digital narratives and present them on their mobile devices.

References

[1] Abreu Alvarado, Y., Barrera Jiménez, A. D., Breijo Worosz, T., & Bonilla Vichot, I. (2018). El proceso de enseñanza-aprendizaje de los Estudios Lingüísticos: su impacto en la motivación hacia el estudio de la lengua. Mendive. Revista de Educación, 611.

[2] Alonso, A. B., Ferreira Artime, I., & Rodríguez, M. Á. (2011). Dispositivos móviles. E.P.S.I.G : Ingeniería de Telecomunicación Universidad de Oviedo , 1.

[3] Attewell, P. (2009). ¿Qué es una competencia? Pedagogía Social. Revista Interuniversitaria, (16), 21-43. Recuperado el 02 de Junio de 2021, de https://www.redalyc.org/pdf/1350/135012677003.pdf

[4] aulaPlaneta. (2015). Ocho pasos para usar en clase la narración digital o digital storytelling [Infografía]. Recuperado el 15 de mayo de 2021, de https://www.aulaplaneta.com/wp-content/uploads/2015/07/Inf_Storytelling_Con_Tic.jpg

[5] Barquero, A., & Calderón, F. (2016). INFLUENCIA DE LAS NUEVAS TECNOLOGÍAS EN EL DESARROLLO ADOLESCENTE Y POSIBLES DESAJUSTES. CÚPULA, 3.

[6] Belloch, C. (2012). Aplicaciones multimedia. Recuperado el 09 de Mayo de 2021, de https://repository.unad.edu.co/bitstream/handle/10596/5119/208062.pdf?sequence=1

[7] Benavides Bailón, J. M., & Mendoza Lino, P. (2020). El storytelling en la educación superior: un análisis del impacto y pertinencia de la narración de historias en el proceso formativo. Revista Científica Hallazgos21, 5(2), 149-161, 2.

[8] Buenaño, J. (2016). LA TÉCNICA DE NARRACIÓN DE CUENTOS (STORYTELLING TECHNIQUE) Y LA COMPETENCIA LECTORA DEL IDIOMA INGLÉS. Ambato. Obtenido de https://repositorio.uta.edu.ec/bitstream/123456789/23975/1/J%C3%A9ssica%20Lisbeth%20Buena%C3%B1o%20Pico%20TESIS%20FINAL.pdf

[9] BULL, G., & KAJDER, S. (2004). Digital Storytelling in the language arts classroom. Learning & Leading with Technology, 46-

49. Obtenido de https://files.eric.ed.gov/fulltext/EJ697294.pdf
[10] CEPAL. (2020). Universalizar el acceso a las tecnologías digitales para enfrentar los efectos del COVID-19. Recuperado el 06 de febrero de 2020, de https://repositorio.cepal.org/bitstream/handle/11362/45938/S2000550_es.pdf?sequence=4&isAllowed=y
[11] Chávez, E. (s.f). La importancia del Storytelling en los contenidos digitales. Recuperado el 2021 de mayo de 15 , de Marketing Insider Review: https://www.marketinginsiderreview.com/importancia-storytelling-contenidos-digitales/
[12] ConectaCode. (s.f). CREAR CON SCRATCH: Materiales de inicio a la programacion creativa. Obtenido de https://fundacionesplai.org/wp-content/uploads/2017/04/Crear-con-Scratch.-Introducci%C3%B3n-a-la-Programaci%C3%B3n-Creativa.pdf
[13] DigitalMenta. (2020). Beneficios de integrar el storytelling en tu estrategia digital. Recuperado el 15 de mayo de 2021, de https://www.digitalmenta.com/inbound-marketing/storytelling/
[14] Dillingham. (2001). Diagrama Visual del Retrato de la Historia. Obtenido de http://www.jasonohler.com/pdfs/storybook11-v2-vps-extracts.pdf
[15] Enciclopedia Económica. (2019). Recursos tecnológicos. Obtenido de https://enciclopediaeconomica.com/recursos-tecnologicos/
[16] Evirtualplus. (2018). «M-Learning: educación móvil en el aula». Obtenido de https://www.evirtualplus.com/m-learning-educacion-movil/#Cuales_son_las_caracteristicas_basicas_del_M-Learning
[17] Flétscher Bocanegra, L. A., & Morales González, Á. I. (2007). Modelo de desarrollo de servicios m-learning, una propuesta desde la concepción del servicio hacia la pedagogía. Revista Virtual Universidad Católica del Norte, 1-22. Recuperado el 02 de Junio de 2021, de https://www.redalyc.org/pdf/1942/194220377001.pdf
[18] Freire, J. (30 de junio de 2020). El Universo . Obtenido de En Ecuador ha aumentado la demanda de internet y el consumo de contenido debido al aislamiento: https://www.eluniverso.com/larevista/2020/06/29/nota/7888932/ecuador-ha-aumentado-demanda-internet-consumo-contenido-debido
[19] García, I. (2019). Investigacion exploratoria, descriptiva, explicativa y correlacionaL. Obtenido de http://148.215.1.182/bitstream/handle/20.500.11799/108148/secme-1623_1.pdf?sequence=1
[20] Guerrero, E. (2014). Aprendizaje y TIC en el siglo XXI . Revista Internacional de Humanidades , 81.
[21] Hamilton, M., & Weiss, M. (2005). Children tell stories. Teaching ans using storytelling in the classroom. Katonah, Nueva York: Richard C. Owen.
[22] Haven, K. F. (2000). Super simple storytelling: a con-do guide for every classroom, every day. . Eaglewood,Colorado: Teacher Ideas Press.
[23] Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2014). Metodología de la investigación (6a. ed. --.). México D.F.: McGraw-Hill.
[24] HULL, G., & KATZ, M. (2006). Crafting an agentive self. Case studies of digital. Research in the Teaching of English, 41.
[25] Lagos, G. G. (2018). El m- learning, un nuevo escenario en la educación superior del Ecuador . INNOVA Research Journal 2018. Vol. 3, No.10.1, 114.
[26] Lambert, J. (2009). Digital Storytelling. Berkeley: Digital.
[27] Lion, C. (2019). Los desafíos y oportunidades de incluir tecnologías en las prácticas educativas. Análisis de casos inspiradores. Obtenido de https://www.buenosaires.iiep.unesco.org/sites/default/files/actividades/2019-09/An%C3%A1lisis%20comparativos%20-%20Pol%C3%ADticas%20TIC%20-%20Carina%20Lion_0.pdf
[28] LOES. LEY ORGANICA DE EDUCACION SUPERIOR. (2018). CAPITULO 1. DEL PRINCIPIO DE IGUALDAD DE OPORTUNIDADES. Quito. Obtenido de https://www.epn.edu.ec/wp-content/uploads/2018/08/LOES.pdf
[29] Lopera Echavarria, J. D. (2010). EL MÉTODO ANALÍTICO COMO MÉTODO NATURAL. Nómadas. Revista Crítica de Ciencias Sociales y Jurídicas |,

25. Obtenido de https://pendientedemigracion.ucm.es/info/nomadas/25/juandiegolopera.pdf
[30] Lopez Escarcena, S. (8 de noviembre de 2010). PARA ESCRIBIR UNA TESIS JURÍDICA: TÉCNICAS DE INVESTIGACIÓN EN DERECHO. Obtenido de http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0718-00122011000100010
[31] López Jiménez, I. E., & Villafañe Rodríguez, C. (2010). LA INTEGRACIÓN DE LAS TIC AL CURRÍCULO: PROPUESTA PRÁCTICA. RAZÓN Y PALABRA, 3.
[32] López, K. (2016). Lo que decimos sobre la: Caracterización de los recursos educativos digitales compartidos por centros y programas de escritura de Latinoamérica. Grafía, 4.
[33] Mejía Dávila, M. R. (2020). M-Learning: características, ventajas y desventajas, uso. Revista Tecnológica-Educativa Docentes 2.0, 8(1), 50-52.
[34] Mendoza, J. R. (2010). Curso de Derecho Penal Venezolano TomoIII. Caracas.
[35] Molina, A. (2013). Storytelling y la Transmedia. Guayaquil. Recuperado el 13 de Marzo de 2021, de http://dspace.casagrande.edu.ec:8080/bitstream/ucasagrande/217/1/Tesis691MOLs.pdf
[36] Morán Peña, F. J., Rosero Lozano, J. M., & Olvera Vera, L. A. (2017). Recursos Tecnológicos. Guayaquil : COMPAS.
[37] Mosquera Gende, I. (2018). M-learning: ventajas e inconvenientes del uso educativo del móvil. Revista UNIR. Obtenido de https://www.unir.net/educacion/revista/m-learning-ventajas-e-inconvenientes-del-uso-educativo-del-movil/#:~:text=Se%20producen%20robos%20de%20m%C3%B3viles,Divergencia%20de%20acceso.
[38] Mosquera, I. (2019). Las cifras no mienten: la digitalización en las aulas es una realidad a nivel mundial. Recuperado el 06 de febrero de 2020, de https://www.unir.net/educacion/revista/las-cifras-no-mienten-la-digitalizacion-en-las-aulas-es-una-realidad-a-nivel-mundial/
[39] Ocampo, A., & Sánchez, E. (2015). Hardware y Software. Recuperado el 19 de mayo de 2021, de http://repository.uaeh.edu.mx/bitstream/bitstream/handle/123456789/16657/PE_T1_U1_HardwareSoftware.pdf?sequence=1
[40] Ovelar, R., Benito, M., & Romo, J. (2009). Nativos digitales y aprendizaje. ICONO, 38. Recuperado el 15 de enero de 2021, de file:///C:/Users/DANIEL%20CAMPOVERDE/Downloads/Dialnet-NativosDigitalesYAprendizaje-3101495.pdf
[41] PROYECTO TSP . (2015). Herramienta Powton. Obtenido de Gobierno de Canarias: https://www3.gobiernodecanarias.org/medusa/ecoescuela/recursosdigitales/2015/09/29/herramienta-powtoon/
[42] Quiroz, J. S., Fernández Serrano, E., & Astudillo Cavieres, A. (2016). MODELO INTERACTIVO EN RED PARA EL APRENDIZAJE:HACIA UN PROCESO DE APRENDIZAJE ONLINE CENTRADO EN EL ESTUDIANTE. Pixel-Bit. Revista de Medios y Educación, núm. 49.
[43] Ramón, A. (2015). Propuesta de un Modelo Teórico de Enseñanza para Entornos de Aprendizaje Móvil en las Enseñanzas Artísticas Visuales. Murcia. Recuperado el 13 de Marzo de 2021, de https://digitum.um.es/digitum/bitstream/10201/46665/1/Tesis%20Doctoral_Alfredo%20Jose%20Ramon%20Verdu.pdf
[44] Rizo Garcia, M. (2004). La comunicación como base para la interacción social. Aportaciones de la comunicología al estudio de la ciudad, la identidad y la inmigración. CONTEMPORANEA, 56.
[45] Salmon, C. (2008). Storytelling, la máquina de fabricar historias y formatear mentes. Barcelona: Península.
[46] Stallings, W. (2005). Sistemas operativos: Aspectos internos y principios de diseño. Madrid: PEARSON EDUCACIÓN, S.A.
[47] UNESCO. (2002). Information and Communication Technologies in Education. Recuperado el 09 de Mayo de 2021, de https://unesdoc.unesco.org/ark:/48223/pf0000129538
[48] UNESCO. (2012). APRENDIZAJE MÓVIL PARA DOCENTES EN AMÉRICA LATINA. Obtenido de https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmarcdef_0000216081_spa&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/a

ttach_import_897f299e-6eaf-466e-b5b3-8cd747ee93c2%3F_%3D216081spa.pdf&locale=es&multi=true&ark=/ark:/482

[49] UNESCO. Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2009). Directrices sobre políticas de inclusión en la educación. Obtenido de https://unesdoc.unesco.org/ark:/48223/pf0000177849_spa